Laura Nogueira Sánchez

Morphosyntactic transfer in L3 English beyond the initial stages

A study of 2L1 speakers of Catalan and Spanish

Master's thesis in English linguistics and language acquisition
Supervisor: Anne Dahl

June 2020

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NTNU
Kunnskap for en bedre verden

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Abstract

This study investigates morphosyntactic transfer in the acquisition of English as an L3 by bilingual (2L1) speakers of Catalan and Spanish. Several previous L3A studies have focused on the same population, but most have only recruited participants in the initial stages of L3A, whereas this thesis concentrates specifically on how previously acquired languages can influence the L3 beyond the initial stages. Additionally, this thesis also examines two groups of morphosyntactic properties which have not been studied before in this population: (1) locative, projective, spatial prepositions (LPSPs) followed by a pronoun and (2) hodiernal structures. Causative structures, which one study of the initial stages had previously examined, are also included in this thesis. The main aim of the present study is to establish whether only one or both of the previously learned languages can influence the L3. Since previous studies have only found evidence of transfer from Catalan, the main hypothesis of the present study is that transfer from Catalan in the aforementioned properties can be detected beyond the initial stages, especially among participants who are less proficient in English.

Three groups of participants took part in the study: L3 learners of English who were 2L1 speakers of Catalan and Spanish, L2 learners of English who were L1 speakers of Spanish, and L1 speakers of English (who acted as a control group). The L3 and L2 groups were divided into smaller subgroups according to their English proficiency. All groups completed an acceptability judgment task (AJT) in English and a background questionnaire. Additionally, the L3 and L2 groups were asked to complete AJTs in their respective L1s.

Though the results showed evidence of transfer, establishing the source of transfer was impossible in most cases except one: there was evidence of transfer from Spanish in one of the LPSP conditions, which we call *of+obq* (*behind of me). Additionally, the results of the present study, in combination with those of Puig-Mayenco & Marsden (2018), suggest that transfer from both Catalan and Spanish is possible in L3A beyond the initial stages of acquisition, as posited by the Linguistic Proximity Model (Westergaard et al., 2017) and the scalpel model (Slabakova, 2017). Furthermore, since one condition which was expected to be unacceptable in Spanish turned out to be acceptable in the Spanish grammar of the L3 group, the present study highlights the importance of testing the properties of the learners' prior languages in L3 research.

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List of abbreviations and acronyms

2L1	simultaneous bilingual
AJT	Acceptability Judgment Task
BLP	Bilingual Language Profile
CEFR	Common European Framework of Reference for Languages
CEM	Cumulative Enhancement Model
CLI	cross-linguistic influence
DP	determiner phrase
L1	first language
L1A	first language acquisition
L2	second language
L2A	second language acquisition
L3	third language
L3A	third language acquisition
Ln	any language acquired after the L3
LnA	acquisition of a language after the L3
LPM	Linguistic Proximity Model
LPSP	locative, projective, spatial preposition
NSD	Norwegian Centre for Research Data
NTNU	The Norwegian University of Science and Technology
SD	standard deviation
SP	spatial preposition
TPM	Typological Primacy Model
UG	Universal Grammar
V2	verb second

1. Introduction

This study focuses on third language acquisition, specifically morphosyntactic transfer. While first (L1) and second language (L2) acquisition have been studied for decades, the field of third language (L3) acquisition is relatively new in comparison. The term "third language acquisition" (L3A) refers to the process in which someone who has already acquired two different languages acquires a third one. Until the mid-2000s, the acquisition of an L3 was implicitly considered to just another instance of L2 acquisition (Rothman et al., 2019). In recent times, however, researchers have begun to differentiate between L2 and L3 acquisition, and new questions have been formulated (ibid.).

One of the most prominent questions in L3A concerns the influence of the two previously acquired languages on the third. Is it only the L1 that can influence the L3? Is it only the L2? Or is it both? If it is the latter, which factors determine the influence of each language on the L3? The main aim of this thesis is to examine the unfolding of L3A beyond its initial stages.

The present study examines morphosyntactic transfer in bilingual speakers of Catalan and Spanish who are L3 learners of English. Several authors have already studied L3A on the same population, but this thesis concentrates on different morphosyntactic properties, which can be categorised in three subgroups: (1) structures containing locative, projective, spatial prepositions (LPSPs) followed by a pronoun, (2) causative structures, and (3) hodiernal structures. The overarching hypothesis for all examined properties is that evidence of transfer effects from the initial stages of L3A will be observable in later stages, especially in speakers whose L3 English proficiency is lower.

1.1. Catalan, Spanish, and English in Catalonia

Of the languages involved in this thesis, Catalan might be relatively unknown to some readers, which is why most of this section will revolve around this language and its current status. Towards the end of this section, the status of Spanish and English in Catalonia will also be discussed. All the information presented in this section is important to contextualise

the conditions used in the experiment carried out for this thesis, as well as the results and the discussion.

Catalan is a Romance language with around 9,195,000 speakers (Posner & Sala, 2019). Most of its speakers reside in Spain, where it is spoken in several regions: Catalonia, the Valencian Community, Carxe (in Murcia), the Balearic Islands, and Franja de Ponent (in Aragon) (Pradilla, 2001). It is also spoken in France (in the northern area of the Pyrenees), Andorra, and Italy (in the town of Alghero, Sardinia) (ibid.). It is only an official language in Andorra (Posner & Sala, 2019); in Spain it is co-official with Spanish in the regions that are considered bilingual (Catalonia, Valencian Community, and Balearic Islands) (Ros et al. 1994). The vast majority of Catalan speakers are bilingual (2L1), with their other L1 being the main one of the state where they live, e.g. Spanish for those who live in Spain[1] (Wheeler, 2005).

There are several distinct dialectal groups in modern Catalan, all of which can be roughly divided into two groups: western dialects and eastern dialects. Western dialects include North-Western Catalan and Valencian, while eastern dialects include North Catalan, Central Catalan, Balearic, and Alguerese (Pradilla, 2001). Central Catalan, which is the dialect spoken roughly in the eastern half of Catalonia, is the most relevant for this thesis. The different dialects outlined above differ both in terms of pronunciation and in terms of morphosyntax. These differences, however, do not affect the mutual intelligibility of the different dialects, which is quite high (Wheeler, 2005).

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[1] In the case of Andorrans, they speak either Spanish or French, or both, in addition to Catalan (Wheeler, 2005).
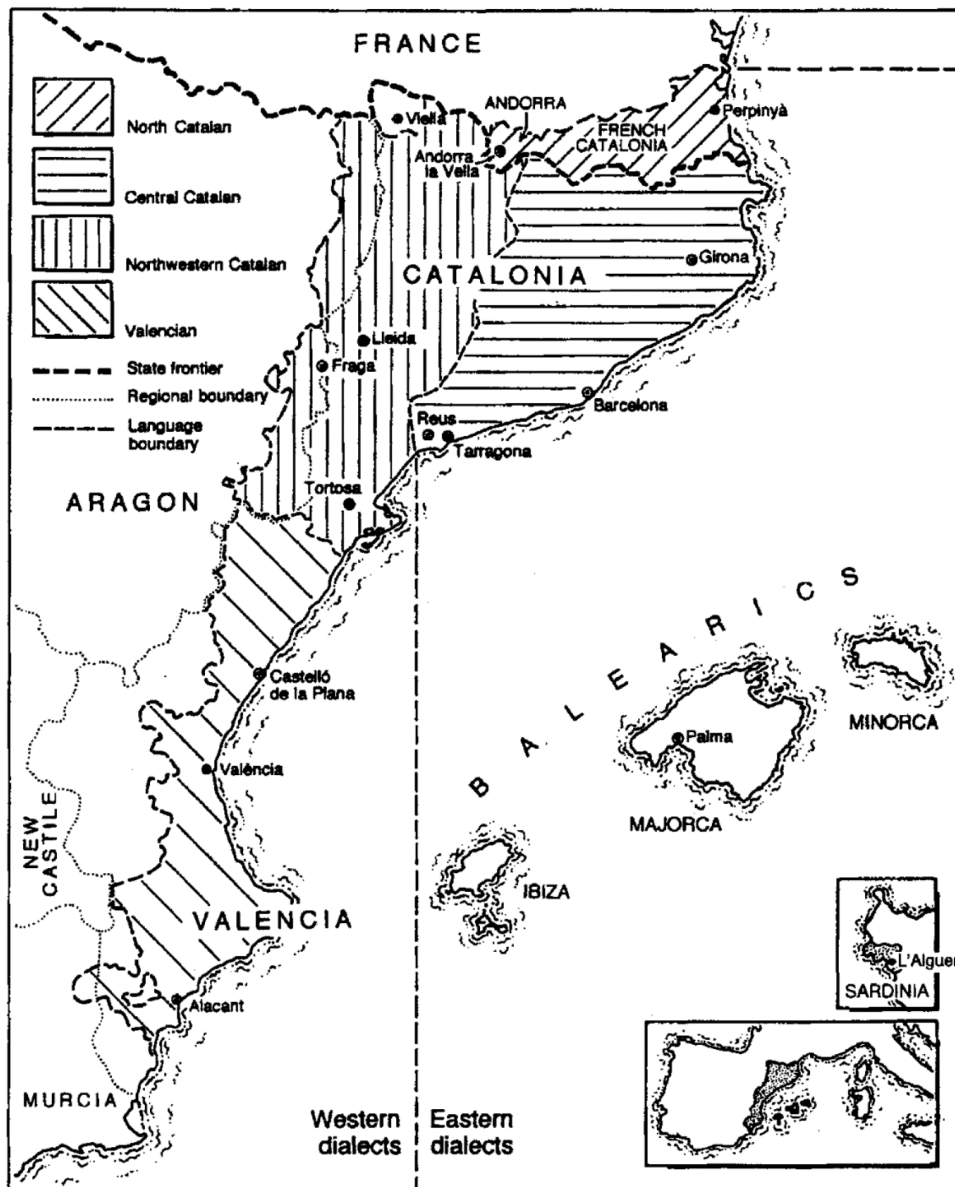
Figure 1. Catalan-speaking areas and dialects (from Wheeler et al., 1999)

Usage of the Catalan language in Spain, like other minority languages, was not allowed in the public sphere during the Franco Dictatorship (1939-1975) (Pradilla, 2001). This meant that, by the end of this period, the vitality of the language was severely threatened (Hoffmann, 1996). For example, only a little over 10% of the population was literate in Catalan (Muñoz, 2000). It was then, with Spain initiating its transition to democracy, that several institutions were created to preserve the Catalan language and improve its status (Pradilla, 2001). Laws were passed which reinstated the status of Catalan as a language present in public institutions, mass media, and education (ibid.). The minimum number of hours of Catalan in schools in Catalonia increased with the passing of several laws during the late 1970s and early 1980s, a

process which culminated with the introduction of the Catalan linguistic immersion programme in 1983. In this model, both teaching and communication is conducted in Catalan, with the exception of Spanish language classes and one other subject (ibid.). By 1993, this linguistic immersion programme was used in 88.8% of schools in Catalonia (ibid.).

According to a study conducted by the Catalan government in 2018, 94.4% of the population in Catalonia can understand Catalan, though only 81.2% can speak it and 65.3% can write in it (Generalitat de Catalunya, 2019). In contrast, as shown in the same study, almost 100% of the population can understand Spanish (99.8%), speak it (99.5%), and write in it (97.6%). When it comes to linguistic attitudes, the study reveals that 31.5% of the population of Catalonia see Catalan as their L1 while 52.7% report L1 Spanish (ibid.). Only 2.8% of the population consider both Catalan and Spanish their L1s, while the rest report other languages or language combinations. In the metropolitan area of Barcelona, Spanish is the language used most often by 57.9% of the population, while 27.5% of the population claim that they use Catalan the most (ibid.). The situation is similar in the regions of Tarragona and Penedès but reversed in other regions of Catalonia: in most areas, over 50% of the population claim to use Catalan most often (ibid.). It is worth noting, however, that the areas where Catalan is used the most are also the least densely populated (Idescat, n.d.). Overall, these data suggest that, though Catalan and Spanish have a more similar status compared to a few decades ago, Spanish is still predominant in some Catalan-speaking areas.

Additionally, according to the same 2018 study cited above (Generalitat de Catalunya, 2019), English is the foreign language that residents of Catalonia are the most familiar with: 45.8% of those older than 15 understand it, and 37.5% can speak it (ibid.). These numbers might seem surprising given the higher prevalence of English as a foreign language in other European regions. However, this can be explained by the fact that most of the older generations were not taught English in school, but French, which was more popular at the time (Muñoz, 2000).

It is important to note that the variety of Spanish spoken in Catalonia is considered a variety on its own, which deviates in some ways from other varieties of Spanish (Sinner, 2004). As Sinner (2004, p. 623) remarks, the particularities of the dialectal variety of Spanish spoken in Catalonia have often been described as "violations of the norm" caused by the influence of Catalan on Spanish. This used to be the case especially before 1990 (Galindo i Solé, 2006). Even Catalan speakers themselves tend to have a negative perception of the Spanish spoken

in Catalonia, and most do not consider it a dialect in its own right (ibid.). However, more recent studies consider that some features of the dialect of Spanish spoken in Catalonia can be attributed to the evolution of Spanish rather than the direct influence of Catalan, though contact with Catalan might accelerate the observed changes (cf. Galindo i Solé, 2005).

Even though the current sociolinguistic situation in Catalonia ensures successful bilingualism in Catalan and Spanish in nearly all cases (Puig-Mayenco et al., 2018, p. 2), several studies have detected differences between Catalan-dominant and Spanish-dominant bilinguals. For instance, a study by Perpiñán (2017) found that, among Catalan-Spanish bilinguals, Spanish-dominant bilinguals and balanced bilinguals displayed optional omission of specific Catalan clitic pronouns (*en* and *hi*, which exist and cannot be omitted in Catalan, but do not exist in Spanish), while Catalan-dominant bilinguals did not.

In conclusion, the linguistic situation of Catalonia makes it a useful target for L3A research. In fact, several L3A studies that have already been published focus on 2L1 Catalan/Spanish speakers with English as an L3 (for further details, see table 1 in section 2.4.4).

2. Theoretical background

This section will provide an introduction to the field of third language acquisition (L3A) and the conditions used in this study. One subsection is devoted to discussing the particularities associated with the study of bilinguals, as it is within the scope of this thesis. Then, the discussion will turn to morphosyntactic transfer within third language acquisition, including a description of the most prominent theories of morphosyntactic transfer in L3A. Some theories are discussed more thoroughly than others based on their relevance for the present study. Finally, the three groups of conditions relevant for this study are introduced.

2.1. What is third language acquisition?

To understand third language acquisition, we must first discuss language acquisition as a whole. The term "language acquisition" refers to any process where a human starts out not speaking a language and ends up speaking it. This definition, while technically true, obscures the complexity of the language acquisition process and the nuances behind the term. Specifically, there are two remarks to be made.

First of all, the initial state of language acquisition has been a very prominent point of discussion in the field. The main debate, usually referred to as the nature-nurture debate, is whether humans are born with some sort of innate linguistic knowledge or language-specific mechanisms, or whether language is acquired entirely from scratch (Karmiloff & Karmiloff-Smith, 2001). Proponents of the first option state that every human has access to Universal Grammar (UG), and that this knowledge is innate. UG is defined by Chomsky (1981) as a combination of principles and parameters. In the context of UG, the term "principles" is used to refer to any attribute which is common to all human languages (like having verbs), and the term "parameters" refers to the features that human languages can have (like being pro-drop) (Clark & Lappin, 2011). The principles and parameters of UG are said to act as constraints that support the process of language acquisition for babies acquiring their L1 (Karmiloff & Karmiloff-Smith, 2001). Additionally, there is evidence that suggests that UG can play a role in both second and third language acquisition (White, 1989; Leung, 2009).

Secondly, the initial state of language acquisition must also be considered in terms of the speaker's background. A baby who is learning their L1 has no prior knowledge of any other languages, while an adult language learner can already speak at least one other language (Bardel & Falk, 2012). Therefore, while it can be hypothesised that previous linguistic knowledge may be While this may seem like a trivial (and possibly, quite obvious) point to make, the reality is that the background of the speaker can completely alter how language acquisition is analysed and from which perspectives. For this reason, language acquisition is often discussed in three separate groups: first language acquisition (L1A), second language acquisition (L2A), and third language acquisition (L3A). In some of the literature, the acquisition of additional languages after the L3 is often discussed together with L3A (e.g. Rothman & Halloran, 2013). Additional languages acquired after the L3 are sometimes labelled Ln.

First language acquisition is the process of acquiring one's native language, while second, third or n language acquisition refer to languages acquired after the L1. Meisel (2008) states that L2 learners very rarely attain native-like competence, something which can likely be extended to the L3 and Ln as well. There are also some differences between L2 and L3/n acquisition, as listed by Bardel and Falk (2012). Firstly, one must consider that, at the beginning of L2A, the speaker starts out knowing just one language (their native one), while learners of an L3/n already speak at least one more. For this reason, L3/n learners are assumed to have previous experience with the process of consciously acquiring a language while L2 learners are not, since L1A begins very early in life and most of it is carried out in a natural setting as opposed to a classroom setting. Bardel and Falk (2012) also claim that L3/n learners might have more metalinguistic awareness due to this. Furthermore, L3/n learners are said to have acquired learning strategies during L2A that can be reapplied to L3A (ibid.).

2.2. Prominent issues in research involving bilinguals

In the final paragraph of the previous section there was one key assumption which should not be overlooked. Most of the advantages that are said to apply during L3A only apply if the L2 has been acquired later in life. However, simultaneous acquisition of the L1 and the L2 is possible, wherein both languages are acquired roughly at the same time (Meisel, 2008). In this case, the L2 would have been acquired similarly to the L1, thus eliminating most of the advantages cited above for L3A. This is not an isolated case, but rather something that

happens to a considerable amount of people around the world, and even whole communities. In fact, one of the demographic groups on which this thesis is based acquired two L1s simultaneously (see section 1.1 for further details). When two languages are acquired simultaneously as L1s, they are referred to in the literature as 2L1. In contrast, the acquisition of two languages in succession, one after the other, is called "successive acquisition" (Meisel, 2008). This distinction in the chronology of acquisition has not received much attention in the past, but it appears to be attracting more attention in the recent literature (e.g. Rothman 2015). Additionally, some recent papers have highlighted the problem of defining by what age L2A should have begun in order to be considered simultaneous with L1A. Edwards (2008) states that some authors consider that the limit should be set between ages three or four, though he calls this statement "arbitrary". Indeed, a closer examination of existing studies reveals that there does not seem to be a consensus regarding the requirements to define someone as a simultaneous bilingual. This poses an issue because the chronology of acquisition of an individual's languages is highly relevant in L3A research. Therefore, it should be carefully documented and taken into account. According to Edwards (2008), some other factors that should be considered when testing bilinguals are:

- Language competence
- Proficiency in all relevant communication skills (reading, listening, writing and speaking)
- Dominance of each language in each individual
- Linguistic distance between the two languages
- Linguistic attitudes

Furthermore, an important note that Edwards (2008) makes is that the reliability of self-reporting to measure an individual's bilingualism can be greatly impaired by factors such as the variation of the definition of competence among individuals and the willingness to rate one's own proficiency in an accurate, unbiased way. It is for this reason that self-reporting was only used as a secondary measure in this study (refer to section 3.3.1 for further details).

The very definition of bilingualism can be problematic, as not all authors agree on what exactly constitutes bilingualism. Establishing exactly how much knowledge of the two languages is required to define someone as a bilingual is a complicated task. In fact, there may not be a one-fits-all solution, as bilingualism may be defined (and therefore, measured) differently depending on the context. It is probably more productive to consider the different

possible definitions of bilingualism one can adopt as a spectrum. Bloomfield's (1933) definition would be on one end of the spectrum, as it describes a bilingual as someone with "native-like control of two languages" (Bloomfield, 1933, p. 56). As Butler and Hakuta (2004) point out, the main issue with this definition is its strictness, as well as the inherent difficulty of establishing what "native-like" means. On the other end, there is Haugen's (1953) view, according to which any individual capable of producing "complete meaningful utterances in the other language" is considered bilingual. This is, unquestionably, a much broader definition, and one which would allow us to classify even relatively new learners of a language as bilinguals. It is therefore crucial to keep in mind that the definition of "bilingual" can vary substantially among studies. In the case of the present thesis, the participants who are L3 speakers of English are described as Catalan-Spanish bilinguals due to the sociolinguistic context they grew up in (see section 1.1), and many of them would most likely fit into Bloomfield's (1933) strict definition.

2.3.   Transfer in language acquisition

Transfer is a key phenomenon in L2 and L3/n acquisition. It is an effect that has been attested in speakers of several languages, wherein the acquisition of the target language is influenced by "the similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired" (Odlin, 1989, p. 27). Transfer can have two possible outcomes: it can be positive, leading to correct use of the target language, or negative, leading to incorrect use of the target language[2] (Weinreich, 1953). It is also important to note that some authors use the term *cross-linguistic influence* (CLI) instead of *transfer.* While some consider transfer and CLI to be synonyms (e.g. Odlin, 2003), others treat them as different terms. According to Rothman et al. (2013, p. 380), the concept of transfer is meant to describe "the impact of the first language on the second" (or successive languages), while CLI was introduced to account for the idea that any language can influence other languages in acquisition; for instance, the influence of the L2 on the L1. Unless otherwise stated, both terms are treated as synonyms throughout the present thesis for the sake of simplicity.

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[2] Positive transfer is also often referred to as "facilitative transfer", and negative as "non-facilitative transfer". Both terms are used interchangeably in the present study.

In L2A, transfer from the L1 to the L2 is a widely attested phenomenon, though there is no consensus in the literature as to what can and cannot transfer (White, 2003). In general, the proposals that have been put forward to explain transfer in L2A can be divided into two groups: those that posit that the L1 grammar transfers fully, such as the Full Transfer Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996), and those that state that transfer from the L1 to the L2 is only partial, such as the Minimal Trees Hypothesis (Vainikka & Young-Scholten, 1996).

Transfer has one added layer of complexity in L3A: since both the L1 and the L2 may be hypothesised to transfer, the source of transfer and how it is selected are also major points of discussion. Some authors have stated that similarities between languages lead to positive transfer and, likewise, differences between languages lead to negative transfer, but predicting transfer is not so straightforward (Gass, 1996). To illustrate this point, consider the 2006 study by Bohnacker. In it, two groups of Swedish L1 speakers who were learning German were compared: one of the groups had already acquired English as an L2, so German was their L3; the other had not and thus German was the L2 in this case. The study focused on the V2 (verb second) rule, which is present in Swedish (Teleman et al., 1999) and German (Haider, 2010), but not English (ibid.). When the V2 rule is present in a clause, as is the case with main clauses in German, the second constituent of the clause must be a verb (Matthews, 2014). The results of Bohnacker's (2006) study showed that the group that had German as an L2 followed the V2 rule in German with very few issues, while the group that spoke English as an L2 and German as an L3 violated the V2 rule 45% of the time. This counterintuitive outcome shows that "L2 knowledge of a non-V2 language (English) may obscure [...] V2 transfer" (Bohnacker, 2006, p. 444).

Several linguistic and extralinguistic factors have been theorised to influence the source of transfer in L3/n acquisition, for instance:

- Recency of contact with a particular language (Williams & Hammarberg, 1998).
- Order of acquisition (Bardel & Falk, 2007).
- Level of proficiency, both in the L3 and the previously acquired languages (Bardel & Lindqvist, 2007).
- Cognitive similarity, i.e. the idea that the L2 and the L3 are cognitively more similar than the L1 and the L3 (Bardel & Falk, 2012).

– Typological proximity, i.e. how similar the linguistic features of the languages involved are (Rothman & Cabrelli Amaro, 2010).

Transfer can affect any aspect of language, from pragmatics and rhetoric to phonetics or orthography (Odlin, 2003). The work presented here will focus exclusively on morphosyntactic transfer.

2.4. Models of transfer in third language acquisition

This section introduces several models of morphosyntactic transfer in L3A. To begin, it is helpful to observe that any possible model that could be proposed could be reduced to one of the following claims:

– There is no transfer.
– The L1 has a privileged role in transfer.
– The L2 has a privileged role in transfer.
– Both the L1 and the L2 may have a role in transfer.

These basic claims are used to classify the models discussed below, with the exception of the first one (no transfer), as the scientific community at large considers that such a model cannot be fruitful given the available evidence (Rothman et al., 2013).

2.4.1. The L1 has a privileged role in transfer

Several studies in the literature provide evidence that the L1 can influence the L3. Take, for example, the 2010 study by Hermas, which studied learners of L3 English who spoke Moroccan Arabic as an L1 and French as an L2. The results showed that the initial state of L3 English was only influenced by the L1 (Moroccan Arabic).

However, as noted by Slabakova (2017), none of the studies that have found evidence of L1 transfer into the L3 show unequivocal evidence that the L1 has a privileged role in transfer, as the properties they examined had not been successfully acquired in the L2. Additionally, no formal models of exclusive L1 transfer have been proposed (Slabakova, 2017), and it is important to keep in mind that finding evidence of transfer from the L1 to the L3 in certain language combinations does not mean that this holds for every language combination (see

Bohnacker, 2006, for a counterexample). In conclusion, it is apparent that the L1 does not have a privileged role in transfer in the acquisition of third and successive languages.

2.4.2. The L2 has a privileged role in transfer

As a counterpoint to the previous section, some authors have proposed the opposite: that the L2 may have a privileged role in transfer. The L2 status factor (Bardel & Falk, 2012) is a prominent example. The model is based on the claim that the L2 is cognitively closer to the L3. Note, however, that according to the authors themselves this model is only relevant to those who have acquired their L2 in formal settings as adults. This means that it cannot be applied when the L2 has been acquired before adolescence, including cases of 2L1.

The authors claim that L3 learners, having already been in contact with at least one language in addition to their L1, are more aware of the language learning process. Furthermore, they will have acquired a set of learning strategies during L2 acquisition that can be reapplied during L3A. In addition, they claim that the L2 can be considered cognitively closer to the L3 because they tend to share characteristics that the L1 does not have:

- Age of onset
- Outcome
- Learning situation
- Degree of metalinguistic knowledge
- Learning strategies
- Degree of awareness of the language learning process

These assertions are supported by means of the neurolinguistic framework put forward by Paradis (2004, 2009), according to which all late-learned languages rely mostly on declarative memory while the L1 is heavily sustained by procedural memory[3]. Bardel & Falk (2012) state that this could be an additional factor in making the L2 more likely to be a privileged source of transfer. Moreover, all these similarities are said to block transfer from the L1 to the L3, even if the L1 is typologically closer to the L3 than the L2 is. This effect has been used to explain the results of several L3A studies, such as Bardel & Falk (2007) and Bohnacker (2006).

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[3] With some exceptions, like vocabulary, which is sustained by declarative memory in this framework.

However, the model has one noticeable shortcoming: as mentioned above, it does not make predictions when the acquisition of the L2 has started before adolescence. Considering the current European education policies, for example, this could be seen as a considerable gap, as it is quite common for children to start learning a first foreign language during primary education (Hoffmann, 2000). The L2 status factor could not be used to predict the L3A of any individuals who acquired their L2 under such circumstances. This model has also received criticism for relying on Paradis's (2004, 2009) claims, which are considered controversial by some (cf. Rothman & Halloran, 2013).

It is worth mentioning that some recent papers about the L2 status factor acknowledge the possibility that the L1 may transfer occasionally. Falk et al. (2015) and Bardel & Sánchez (2017) posit that transfer from the L1 may be possible when the learner has a high degree of metalinguistic knowledge about the L1. Additionally, they also state that individual differences, such as working memory capacity, might be at play in cases where the L2 status factor fails to make successful predictions. These new claims, however, remain untested for the time being (Puig-Mayenco et al., 2018)

2.4.3. Both the L1 and the L2 may have a role in transfer

The theories discussed in this section do not postulate that transfer always comes from the L1 or the L2. Instead, they claim that transfer has the potential to come from the L1 or the L2, and that the final result can be influenced by several factors. "Potential" is a key word in this description. Imagine a scenario in which speakers of L1 Spanish and L2 English start learning Italian as an L3. After a while, they are tested to see if there is evidence of transfer from their L1 or their L2, and the results show that there is transfer from the L1. According to the theories in this section, in these hypothetical results would not indicate that only the L1 can be the source of transfer, but rather that the L1 realises its potential to transfer in this specific case, even though the L2 may do so as well in different circumstances. The theories discussed below differ mostly in two aspects:

- The possible sources of transfer: some models assume that only one of the previously known languages can act as the source of transfer (wholesale transfer), while others assume that transfer could come from either of the previously known languages (property-by-property transfer).
- The factors which are said to influence transfer.

2.4.3.1.   The Cumulative-Enhancement Model

According to the Cumulative-Enhancement Model (CEM) (Flynn et al., 2004), all previously learned languages may play a role in the acquisition of a new language. Specifically, all languages known by the speaker are assumed to be equally privileged and accessible, and they may enhance the process of language acquisition. The authors conducted a study which they present as favourable evidence, which focuses on the production of restricted relative clauses by speakers of L1 Kazakh / L2 Russian / L3 English. The study found that any previously learned language can influence L3A and that there are subtle differences between child L3A and adult L3A. Crucially, the results suggested that the previously learned languages either enhanced L3A or remained neutral, but did not affect it negatively.

The CEM does not contemplate negative transfer. This is problematic, as multiple studies have shown that negative transfer can occur even when there is an available option for positive transfer (see Bohnacker, 2006, for an example). However, even if the CEM cannot be considered a viable model, its authors do bring up an idea which can also be found in later models: the fact that transfer is not wholesale and, instead, happens on a property-by-property basis.

2.4.3.2.   The Typological Primacy Model

The Typological Primacy Model (TPM) states that, while transfer in the initial stages of L3A can potentially happen from either the L1 or the L2, it is always wholesale (Rothman, 2011). In other words, the TPM predicts that this transfer can only happen exclusively from one of the previously acquired languages, and never from both. Unlike the CEM, the TPM predicts both facilitative and non-facilitative transfer. Additionally, it posits that the language that transfers to the L3 is selected on the basis of psychotypological similarity. This means that, out of the previously learned languages, whichever one the speaker perceives (unconsciously) as being typologically closer to the L3 is the one that transfers. Specifically, Rothman (2015) proposes that the speaker's perception is based on these four cues (in order of relative influence):

1. Lexicon
2. Phonological/phonotactic cues
3. Functional morphology
4. Syntactic structure

Thus, according to the TPM, "the established linguistic system with the most detectable/usable structural crossover, at the highest levels of the cue hierarchy, at the earliest of timing at the very initial stages will be selected for complete transfer" (Rothman, 2015, p. 186). Additionally, Rothman (2015) claims that wholesale transfer in the initial stages could be a form of cognitive economy. In other words, the argument is that wholesale transfer might make it easier for the brain to initiate the process of L3A, since inhibiting one of the previously acquired languages might eliminate "redundancy in acquisition" and "lessen the cognitive burden of an additional grammar" (Rothman, 2015, p. 184). Westergaard et al. (2017) and Slabakova (2017) have challenged this view, stating that the opposite could be true: being able to access all previously learned languages could also be argued to be cognitively economical, and inhibiting one or more of them could be seen as more "costly in terms of processing resources" (Slabakova, 2017, p. 658).

The TPM has received some empirical support, for instance, from a study by Giancaspro et al. (2015) which focused on speakers of English, Spanish, and Brazilian Portuguese. All study participants were in the initial stages of acquisition of Brazilian Portuguese as an L3, but their linguistic backgrounds differed, and they were divided into three groups accordingly: (1) L1 English, L2 Spanish, L3 Brazilian Portuguese; (2) L1 Spanish, L2 English, L3 Brazilian Portuguese; (3) 2L1 Spanish/English[4], L3 Brazilian Portuguese. The study focused on differential object marking, an overt morphological case marking which is used to distinguish certain direct objects from other. In Spanish, differential object marking is used (with the preposition *a*). It does not exist in English or Brazilian Portuguese. All three groups took part in an acceptability judgment task, and all three rejected sentences with differential object marking in English, but their performance in Brazilian Portuguese did not match that of native speakers. Furthermore, all three groups showed evidence of negative transfer from Spanish, which is not in line with the CEM or the L2 status factor (since one of these groups had Spanish as their L1[5]). According to the authors of the study, these results could be explained by the TPM, as it predicts transfer from the most typologically similar language (in this scenario, this is assumed to be Spanish). This is probably a safe assumption, since Spanish and Brazilian Portuguese are Romance languages and English is not, making it very likely that they will be perceived as typologically similar (Rothman, 2015). However,

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[4] Participants in this group spoke heritage Spanish and had started learning English before the age of 7, which led the authors to categorize them as simultaneous bilinguals.

[5] The group of 2L1 Spanish/English speakers is not taken into account here because the L2 status factor only makes predictions for successive bilinguals.

one major hurdle for this and other studies claiming to support the TPM is that these results only prove that one specific property is being transferred, something which could also be used to support models that argue for structure-by-structure transfer (see the LPM and the scalpel model below). To obtain full support for the TPM, one would have to find empirical proof that, within a given language combination, only one of the previously learned languages can influence transfer for all applicable properties. On the other hand, the TPM could be disproved if there was empirical proof that transfer can be influenced by more than one of the previously learned languages depending on the property. As far as I am aware, research in this direction has been scarce, though Westergaard et al.'s (2017) description of the Linguistic Proximity Model contains one example of such research (see section 2.4.3.3 below for more details).

One could argue that the TPM, while it opens the door to a lot of important questions, has some shortcomings. For example, one limitation is the fact that it focuses solely on the initial period and provides no predictions for what might happen afterwards[6]. Furthermore, attempting to define the initial period is quite a complex issue in itself. In fact, as Westergaard et al. (2017) state, the exact limits of the initial period of L3A have not been clearly defined, which poses a serious issue for any attempts to find empirical support for or against the TPM. Additionally, even though the cues that Rothman (2015) suggests (see section 2.4.3.2) should theoretically cover all sorts of language combinations, there have been cases in which authors have found it difficult to apply them. For example, a 2018 study by Puig-Mayenco and Marsden found evidence of transfer from L1 Catalan into L3 English in participants that had Spanish as an L2. In this study, trying to ascertain whether Catalan or Spanish could be perceived as being closer to English turned out to be problematic. The main issue was that Catalan and Spanish highly resemble each other in all the measures proposed by Rothman (2015) (they are, after all, closely related). Ultimately, Puig-Mayenco and Marsden (2018) stated that vowel reduction could potentially act as a phonological cue: Spanish does not have vowel reduction, while Catalan and English do (although the vowel reduction process is different in Catalan and English, see Prieto et al., 2012). If true, this might lead speakers to unconsciously perceive Catalan as typologically closer to English, and not Spanish. However, Puig-Mayenco and Marsden (2018) also concede that there is no

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[6] Some studies (e.g. Foote 2009) have found evidence that suggests wholesale transfer based on typological similarity can have lasting effects beyond the initial stages.

empirical evidence that confirms that the suggestion that Catalan and English are perceived to be more similar is actually attested.

2.4.3.3. The Linguistic Proximity Model

The Linguistic Proximity Model (LPM) was proposed by Westergaard et al. in 2017. The LPM makes the two following main claims:

– Acquisition is cumulative and learners can access their previously acquired linguistic knowledge in its entirety at all times.
– Transfer in L3A is property-by-property and is influenced by similarities or overlaps between grammars, rather than general typological similarity.

The LPM has been compared to the CEM in that both models state that acquisition is cumulative but, crucially, the LPM predicts both facilitative and non-facilitative transfer while the CEM does not. It is easy to imagine how facilitative transfer may take place based on the two main claims above: if a structure in a learner's L3 is similar to one in their L2 (for example), the learner could make predictions based on that and transfer accordingly. That seems quite straightforward, but it might be more difficult to understand how non-facilitative transfer could take place. However, take the same example: since transfer is based on the learner's linguistic experience, insufficient L3 input could easily lead to non-facilitative transfer. Additionally, learners might mistakenly make incorrect assumptions about the similarity of certain properties, which would also lead to non-facilitative transfer.

Westergaard et al. (2017) provide some evidence as support for the LPM. Specifically, they report a study on the acquisition of word order of adverb-verb combinations and subject-auxiliary inversion in L3 English by 2L1 Norwegian-Russian speakers. The study hinges on the fact that, when it comes to adverb-verb combinations, English and Russian have the same word order and Norwegian differs; in contrast, subject-auxiliary inversion is a feature that English and Norwegian share and Russian does not have. In adverb-verb combinations, the authors found a significant difference between the performance of both L1 Russian speakers and Norwegian-Russian bilinguals compared to L1 Norwegian speakers. Interestingly, 2L1 speakers performed slightly below the L1 Russian speakers. The authors ascribe this to a presence of conflicting influence: facilitative influence from Russian and non-facilitative

influence from Norwegian. In subject-auxiliary inversion, some differences were observed between groups but none were significant.

The LPM has one major limitation, as acknowledged by Westergaard et al. (2017) themselves: the model may not make completely accurate predictions about the earliest stages of L3A, because learners may only be able to detect meaningful similarities after they have received some degree of exposure. According to the authors, it might be possible for transfer to be influenced by typological proximity in the initial stages, as posited by the TPM, and this influence might gradually shift as L3A progresses. As the authors put it: "as exposure to an L3 grows, CLI[7] should become more dependent on abstract structural proximity" (Westergaard et al., 2017, p. 677).

2.4.3.4.   The scalpel model

The scalpel model was proposed by Slabakova in 2017 and its main claim is that the process of L3A benefits from the combined grammars of the L1 and the L2. Like the LPM, this model rejects wholesale transfer, and hypothesises that transfer happens on a property-by-property basis. This claim stems from the assumption that the grammars of the acquired languages are divided into sub-grammars, which are tagged for differentiation purposes (see Amaral & Roeper, 2014). This prevents the L1 or the L2 from having a privileged role in transfer, and results in the grammars of both languages competing and influencing each other in L3A (Slabakova, 2017).

As mentioned in section 2.4.3.2, Slabakova remarks that the ability to access all previously learned languages can be considered economical for cognitive processing. Not only that, but she also points out that there is some empirical evidence that contradicts wholesale theories of transfer (see Bruhn de Garavito and Perpiñán, 2014). She also appeals to findings in multilingual lexical processing[8] which suggest that the mental lexicons of both the L1 and the L2 play a role in the acquisition of the L3 from the very start (see González Alonso, 2012). The scalpel model shares some characteristics with the LPM, as it posits that all previously learned languages can influence L3A and that transfer can be facilitative or non-facilitative. Slabakova (2017) acknowledges that L1 transfer, L2 transfer and perceived typology, as

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[7] The term "CLI" is used by some authors instead of "transfer". See section 2.3 for further information, including a discussion of the terms.

[8] These findings are related to the Parasitic Model (see Hall & Ecke, 2003)

posited by other models, can influence transfer in the L3, but she also states that there are other factors which can play a role, including construction frequency, prevalent use, the quality of L3 input, and structural linguistic complexity. She also notes that linguistic features that require negative evidence or for which evidence is insufficient may be challenging (or impossible, even) for learners to acquire.

The scalpel model, as the LPM, is quite recent, and few studies have directly tested its predictions so far. For an example, the reader can refer to Clements and Domínguez (2018), which examined the acquisition of null and overt subjects in the L3 Chinese of L1 English speakers with either Spanish, French, or German as an L2. Though the study used a relatively small sample size, the results appear to support both the scalpel model and the LPM.

2.4.4. Additional considerations

Puig-Mayenco et al. (2020) conducted a review of 71 studies on transfer in L3A which provides an exhaustive overview of the current state of L3A research. This review constitutes very clear evidence against the CEM, since over 90% of the studies analysed reported finding evidence of negative transfer. The results of the analysis[9] are also difficult to reconcile with L1 status and L2 status models: 14.1% of the studies showed evidence of L1 transfer but 28.2% showed evidence of L2 transfer. For this reason, neither the CEM nor L1 status and L2 status models are discussed any further in the present study. When it comes to the other models discussed above, the results of the review are not conclusive. Puig-Mayenco et al. (2020) found that 60.1% of the studies could be interpreted in favour of typological transfer, which is predicted by the TPM, but 23.9% of them showed evidence of hybrid transfer (coming from both the L1 and the L2), which is not predicted by the TPM, at least in the initial stages. This is further complicated by two points which have already been discussed above: (1) the TPM does not make predictions beyond the initial stages of L3A, and (2) the LPM and the scalpel model (which could be supported by studies that found hybrid transfer) are not as specific as the TPM in their predictions. Puig-Mayenco et al. (2020) also stress the importance of testing the status of the learners' grammar in the L2 in order to ensure that any L2 features that are hypothesised to transfer are indeed available for transfer. The study found

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[9] Note that the percentages discussed in this paragraph add up to more than 100% because the models analysed in this review can lead to overlapping predictions in some cases (see Puig-Mayenco et al. 2020 for further details).

that this was an issue with a few of the studies that were analysed, which can make it difficult to argue unequivocally in favour of or against a given model.

The specific combination and order of acquisition of the languages used in the present study has already been used to test the morphosyntactic transfer of different linguistic properties in several previous studies. Table 1 summarises them:

Table 1. Previous studies of morphosyntactic transfer on 2L1 Catalan/Spanish bilinguals with L3 English.

Study	Property	Outcome[10]
Puig-Mayenco, Miller, and Rothman (2018)	Negative quantifiers	Evidence of transfer from Catalan
Puig-Mayenco and Marsden (2018)	Negative polarity items	Evidence of transfer from Catalan
Gorgone (2018)	Definiteness effect and VSO/VOS word order	Evidence of transfer from Catalan
Puig-Mayenco and Rothman (2020)	Negative quantifiers and negative polarity items	Evidence of transfer from Catalan
Puig-Mayenco, Rothman, and Tubau (2019 [submitted])	Negative quantifiers and negative polarity items	Evidence of transfer from Catalan
González Alonso, Puig-Mayenco, Fábregas, and Rothman (2020 [submitted])	Differential object marking, determiners preceding proper nouns, VSO word order, structures of the type causative verb + DP + infinitive	Evidence of transfer from Catalan

Crucially, most studies listed in table 1 focused on learners who were in the initial stages of acquiring their L3. The aim of the present study, therefore, is mainly to go beyond the initial stages of third language acquisition to hopefully help obtain a more comprehensive picture of the entire process of L3A.

2.4.5. Summary

In the previous sections, we have discussed several models of morphosyntactic transfer in L3A. Three of them have received a considerable amount of disconfirming evidence, so they

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[10] Some of these studies do have results that would be compatible with transfer from Spanish (e.g. Gorgone 2018), but none of them are conclusive in that regard.

will not be discussed any further in the present thesis: L1 status, L2 status, and the CEM. Our review of the existing literature suggests that both previously learned languages may transfer in L3A, and that transfer can be both facilitative and non-facilitative. Thus, only the remaining models (TPM, LPM, and scalpel model) are relevant in the following sections.

2.5.   The conditions used in this study

2.5.1. Locative, projective spatial prepositions

The main phenomenon that this thesis will examine is the syntax of prepositional phrases headed by a spatial preposition (SP) which also contain a pronoun (e.g. "above me"). The reason why spatial prepositions were selected as the main focus of the experiment is that they make it possible to test two morphosyntactic properties at the same time. On one hand, pronouns which follow a spatial preposition are typically used in their possessive form in Central Catalan, which is not the case for Spanish or English. On the other hand, Spanish spatial prepositions must generally be followed by the preposition *de* ("of"), which is typically not the case with most English or Catalan spatial prepositions. Specifically, English SPs and their complementizing pronouns can take three different structures depending on the preposition at hand:

(1)   a. in front/in back *(of) the house

             b. inside (of) the house

             c. below/beyond/behind (*of) the house

<div align="right">(examples from Terzi, 2010, p. 17)</div>

Prepositions like the ones shown in (1a) are called "complex prepositions" (Quirk et al., 1985, p. 665) and are not included in the present study. For the SPs involved in the present study, (1c) is the most common structure, though (1b) is also be included.

Before proceeding, however, two things must be noted. First, a review of the literature on this subject reveals that several different terms are used to describe spatial prepositions in the languages of interest for this thesis. In Catalan and Spanish, some authors use the term "locative adverb" (Hernanz i Carbó & Rigau i Oliver, 2007; Salgado & Bouzouita, 2017). Others use the term "prepositional adverbs" (AVL, 2006). Yet other sources do refer to them

as prepositions (IEC, 2018; Sancho Cremades, 2008). The reader should keep this in mind when consulting the literature and note that there can appear to be discrepancies. Secondly, this thesis will only concentrate on locative, projective SPs (e.g. "above"). Locative SPs as described by several authors (e.g. Jackendoff, 1983)[11] are those that denote a static location, as opposed to directional ones (e.g. "through"), which denote movement. Within locative SPs, a further subdivision is possible between projective and non-projective SPs. Projective SPs denote location as expressed along an axis or projection, while non-projective SPs only express topological information (e.g. "on") (Ursini, 2015). From now on, we will use the abbreviation LPSPs to refer to locative, projective spatial prepositions.

2.5.1.1.   LPSPs and pronouns in Catalan

The following list contains some examples of LPSPs in Catalan:

- *dins*, *dintre* (inside)
- *fora* (outside)
- *darrere*, *rere* (behind)
- *davant* (before, in front of)
- *damunt*, *sobre* (on top of, on, above)
- *sota*, *davall* (under, below, underneath)
- *lluny* (far, away)
- *prop* (close, near)

<div align="right">(list extracted from IEC, 2018)</div>

For the purposes of this thesis, we must also consider some compound prepositions made up of a preposition, a determiner and a noun. In some cases, these expressions are the only ones available to express certain semantic content related to location. For example, consider the following prepositional phrase:

(2)   *al voltant*

            at-the surrounding

            "around"

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[11] See Meilán García (1998) for a discussion of Spanish SPs.

Both LPSPs and compound prepositions like (2) can be followed by pronouns and, in Catalan, these pronouns can be possessive pronouns or personal pronouns with oblique case (Todolí, 2008). In the latter case, the preposition "of" must be used between the LPSP and the pronoun[12] (ibid.), as shown in (3).

(3)　　　a. *dintre nostre*

inside ours

"inside [of] us"

b. *dintre de nosaltres*

inside of us

"inside [of] us"

<div align="right">(examples extracted from Hernanz i Carbó & Rigau i Oliver, 2007, p. 114)</div>

Option a in (3) (from now on, "the possessive variant") is much more prevalent in the Central Catalan dialect, while option b in (3) (from now on, "the oblique variant") is considered unnatural in most cases by speakers of this dialect (Hernanz i Carbó & Rigau i Oliver, 2007). In contrast, the oblique variant is preferred in the Valencian dialect (ibid.), which is spoken in the Valencian Community. In the Balearic dialects, spoken in the Balearic Islands, the possessive variant is also unusual (see Rull i Muruzàbal, 2020). Granted, there are some exceptions in Central Catalan: "lluny" (far) and "fora" (outside), which license the oblique variant rather than the possessive (IEC, 2018). Another point worth mentioning is that the oblique variant is also more common when the pronoun refers to a third person, either singular or plural (ibid.). This might be due to the fact that the possessive form of the third person singular and plural is the same, both for masculine and feminine possessors. Therefore, speakers might be more inclined to use the oblique variant when the third person is involved to avoid ambiguity. For example, *davant seu* can mean "in front of him", "in front of her", "in front of them", or "in front of you" (in the polite form *vostè*). Using the oblique variant renders several different options as listed in (4) and ensures clarity.

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[12] It is also worth noting that in Balearic dialects, the preposition "of" (*de*) is not necessarily required, e.g. *darrera mi* (behind me) (Moll, 1952/2006).

(4)   a. *davant d'ell*: "in front of him"

              b. *davant d'ella*: "in front of her"

              c. *davant d'ells*: "in front of them" (masculine or generic)

              d. *davant d'elles*: "in front of them" (feminine)

              e. *davant de vostè*: "in front of you" (polite form)

Another construction, which can be licensed only by a subset of these prepositions in the Central dialect, is the following: determiner + possessive pronoun + preposition (see (5)).

(5)   *Ho tenia al seu davant*

              CL had$_{[3sg]}$ at-the his/her front

              "He/she had it in front of him/her"

                            (Hernanz i Carbó & Rigau i Oliver, 2007, p. 115)

According to some authors (Plann 1984, Pavón 1999), this is possible because the prepositions that license the syntactic structure shown in (5) retain certain nominal properties. In contrast, such structures are not possible in the Valencian dialect (Hernanz i Carbó & Rigau i Oliver, 2007).

While analysing the literature on the subject, it became apparent that there was a lack of empirical data in the literature regarding the usage of LPSPs in the two different variants when compared to Spanish. For this reason, it was decided that an exploratory search in a corpus would help solidify the background. The search was performed using the caTenTen14 v2 in October 2019, which is part of the TenTen corpus family (Jakubíček et al. 2013) and contained 182,691,653 words at the time. Several different structures containing an LPSP and a pronoun were searched. We found that the possessive variant was used much more than the oblique variant in most of combinations of LPSP + pronoun searched[13]. The only exceptions were found in cases where LPSPs were combined with a third person pronoun, which, as discussed above, makes the possessive variant ambiguous and thus makes it more likely for speakers to select the oblique variant. Even in those cases, the possessive variant still prevailed. Table 2 shows the results for the preposition *davant* (in front of). In cases where there were very few results for the oblique variant, a closer examination was conducted which showed that most results, if not all, came from texts written in the Valencian dialect.

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[13] The LPSPs used in the search were: *davant* (in front of), *sota* (under), *darrere* (behind), and *prop* (near).

Table 2. Results of the corpus search with the LPSP *davant* (in front of).

Person	Possessive variant	Oblique variant
1st person singular	292 (1.39 per million)	10 (0.05 per million)
2nd person singular	103 (0.49 per million)	9 (0.04 per million)
1st person plural	608 (2.89 per million)	33 (0.16 per million)
2nd person plural	55 (0.26 per million)	3 (0.01 per million)
3rd person singular and plural / 2nd person singular (polite)	347 (1.65 per million)	246 total (breakdown below)
3rd person singular masculine	n/a	77 (0.37 per million)
3rd person singular feminine	n/a	69 (0.33 per million)
3rd person plural masculine	n/a	67 (0.32 per million)
3rd person plural feminine	n/a	27 (0.13 per million)
2nd person singular (polite)	n/a	6 (0.03 per million)

Even though the search did not constitute a systematic corpus analysis, it supports the assumption that Central Catalan speakers favour the possessive variant of the pronoun in most cases when it occurs after an LPSP.

2.5.1.2. LPSPs and pronouns in Spanish

As opposed to Central Catalan, when LPSPs in European Spanish are followed by a pronoun, they are normally combined with the preposition "de" (of), forming a compound preposition. The pronouns that follow these compound prepositions are always used in the oblique form. See (6) for an example:

(6)   *[…] y la cabra corría detrás de nosotros.*
        and the goat ran behind of us
        "[…] and the goat ran behind us"

(example extracted from Gómez Molina, 2005, p.88)

The structure illustrated in (3a) above for Catalan (the possessive variant) is also present in European Spanish, though it is generally perceived as less acceptable by most speakers, and classified as incorrect by prescriptive sources (RAE, 2009), with some exceptions (see (7) below). Interestingly, this is not the case for some of the Spanish dialects spoken in Latin America, where the possessive variant is the most acceptable (Eddington, 2017). Even within Spain, usage is not completely homogenous. In some areas (namely Andalusia and Madrid), usage of the possessive variant appears to be more widespread than in others (Salgado & Bouzouita, 2017). Variation is also tied to individual prepositions, as well as the person that the pronoun refers to. For example, in a corpus study, Salgado and Bouzouita (2017) found that *alrededor* (around) was used in combination with a possessive pronoun 77% of the time, while others, like *detrás* (behind) were only followed by a possessive pronoun 22% of the time. In fact, several authors had previously observed that the possessive variant is deemed much more acceptable when combined with the phrases *al lado* ("next to"), *en torno* ("around") and *alrededor* ("around") (Casado Velarde, 1988; Silva Domínguez, 1995; Gómez Torrego, 2006). The reason for this is said to be the fact that these phrases are linked to the nouns *lado* ("side"), *torno* ("surrounding") and *rededor* ("surrounding"), respectively (Salgado & Bouzouita, 2017). As Salgado and Bouzouita (2017) remark, these are also the only locative expressions that allow anteposition of the possessive:

(7)   *Estoy a su lado*

         am at his/her side

         "I am next to him/her"

                                                            (extracted from Eddington, 2017, p. 47)

(8)   **se colocó en su detrás*

         CL got[3sg] in his/her behind

         "he/she got behind him/her"

                                                            (example extracted from González Calvo, 2006)

Note that, unlike in Central Catalan (see section 2.5.1.1), LPSPs in European Spanish appear not to have retained the nominal properties discussed by Plann (1984) and Pavón (1999). It is also worth noting that, while (8) would not be considered grammatical in European Spanish, it is attested in some dialects of Spanish spoken in Latin America. This mirrors the acceptability of the possessive variant, which is much higher in these Latin American dialects and in Central Catalan.

Salgado and Bouzouita (2017) also found that when the referent of the pronoun was the 3rd person (both singular and plural) speakers showed a very clear preference for the oblique variant over the possessive, irrespective of the preposition involved. However, part of these results could be explained by the fact that the possessive *suyo* in Spanish (his/hers) can be used for both masculine and feminine referents, both in the singular and in the plural, making it necessary to use the oblique variant if one wishes to avoid ambiguity[14] (Larsson & Bouzouita, 2018). See (9) and (10) for an example.

(9)   *María le dijo a Ramón que el libro estaba delante suyo*
        María CL told[3sg] to Ramón that the book was[3sg] in front of his/hers
        "María told Ramón that the book was in front of him/her"

(10)   *María le dijo a Ramón que el libro estaba delante de él*
        María CL told[3sg] to Ramón that the book was[3sg] in front of him
        "María told Ramón that the book was in front of him"

All in all, the acceptability of possessive pronouns after LPSPs in European Spanish can be said to be much lower than it is for Central Catalan.

2.5.2. Causative constructions

The acquisition of causative constructions in L3 English is also relevant for this thesis. In Catalan, DPs which refer to a causee cannot be placed between the main verb and the infinitive verb of sentences which express causation (Villalba, 1992, 1994; Alsina, 1992, 1996, 2002). In contrast, this is possible in Spanish (Torrego, 2010) and in English, as seen in (11).

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[14] Note that, as explained above, this is also the case for Catalan.

(11)   a. (Catalan) *Vaig fer (*a la Maria) comprar un cotxe **a la Maria**.*

             made[1sg] (to the Maria) buy a car to the Maria

             "I made Maria buy a car"

      b. (Spanish) *Hice (a María) comprar un coche.*

             made[1sg] (to María) buy a car

             "I made María buy a car"

      c. (English) I made Mary buy a car.

                  (Catalan and Spanish examples extracted from Puig-Mayenco et al., 2019.

                  The English example is a literal translation.)

This property was used in a previous empirical study of L3A by González Alonso et al. (2020), which focused solely on the initial stages. It was decided that it should be included in the present study for three reasons: (1) in order to test whether the results of González Alonso et al. (2020) could be reproduced beyond the initial stages, (2) so that it would provide an additional point of comparison, and (3) in order to better link the present thesis to the existing literature. As in González Alonso et al. (2020), this condition (causative verb + DP + infinitive) was contrasted with two other related conditions: causative verb + clitic/short pronoun + infinitive (see (12), (13), (14)), and causative periphrasis + clitic/short pronoun + infinitive (see (15), (16), (17)).

(12)   (Catalan) **El noi farà li arribar tard a la reunió.*

          The boy will-make CL[3sg, masc/fem] get late to the meeting

          "The boy will make him/her late for the meeting"

(13)   (Spanish) **El taxista hizo le pagar el doble*.

          The taxi driver made CL[3sg., masc/fem] pay the double

          "The taxi driver made him/her pay double"

(14)   (English) The girl made him wear a black t-shirt.

(15)   (Catalan) *El periodista va fer-li dir la veritat.*

          The journalist went made-CL[3sg, masc/fem] say the truth

          "The journalist made him/her tell the truth"

(16)   (Spanish) *La mujer va a hacerle pagar la cena*.

The woman goes to make-CL[3sg, masc/fem] pay the dinner

"The woman is going to make him/her pay for dinner"

(17)   (English) The doctor is making him write a book.

<div align="right">(all examples extracted from González Alonso, 2020, translations my own)</div>

2.5.3. Hodiernal sentences

The final group of conditions relevant for this study concerns the usage of the preterite and the present perfect in the hodiernal past (a term which is used to describe events that have taken place in a finished period within the course of the present day)[15]. After a review of the literature on the usage of the preterite and the present perfect in Spanish, it was established that, due to the ongoing shift of the Spanish language in Spain, it would be difficult to pinpoint the source of transfer in these contexts. Still, a decision was made to include these conditions in the study in order to take advantage of the theoretical background research that had already been done.

In English, sentences like (18) are considered "pragmatically odd" according to Howe (2009, p. 164):

(18)   ? John has arrived this morning

<div align="right">(Howe, 2009, p. 164)</div>

Comrie (1976) and McCoard (1978) among others specify that verbs in the English present perfect cannot be modified by locating time adverbials whose denotation does not include the time of utterance, as shown in (19). This phenomenon is known as the Present Perfect Puzzle (Klein, 1992).

(19)   a. *Chris has left York yesterday.
          b. *Chris has left at six.

<div align="right">(Klein, 1992, pp. 525 and 546)</div>

In Catalan, events that have happened in the course of the present day must be described using the *perfet de l'indicatiu*, a tense which is equivalent to the English present perfect

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[15] Note that the hodiernal reading does not include the recent past or "hot news" reading, which refers to very recent past events (Comrie, 1976). Xiqués Garcia (2015, p. 9) provides an example of the recent past reading in English: "The team has just won the match".

(Curell i Gotor, 1990; Pérez Saldanya, 2008). European Spanish, on the other hand, allows the usage of either the *pretérito perfecto* (equivalent to the present perfect) or the *pretérito indefinido* (equivalent to the past simple) (Alarcos Llorach, 2000), while the past simple is more widely used in English. Compare the examples below:

(20)　　*Hem anat al mercat avui a les deu.*

have[1pl] gone to-the market today at the ten

"We went to the market today at ten."

(adapted from Pérez Saldanya, 2008, p. 2593)

(21)　　**Vam anar al mercat avui a les deu.*

went[1pl] go to-the market today at the ten

"We went to the market today at ten"

(adapted from Pérez Saldanya, 2008, p. 2593)

(22)　　*No ha venido esta mañana.*

not has come this morning

"He/she did not come this morning"

(Alarcos Llorach, 2000, p. 167)

(23)　　*No vino esta mañana.*

not came[3sg] this morning

"He/she did not come this morning"

(Alarcos Llorach, 2000, p. 167)

The criteria which Spanish speakers use to select either the perfect or the preterite when speaking about the hodiernal past are not clear-cut. It seems that speakers tend to select the preterite to distance themselves temporally from the action being described, or to show that they perceive it as having taken place further away from the present (Alarcos Llorach, 2000; RAE, 2009). It is important to note that in some dialects of European Spanish, such as those spoken in Asturias and Galicia, the preterite is preferred in hodiernal situations, and the same is true of several Latin American dialects (Alarcos Llorach, 2000). According to a 2011 article by Kempas and López Samaniego, hodiernal constructions with expressions such as "this morning" seem to be undergoing a shift wherein the perfect is gradually becoming more acceptable than the preterite, while sentences which include the expression "x hours ago" or similar ones seem unaffected and select the preterite most of the time. This statement was tested in an experiment (Kempas & López Samaniego, 2011) which involved, among others,

Spanish speakers from Catalonia (who also spoke Catalan). These participants did show a higher preference for the perfect than other participants, but their responses were still in favour of the preterite overall. Another study, which recruited speakers from Madrid and Valencia (in Spain) showed that speakers consistently chose the perfect when narrating events from the present day (Howe, 2009). Howe (2009, p. 163) also states that speakers of European Spanish tend to favour the preterite in more formal contexts, since the preterite is considered "more standard". Additionally, several other studies (cf. Azpizu, 2014; Brucart & Xiqués Garcia, 2018) made a strong case for the shifting usage of the perfect in European Spanish, to the point where some speakers claim to find it acceptable even in prehodiernal contexts like in (24).

(24)   *Ayer he ido al cine*

         Yesterday have[1sg] gone to-the cinema

         "I went to the cinema yesterday"

<div align="right">(Kempas, 2006, p. 375)</div>

In conclusion, our review of the literature indicates that the present perfect is required in Catalan to describe hodiernal events, that both the perfect and the preterite are accepted in European Spanish, and that, in English, the preterite is generally preferred and is the only tense that is acceptable when the verb is modified by a locating time adverbial which does not encompass the time of utterance. Unfortunately, usage of the preterite and the perfect in European Spanish appears to be too varied and depends on too many factors to be used as the main starting point to determine the source of transfer in the L3 English of Catalan-Spanish bilinguals.

2.5.4. Summary

Table 3 summarises the conditions used for this study, as well as their acceptability in each of the languages involved. As stated before, note that "Catalan" here refers only to the Central dialect of Catalan, while "Spanish" refers only to the European variety. Exceptions are not taken into account in this summary, since they are accounted for in the study design.

Table 3. The conditions used in the present study and their acceptability.

	Condition (description and short name)	Example	Catalan	Spanish	English
LPSPs	LPSP + possessive pronoun (*poss*)	*behind mine	✓	✗ [16]	✗
	LPSP + of + oblique pronoun (*behind of me)	*behind of me	✗	✓	✗
	LPSP + oblique pronoun (behind me)	behind me	✗	✗	✓
Causatives	causative verb + DP + infinitive (*cv+dp*)	… made Fred laugh	✗	✓	✓
	causative verb + pronoun + infinitive (*cv+pro*)	… made him laugh	✗	✗	✓
	periphrasis + pronoun + infinitive (*per+pro*)	… was making him laugh	✓	✓	✓
Hodiernals	Perfect (*perfect*)	*Julia has arrived two hours ago	✓	✓	✗
	Preterite (*preterite*)	*Julia arrived two hours ago	✗	✓	✓

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[16] Even though the literature indicates that this condition might be acceptable in a few regions of Spain, we decided that it would initially be classified as not acceptable for two reasons: (1) there were no specific data about the acceptability of this condition in the variety of Spanish spoken in Catalonia, and (2) the condition is not acceptable in many dialects of European Spanish, as well as considered incorrect by prescriptive sources (see RAE, 2009). Additionally, all assumptions in this table, including this one, were tested as part of the present study (see section 0).

3. Hypotheses and methods

3.1. The present study and its hypotheses

The research question that this study tries to answer is: what does transfer beyond the initial stages look like in L3A? As discussed in section 0, authors like Slabakova (2017) have discussed the need for studies that deal with L3A beyond the initial stages. Additionally, the fact that a few studies on the same language combination and order of acquisition (2L1 Catalan/Spanish, L3 English) already existed provided a solid background for comparison, even though most of them focused on the initial stages.

After analysing the theoretical background, the main hypothesis of this study was formulated based on the TPM. While it is true that the TPM only makes predictions for the initial stages of L3A, it was the only one of the models discussed above that met the following criteria: (1) not having received definite disconfirming evidence and (2) providing clear enough guidelines to formulate well-defined hypotheses based on a specific language combination. Additionally, the TPM was deemed an adequate basis for the hypothesis because, as stated by González Alonso and Rothman (2017, p. 692), models of the initial stages do contain "implicit—if formally unarticulated—predictions" for further developmental stages, based on the hypothesised source of transfer in the initial stages. As established in section 2.4.3.2, the TPM would predict Catalan to be the source of transfer in the initial stages, as well as beyond the initial stages as long as the grammar of the L3 has not been reconfigured due to influence from Spanish or correct acquisition of L3 English.

Taking all the above into account, the main hypothesis for the L3 group is as follows: the only evidence of transfer effects carried over from the initial stages will be from Catalan. These effects will be stronger among the participants in our study who are less proficient in English. For each group of conditions, the specific hypotheses are as follows:

- In LPSP conditions, lower proficiency speakers will tend to over-accept *poss*, show target-like (low) acceptance of *of+obq*, and under-accept *obq*.

- When it comes to causative structures, lower proficiency speakers will tend to under-accept those that do not contain a periphrasis (*cv+pro* and *cv+dp*) and be close to target in their acceptance of *per+cl*, which does contain a periphrasis.
- In the hodiernal conditions, lower proficiency speakers will tend to over-accept the present perfect and under-accept the past simple.

Additionally, we can also posit that if the results of intermediate and high proficiency speakers deviate from those of lower proficiency speakers it will be in either of these two directions: they will either get closer to target-like acceptance or show evidence of transfer from Spanish which is not observable in the lower proficiency group.

Table 4 summarises what the implications would be for each condition based on the results of the L3 group in the English task:

Table 4. Implications of possible outcomes of the English task carried out by the L3 group.

Condition	Example	Implication if result differs significantly from L1 group	Implication if result does not differ significantly from L1 group
poss	*behind mine	negative transfer from Catalan	positive transfer from Spanish or no transfer
of + obq	*behind of me	negative transfer from Spanish	positive transfer from Catalan or no transfer
obq	behind me	negative transfer from Catalan or Spanish	no transfer
cv+pro	made me laugh	negative transfer from Catalan or Spanish	no transfer
cv+dp	made Gina laugh	negative transfer from Catalan	positive transfer from Spanish, or no transfer
per+pro	was making me laugh	-	positive transfer from Catalan or Spanish, or no transfer
perfect	*I have called my mother two hours ago	negative transfer from Catalan or Spanish	no transfer
preterite	I called my mother two hours ago	negative transfer from Catalan	positive transfer from Spanish or no transfer

3.2. Participants

Three separate groups of participants were recruited for this study. Participants in the main group of interest were 2L1 speakers of Catalan and Spanish with L3 English (from now on "the L3 group", for simplicity). The other two groups were speakers of L1 Spanish L2 English (from now on, "the L2 group"), and speakers of L1 English (from now on, "the L1 group"). There was one additional requirement for the L2 group, which was that they should have mostly been exposed to European Spanish, and not other varieties. The reason for this is that some of the conditions examined in this study are different in some Latin American dialects of Spanish (see sections 2.5.1.2 and 2.5.3).

Before its launch, the survey was pilot tested on a total of 10 volunteers whose background matched one of the target groups. This was done to ensure that the survey items did not elicit undesired effects, and that the background questionnaire would be completed as expected. For example, participants might score an item on the low end of the scale due to reasons unrelated to the condition being tested, such as the presence of an unfamiliar word.

Participants for the study were recruited on social media and through personal connections. Additionally, in the case of the L3 group, a portion of the participants were recruited at a high school in Barcelona, which they attended. Participants in two of the groups (L3 and L2) were offered the chance to take part in the raffle of a gift card to encourage participation.

Participants in the L3 group (n = 172) had a mean age of 27.6 years. Within this group, 102 identified as women, 66 as men, and 2 as non-binary (2 did not answer). The L2 group (n = 146) had a mean age of 33 years and the following gender distribution: 102 women, 36 men, and 5 non-binary people (3 did not answer). The L1 group (n = 27) had a mean age of 29.2 and the following gender distribution: 12 women, 12 men, and 3 non-binary people. All participants in all groups reported having normal or corrected-to-normal vision and no history of linguistic impairment.

Before proceeding to the next section, note that the main hypothesis of this study is based on the proficiency of its participants. Proficiency, however, is simply meant to act as a proxy of exposure to the L3: since our main hypothesis is derived from the TPM, which makes claims based on how much exposure to the L3 a speaker has received, it was necessary to find a way to determine to what extent participants had been exposed to English. The distinction between low proficiency speakers and true *ab initio* learners is not to be overlooked: Puig-

Mayenco and Rothman (2020) found that, at very low proficiency levels, learners who have had some previous exposure to the L3 display different patterns from learners who have not been previously exposed to it. Puig-Mayenco and Rothman (2020) state that confounding low proficiency and lack of exposure in the initial stages of L3A can lead to unreliable results. However, bear in mind that the present study does not examine the initial stages, nor will its results be used to establish a direct comparison with other studies that focus on the initial stages. Additionally, measuring exposure in a reliable way would have been too complex a task because we expected most of our participants to have been exposed to English for at least around a decade. At this level of exposure, too many variables would have to be measured in order to determine how much someone has been exposed to English, including the type of input they have received and how they have assimilated it. Ultimately, given the difficulty of measuring exposure with enough precision, and considering the fact that the present study focused on later stages of acquisition, it was decided that proficiency was the best measure of L3 development available. The English proficiency score assigned to each participant was based on 3 different factors: (1) how accurately the participant scored the proficiency-testing fillers (see 3.3.2), (2) the participant's responses about their experience with English[17], and (3) the participant's own self-reported proficiency. Each factor was weighted so that it contributed differently to the final result, with the proficiency-testing fillers being the biggest contributors and self-reported proficiency being the smallest.

3.3. Materials

The present study was registered with NSD (Norwegian Centre for Research Data), and the survey was carried out between late 2019 and early 2020. The experiment was mainly conducted as an online survey using SelectSurvey, which is an online survey tool that NTNU has a data processing agreement with. Some of the L3 participants recruited at a high school filled in an identical paper-based version due to the unavailability of online devices or internet access in the room they were in. Each participant had to complete at least two tasks: a

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[17] Specifically, the following factors were considered: the age at which they started learning it, the age at which they felt comfortable with the language, how many years of formal instruction they had, if they had lived in an English-speaking country (and for how long), if English was spoken in their family (and for how long) and if they spoke English at work (and for how long).

background questionnaire and an acceptability judgment task (AJT). The following sections provide more details about each type of task.

3.3.1. Background questionnaire

The background questionnaire contained a series of background questions, most of which were meant to capture information about the participants' linguistic backgrounds. Most of these questions were taken from the Bilingual Language Profile (BLP) (Birdsong et al., 2012), which allows researchers to calculate a dominance score for each participant based on their answers. By using the BLP, it was possible to classify participants in the L3 group according to their dominant language (Catalan or Spanish), in order to account for possible effects of dominance in the analysis. Additionally, some questions from the BLP were expanded to enquire about the participants' history with English as well (e.g., to establish if they could be considered to be in the initial stages of acquisition). All in all, the questions covered aspects such as how long participants had been acquiring a language, how early they started, in which environments they used it, and how strongly they identified with it. Some of the questions taken from the BLP asked participants to self-report their proficiency in the key languages involved (Catalan, Spanish, and English). Following the BLP, the available levels of self-reported proficiency were expressed using simple terms, instead of a standardized measure like the CEFR (Common European Framework of Reference for Languages), since some of the participants in the pilot tests were not familiar with the CEFR and found it difficult to report their proficiency levels accurately.

Additional questions were added to make it possible to control for factors that might influence the participants' responses in the AJTs, such as which region they and their parents and grandparents came from, whether they had lived in any other countries, and which languages they spoke. In the case of the L2 group, the BLP was applied as well, but the questions concerned Spanish and English only. In the case of the L1 group, this section was much shorter, as it did not include many of the questions that applied for the other groups, including the BLP questions.

All three versions of the background questionnaire can be found in Appendix B.

3.3.2. Acceptability judgment tasks

In an acceptability judgment task (AJT), participants are asked to judge if a given utterance is possible in a language that they speak (Schütze & Sprouse, 2013). Quite often, participants are asked to score the utterance on a scale in order to obtain an accurate measurement of its acceptability (ibid.). AJTs were deemed the best method for data collection in this study because they are used quite often in L3 acquisition research; in fact, many of the studies cited in this thesis use AJTs: for instance, Giancaspro et al. (2015), Westergaard et al. (2017), and González Alonso et al. (2020). This is also the case for L2 acquisition research: an analysis of articles that appeared in *Linguistic Inquiry* between 2001 and 2010 found that approximately 77% of them used an AJT for data collection (Sprouse et al., 2013). The main advantage of AJTs lies in the fact that they can be used to measure the participants' reaction to sentences that are rarely produced in natural speech (Schütze, 1996). Of course, there are also some drawbacks associated with AJTs; for instance, certain factors may affect the way each participant responds. According to Ellis (1991), some of these factors could be the complexity of the target items, their length, unfamiliar vocabulary, or even the participants' mood. Additionally, Ellis (1991) also states that since the strategies a participant may use to judge the items are unclear, their judgments can be inconsistent and, thus, unreliable. Ensuring that most of these factors were minimised was one of the reasons why the items in this study were pilot tested (see section 3.2).

The English AJT contained 88 items. The breakdown of each type of item was as follows:

- 24 items testing the usage of pronouns after LPSPs:
    - 5 for the *poss* condition
    - 5 for the *of+obq* condition
    - 5 for the *obq* condition
    - 3 for the *poss* condition using the preposition "inside"
    - 3 for the *of+obq* condition using the preposition "inside"
    - 3 for the *obq* condition using the preposition "inside"
- 15 items testing the usage of causative structures:
    - 5 for the *cv+pro* condition
    - 5 for the *cv+dp* condition
    - 5 for the *per+pro* condition

- 10 items testing the usage of the present perfect and the past simple in hodiernal contexts:
  - 5 for the *preterite* condition
  - 5 for the *perfect* condition
- 39 filler items, of which:
  - 20 were adapted from the Cambridge English Assessment for Speakers of Other Languages (n.d.). The participants' responses were used to roughly calculate their English proficiency so that it could be used as a variable in the analysis.
  - 19 other filler items, of which some purposefully included obvious errors to prevent scale bias (see Schütze & Sprouse, 2013).

Table 5 summarises all the conditions tested in this study and provides some examples in English. A list of all the items used in each AJT can be found in appendix A.

Table 5. Conditions tested in the present study.

Condition	Examples
poss	*Is there anyone behind mine?
of+obq	*Is there anyone behind of me?
obq	Is there anyone behind me?
cv+dp	They made the visitor wait in the living room.
cv+pro	They made him wait in the living room
per+pro	They were making him wait in the living room
perfect	*The president has given a speech on TV two hours ago
preterite	The president gave a speech on TV two hours ago

In items that tested usage of pronouns after LPSPs, the prepositions "around", "behind", "near", "above", and "under" were used once for each condition. Additionally, three instances of "inside" were introduced for each condition because, as highlighted in section 2.5.1, this preposition licenses both *obq* and *of+obq* in English ("inside [of] me"). It was determined that additional testing with this preposition would be worthwhile in order to be

able to compare it to those that do not license *of+obq*. However, the analysis of LPSP conditions with "inside" could not be completed due to a lack of time.

All condition types used in this study (LPSPs, causatives, hodiernals) were unrelated and could therefore act as fillers for each other. The fillers that were used to test participants' proficiency in English were adapted from the Cambridge English Assessment for Speakers of Other Languages (n.d.). The specific aspects that each question in that test focused on were used to create a set of items that tested participants' knowledge of specific grammar and vocabulary items. Half of the items were correct and half of them were incorrect. Finally, the rest of the fillers followed only two criteria: (1) they could not include any of the conditions being tested (to reduce participants' sensitivity to the conditions), and (2) the number of correct and incorrect items should be such that it balanced out the rest of items in the experiment. For example, in the case of English, the conditions tested in this experiment provided 18 incorrect items and 31 correct ones for each variant of the AJT. The 20 fillers used to test proficiency provided an additional 10 items of each. In order to ensure that both halves of the scale were used more or less equally, the remaining fillers included 3 correct items and 16 incorrect ones.

There were three different variants of the survey that participants were randomly redirected to, each of which contained different variants of the critical items in the AJTs, following a counterbalanced design. What this means is that each item that was designed for the experiment had several variants that only differed in the critical condition that was used in them, and each item variant was assigned to one of the survey variants. For instance, each participant was only asked to rate one of the following variants of the same item:

– *Do you know the man who was standing **near yours**? (*poss*)
– *Do you know the man who was standing **near of you**? (*of+obq*)
– Do you know the man who was standing **near you**? (*obq*)

This ensured that there would be no repetition effects, and that any effects that were observed could not be due to item characteristics not linked to the critical conditions, since all variants of the same item were virtually identical in all respects but the critical condition. In the case of the items containing LPSPs there were three variants (for three conditions), and the same was true of the causative items. The hodiernal items only had two variants (since two conditions were being tested, present perfect and past simple). In this particular case, the first

variant of the test contained 5 items for each condition (10 total), the second variant contained the alternate versions of the items present in the first variant, and the third variant also contained 10 items, half of which were also present in the first variant and half of which were also present in the second variant. Within each survey variant, items of each AJT were semi-randomised so that the critical conditions would appear in a different order depending on the variant and to ensure that items for the same condition were not close to each other.

The AJTs in other languages paralleled the English one, with some differences where necessary (e.g. the balance of correct/incorrect filler items depended on how many conditions were considered correct or incorrect in each language). The Catalan AJT had 88 items, like the English one, but the Spanish AJT had 76 items, since only 27 items were required to keep the amount of correct and incorrect items sufficiently balanced.

One key learning from the pilot testing phase was that coming up with such a high number of items that would validly test the conditions tested in the study while being potentially understandable to learners with low proficiency proved more difficult than expected. The main reason is that the vocabulary and grammar must be as simple as possible but still fulfil two goals at the same time: (1) they cannot sound odd to more advanced speakers, which might happen if simplification is done with only beginner learners in mind, and (2) in some cases the critical conditions limit how simple the items used in the test can be. For example, the *perfect* condition could prove to be challenging, in itself, for learners with low proficiency. The same is true for causative items with a periphrasis, another of the conditions in this study, which require compound verb forms. Therefore, adjustments were made where possible. For example, all items related to LPSPs used prepositions that are taught earlier on (such as "behind" or "under") instead of ones that might be confusing or unknown to lower proficiency learners (such as "below" or "before"). With the exception of the preposition "inside", whose related items were meant to be analysed separately, no prepositions that accept the *of+obq* condition in English were used to create items for the AJT (e.g. complex prepositions such as "in front of").

All items used in each AJT can be found in Appendix A, and the instructions at the beginning of each AJT are reproduced in Appendix D.

3.4. Procedure

The survey started with a consent form, in English, which contained general information about the study and asked participants for their consent to participate in it (see the entire consent form in Appendix C). After reading and accepting the consent form, participants in the L3 group were presented with an AJT in English, followed by a linguistic background questionnaire in Catalan. Once these sections were completed, they were given the option of ending the survey or proceeding to two additional AJTs, one in Catalan and one in Spanish. Since the full survey took quite a bit of time to complete, this was deemed a good approach to maximise the amount of responses that could be obtained for the core part of the study, while still making it possible to collect data about the perception that some of the participants had of the conditions involved in this study in both of their L1s. The latter was necessary to make sure that the grammars of the L3 group matched the assumptions that the experiment relied on as detailed in table 3.

The surveys for the L2 and L1 groups followed the same structure with some adaptations, mainly two: (1) AJTs for languages that the target group was not expected to speak were not included and (2) some questions in the background questionnaire were edited or removed as needed. The L2 group had to complete an AJT in English, followed by a background questionnaire, followed by an (optional) AJT in Spanish. Meanwhile, the L1 group had to complete an AJT in English followed by a shorter background questionnaire.

The items in each AJT were shown to participants one by one. Participants were not allowed to go back to a previous item after submitting their score. They were instructed to rate items on a Likert scale from 1 to 4, where 1 meant that the item did not sound natural to them and 4 meant that the item sounded natural. The lower and higher ends of the scale were labelled "Not natural" and "Natural" respectively, while no labels were used for the middle points of the scale. This scale was chosen to let participants express some granularity in their judgments but minimise the available options so that it would be easier to choose a score. Additionally, it forced participants to choose since there was no middle option. In pilot testing, some volunteers remarked that they were not sure how they should decide what sounded natural and what not, so a note was added that told participants to imagine that a friend was saying each sentence and rate according to whether they would think the person was a native speaker of English or not. Participants were also told to follow their intuitions, and that the aim of the study was not to test their proficiency.

4. Results

As explained in section 3.1, the main aim of this thesis was to find out if there was evidence of transfer beyond the initial stages for the analysed conditions: pronouns preceded by locative, projective spatial prepositions (LPSPs), causative constructions and hodiernal constructions. Most participants in the study were surveyed online, and all participants completed an acceptability judgment task (AJT) in English, followed by a background survey. Optionally, participants who were 2L1 speakers of Catalan and Spanish completed AJTs in Catalan and Spanish, and participants who were native speakers of Spanish (and did not speak Catalan) completed an AJT in Spanish. Participants were asked to rate each item on a scale from 1 to 4, with 1 meaning that it did not sound like something a native speaker of that language would say, and 4 meaning that it did.

The collected data were reorganised and analysed using the programming language R (R Core Team, 2017), and the significance threshold was set at .05. Both procedures were carried out in RStudio (RStudio Team, 2019). Appendix E contains a list of all the R packages that were used. As part of the preparation for the analysis, each participant in the L3 group was assigned an English proficiency score[18] and a language dominance score calculated using the Bilingual Language Profile (Birdsong et al., 2012), which indicated whether a participant was more dominant in Catalan or Spanish. Participants in the L2 group were also assigned an English proficiency score. Additionally, all scores from AJTs were z-scored before the analysis. Z-scores are used to express the value of each observation within a set of observations in standard deviation units (Field et al., 2012). Z-scores are calculated by subtracting the mean of all observations from each single observation and then dividing the result by the standard deviation of all observations (ibid.). As a result, the whole set of observations is redistributed so that the mean of all observations is 0 and the standard deviation is 1 (ibid.). For this study, the z-score of each item was based on the whole set of scores provided by the same participant in the same language.

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[18] For a more in-depth explanation of how the English proficiency score was calculated, see section 3.2.

First, three repeated measures ANOVAs were conducted on each group of conditions, only on the data from L3 speakers who completed the survey in its entirety (that is, provided their acceptability judgments of English, Catalan, and Spanish items). The aim of this analysis was to establish whether the state of the Catalan and Spanish grammars of the L3 participants matched our assumptions based on the theoretical background. There were two within-groups measures in the analysis: the language of the items and the condition they were associated with. If the results of an ANOVA were significant for the interaction between language and condition, a post-hoc test (pairwise t-test with Bonferroni) was conducted on the relevant set of data.

Afterwards, two repeated measures ANOVAs and a t-test were conducted on the results of the Spanish AJT of the L2 participants who had completed the entire survey. The original aim was just to check that L2 participants performed as expected based on our original assumptions. However, after the first set of ANOVAs showed that the Spanish grammar of the L3 group didn't match one of our assumptions about LPSP conditions, this analysis became crucial to establish whether these differences were present in both groups (and therefore, our initial assumptions were unreliable for all speakers of European Spanish) or if it was only the L3 group that did not perform as expected, which would be an important point to take into account when analysing the English grammar of the L3 group. In these ANOVAs, the analysed conditions were used as a within-groups measure. If the results of the ANOVA were significant, a post-hoc test (pairwise t-test with Bonferroni) was conducted.

Finally, two-way mixed ANOVAs were conducted on each group of conditions in English. All groups of participants were included in these ANOVAs (L1, L2, L3), and the non-native groups (L2 and L3) were divided into smaller groups according to their proficiency in English. The goal was to determine if there was evidence of transfer into English by any of the L3 proficiency groups, especially the lower proficiency one, mainly by comparing their scores to those provided by the L1 group. If significant differences were found, scores from the L3 group could be compared to scores of the L2 group, to establish if there was any influence from Spanish in cases where Spanish would be expected to lead to these differences. In these ANOVAs, the analysed conditions were entered as within-groups measures, and the participant group (proficiency considered) was entered as a between-

groups measure[19]. If the results of an ANOVA were significant for any relevant interactions, a post-hoc test (pairwise t-test with Bonferroni) was conducted on the data for the relevant condition.

It is worth noting that this analysis could also have been conducted using regression. Of the independent variables analysed overall, three were categorical (group of participants, condition, and language of the sentences) and one was continuous (English proficiency score). However, doing so would have required skills in R beyond what the author could acquire within the timeframe of the thesis. Thus, the English proficiency score was converted to a categorical variable so that ANOVAs could be used for the analysis.

4.1.   The Catalan and Spanish grammars of the L3 group

Table 6 contains descriptive statistics for each condition as scored by the L3 group. The analysis was conducted using only the data from participants who completed the whole survey (n = 45)[20]. Note that this is a subset of the group of L3 speakers used for the mixed ANOVAs in section 4.3.

Raw scores are shown in table 6 for ease of reading, but keep in mind that, as stated above, they were z-scored for the analysis. The results for each group of conditions are presented separately in the following sections.

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[19] For a more in-depth explanation of how the proficiency groups were divided, see section 3.2.

[20] Data from speakers of Valencian and Balearic varieties of Catalan were excluded from the ANOVA for LPSP conditions. For that ANOVA, n = 44.

Table 6. Descriptive statistics for all conditions as scored by the L3 group in Catalan and Spanish.

Condition	Catalan AJT		Spanish AJT	
	Mean	**SD**	**Mean**	**SD**
poss	3.59	0.75	3.07	1.13
of+obq	2.07	1.21	3.43	0.95
obq	1.64	1.08	1.92	1.24
cv+pro	1.23	0.54	1.08	0.32
cv+dp	2.18	1.18	2.87	1.18
per+pro	3.28	1.06	3.77	0.62
perfect	3.76	0.60	3.76	0.66
preterite	2.43	1.39	3.66	0.71

4.1.1. Results for LPSP conditions

A repeated-measures ANOVA was carried out to investigate whether there were any significant differences between the acceptability judgments on Catalan and Spanish sentences provided by the L3 group. The following conditions were analysed:

– *poss*: *It bothers me when she stands **behind mine**.
– *of+obq*: *It bothers me when she stands **behind of me**.
– *obq*: It bothers me when she stands **behind me**.

The relevant averages can be found in table 6, but figure 2 is included below to help the reader interpret the current section:

Figure 2. Mean scores of the L3 group in Catalan and Spanish, LPSP conditions.

The results show that there were significant interaction effects between language and condition, $F(2, 86) = 92.86$, $p < .0001$, so a post-hoc test (pairwise t-test with Bonferroni) was carried out. For *poss*, the L3 group scored Spanish items significantly lower than Catalan items, $p < .0001$. For *of+obq*, the L3 group scored Spanish sentences with this condition significantly higher than equivalent sentences in Catalan, $p < .0001$. When it comes to *obq*, the L3 group scored Spanish sentences significantly higher than Catalan sentences, $p < .0001$, though it is worth noting that both scores were on the lower end of the scale.

The L3 group performed as predicted by the theoretical background in all conditions except for one: *poss* in Spanish received a higher rating than expected, given that our review of the literature seemed to indicate that speakers of Spanish would tend to reject *poss*. The results in section 4.2.1 return to whether this is also the case for the L2 group. Whichever the case, this unexpected result is relevant for the subsequent discussion (see section 5.1.1).

4.1.2. Results for causative conditions

A repeated-measures ANOVA was carried out to investigate whether there were any significant differences between the acceptability judgments on Catalan and Spanish sentences provided by the L3 group. The following conditions were analysed:

- *cv+pro*: The teacher **made them read** a book.
- *cv+dp*: The teacher **made the students read** a book.
- *per+pro*: The teacher **was making them read** a book.

The relevant averages can be found in table 6, but figure 3 is included below to help the reader interpret the current section:
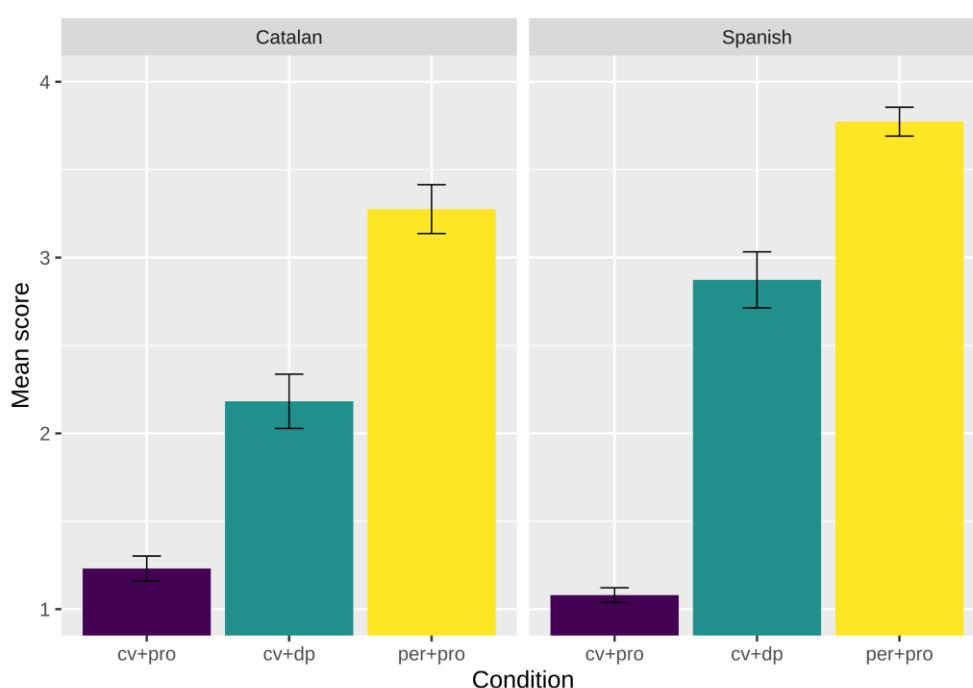
Figure 3. Mean scores of the L3 group in Catalan and Spanish, causative conditions.

The results show that there were significant interaction effects between condition and language, $F(2, 88) = 24.45$, $p < .0001$. The post-hoc test (pairwise t-test with Bonferroni) shows that both *cv+dp* and *per+pro* received significantly higher ratings in Spanish than in Catalan, $p < .0001$ in both cases. The difference in the ratings of *cv+pro* in Catalan and Spanish was not significant. Within each language, all differences between conditions were significant, $p < .0001$. Overall, the results are within the expected thresholds given our review

of the literature: *per+pro* appears to be acceptable in both languages while *cv+dp* only appears to be acceptable in Spanish, and *cv+pro* does not seem to be acceptable in either.

4.1.3. Results for hodiernal conditions

A repeated-measures ANOVA was carried out to investigate whether there were any significant differences between the acceptability judgments on Catalan and Spanish items provided by the L3 group. The following conditions were analysed:

– *preterite*: The president **gave** a speech on TV two hours ago.
– *perfect*: *The president **has given** a speech on TV two hours ago.

The relevant averages can be found in table 6, but figure 4 is included below to help the reader interpret the current section:
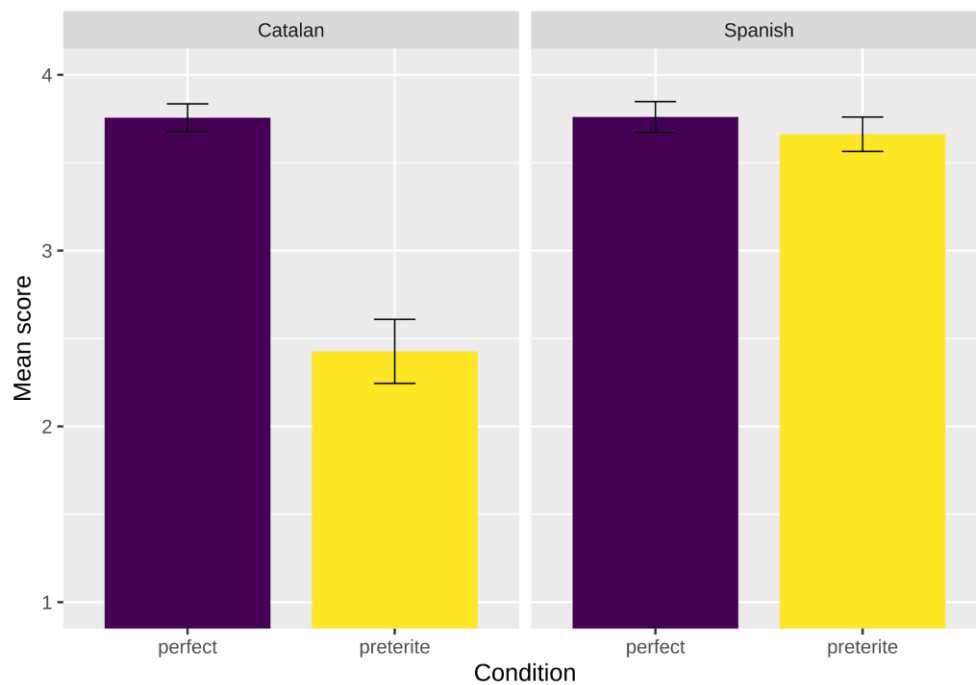
Figure 4. Mean scores of the L3 group in Catalan and Spanish, hodiernal conditions.

The results show that there were significant interaction effects between language and condition, $F(1, 44) = 43.80$, $p < .0001$. The post-hoc test (pairwise t-test with Bonferroni) shows that the *perfect* condition received a similar score in both languages, while *preterite* received a significantly higher rating in Spanish, $p < .0001$. This is in line with our review of

the relevant literature, which indicated that Spanish speakers would display optionality between *perfect* and *preterite*, while *perfect* would be preferred in Catalan.

4.2.   The Spanish grammar of the L2 group

The following table contains descriptive statistics for each condition in Spanish as scored by the L2 group. The analysis was conducted using only the data from participants who completed the whole survey (n = 112). Note that this is a subset of the group of L2 speakers used for the mixed ANOVAs in section 4.3.

Raw scores are shown for ease of reading, but keep in mind that, as stated above, they were z-scored for the analysis. The results for each group of conditions are presented separately in the following sections.

Table 7. Descriptive statistics for all conditions as scored by the L2 group in Spanish.

Condition	Mean	SD
poss	2.64	1.12
of+obq	3.55	0.80
obq	2.19	1.31
cv+pro	1.18	0.54
cv+dp	3.28	0.94
per+pro	3.69	0.67
perfect	3.69	0.72
preterite	3.78	0.61

4.2.1. Results for LPSP conditions

A one-way repeated measures ANOVA was carried out to examine the acceptability judgments on Spanish sentences provided by L2 speakers of English. The relevant averages can be found in table 7, but figure 5 is included below to help the reader interpret the current section:
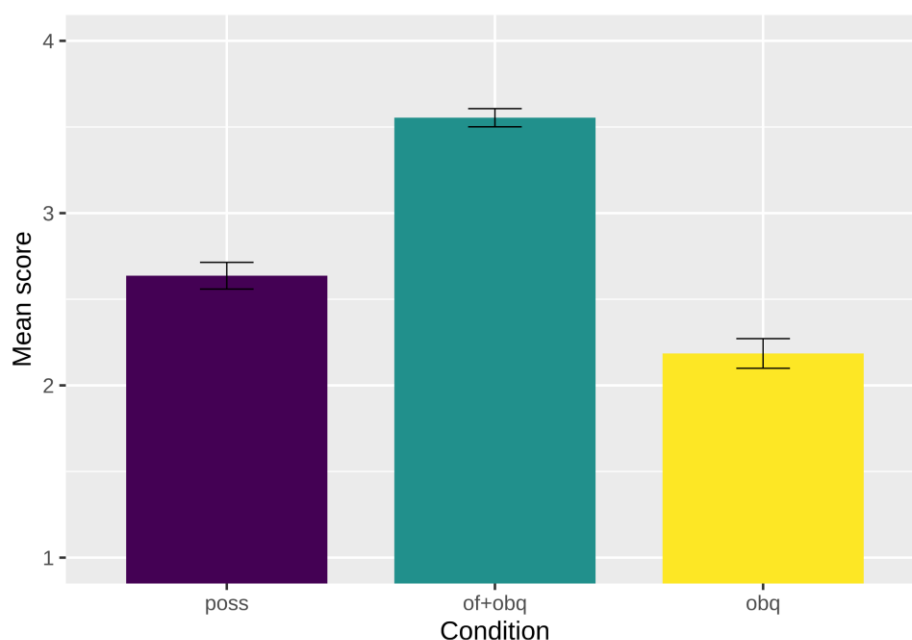
Figure 5. Mean scores of the L2 group in Spanish, LPSP conditions.

Mauchly's test indicated that the assumption of sphericity had been violated for the main effects of condition, $W = 0.865$, $p = .0003$. Therefore, the Greenhouse-Geisser corrected values are reported ($\varepsilon = .88$). The results show that there was a significant main effect of condition on item ratings, $F(1.76, 195.61) = 142.31$, $p = < .0001$, so a post-hoc test (pairwise t-test with Bonferroni) was carried out.

The differences between conditions were all significant, $p < .0001$ for all comparisons. Specifically, *of+obq* (acceptable in Spanish according to the literature) received the highest rating, while *poss* (acceptable in some dialects) fell towards the middle of the scale and *obq* (not acceptable in Spanish) was rated lower. Comparing these results to the ones on figure 2 shows that both the L2 and the L3 groups gave *of+obq* and *obq* similar ratings in the Spanish AJT, while the L3 group appears to have rated *poss* much higher. Indeed, an exploratory t-test showed that the L2 group gave *poss* a significantly lower score than the L3 group, $p < .0001$. This means that, not only did the L3 group not perform as expected based on our review of the literature, but it also performed differently from the L2 group, which suggests there are some differences between the Spanish grammars of these two groups. The possible causes and the implications of this result are discussed in detail in section 5.1.1.

4.2.2. Results for causative conditions

A one-way repeated measures ANOVA was carried out to examine the acceptability judgments on Spanish sentences provided by L2 speakers of English. The relevant averages can be found in table 7, but figure 6 is included below to help the reader interpret the current section:
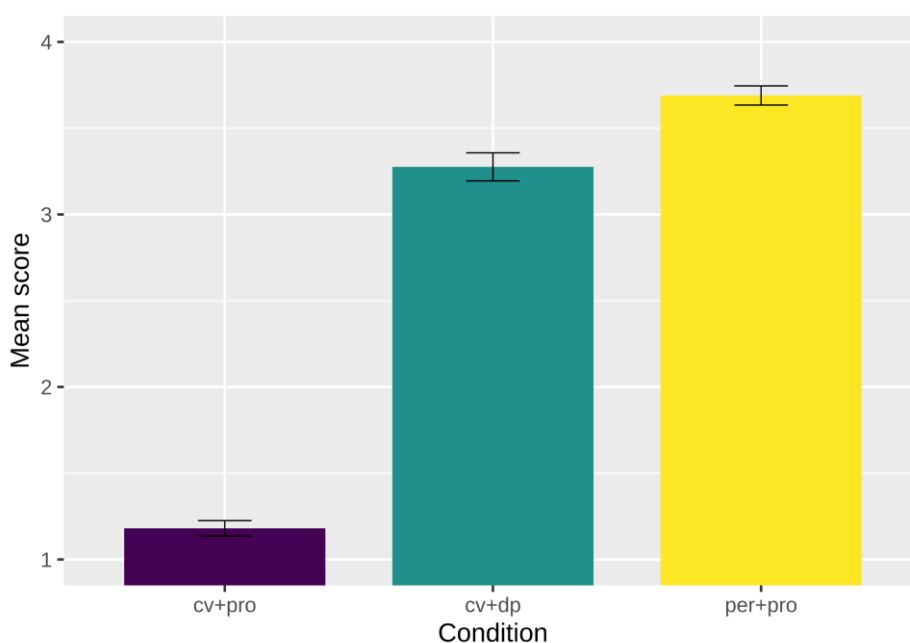
Figure 6. Mean scores of the L2 group in Spanish, causative conditions.

Mauchly's test indicated that the assumption of sphericity had been violated for the main effects of condition, $W = 0.944$, $p = .042$. Therefore, the Greenhouse-Geisser corrected values are reported ($\varepsilon = .95$). The results show that there was a significant main effect of condition on item ratings, $F(1.89, 210.23) = 1223.00$, $p = < .0001$, so a post-hoc test (pairwise t-test with Bonferroni) was carried out.

All differences between conditions were significant, $p < .0001$ and matched our expectations: *cv+pro* (not acceptable in Spanish) received the lowest score, while *cv+dp* and *per+pro* (both acceptable in Spanish) received high ones, with *per+pro* being the highest. When compared to the results of the Spanish AJT of the L3 group, the results are quite similar overall (see figure 3). The only visible difference is related to the *cv+dp* condition, and an exploratory t-test revealed that the L3 group gave it a significantly lower score than the L2 group, $p < .0001$. However, both scores were still as high as expected.

4.2.3. Results for hodiernal conditions

A t-test was carried out to examine the acceptability judgments on *perfect* and *preterite* provided by the L2 group in the Spanish AJT. The relevant averages can be found in table 7, but figure 7 is included below to help the reader interpret the current section:
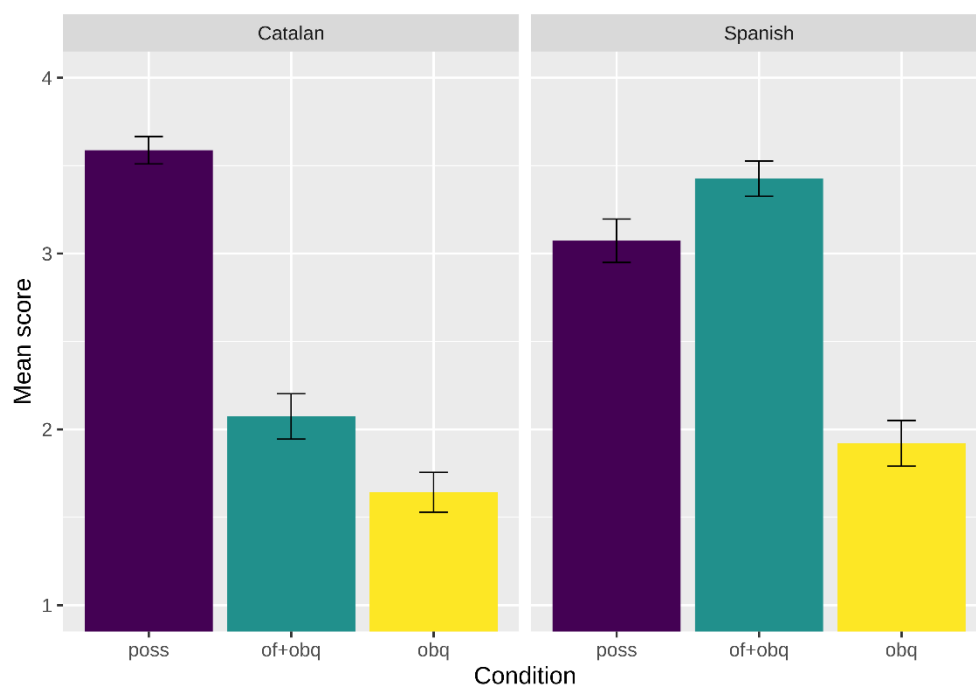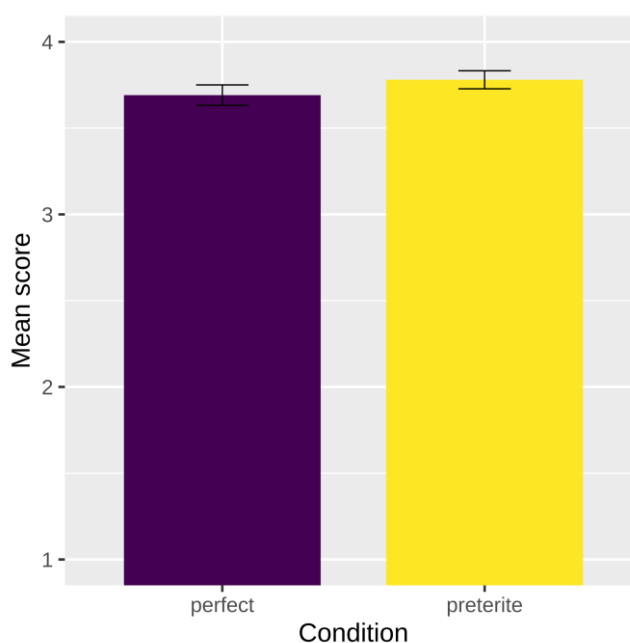

Figure 7. Mean scores of the L2 group in Spanish, hodiernal conditions.

According to the t-test, the difference between the ratings of *perfect* and *preterite* in Spanish given by the L2 group was not significant, though it is worth noting that *preterite* received a slightly higher score than *perfect*. This meets our expectations, since our review of the literature led us to assume that Spanish speakers would find both conditions acceptable, but that *preterite* might be preferred. If we compare figure 7 to figure 4, it is apparent that the L2 and L3 groups rated the conditions similarly in the Spanish AJT.

4.3. The results of the English AJT

For this analysis, the L3 and L2 groups were divided into subgroups according to their proficiency in English. Table 8 contains descriptive statistics for the scores that each group

provided for each condition in English. Raw scores are shown for ease of reading, but keep in mind that, as stated above, they were z-scored for the analysis.

Table 8. Descriptive statistics for all conditions as scored by each group, English proficiency considered.

Cond.	L3 group, low (n=44)[21]		L3 group, intermediate (n=96)[22]		L3 group, high (n=32)[23]		L2 group, low (n=35)		L2 group, intermediate (n=82)		L2 group, high (n=29)		L1 group (n=27)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
poss	2.45	1.21	1.96	1.19	1.81	1.22	2.26	1.23	1.90	1.11	1.54	0.10	1.91	1.12
of+obq	2.76	1.16	2.09	1.16	1.97	1.24	2.39	1.19	1.96	1.13	1.59	0.96	1.93	1.12
obq	3.24	1.00	3.30	0.95	3.48	0.91	3.21	1.01	3.38	0.91	3.50	0.87	3.78	0.53
cv+pro	2.78	1.08	3.15	1.01	3.40	0.91	3.12	0.99	3.28	0.91	3.46	0.79	3.62	0.67
cv+dp	2.93	1.03	3.21	0.99	3.52	0.83	3.16	1.01	3.28	0.97	3.15	1.03	3.69	0.60
per+pro	2.54	1.11	2.85	1.13	3.15	1.09	2.77	1.14	2.91	1.06	3.04	1.02	3.49	0.23
perfect	2.96	1.09	2.45	1.19	2.05	1.15	2.79	1.19	2.36	1.16	1.79	0.99	1.99	0.94
preterite	3.26	0.96	3.41	0.89	3.64	0.80	3.38	0.87	3.50	0.82	3.63	0.65	3.82	0.42

In table 8, it is important to note that the L1 group followed the expected: a high score for *obq* and low scores for *poss* and *of+obq*, high scores for all causative structures, and preference for the past simple over the present perfect in hodiernal contexts. This is worth pointing out because one of the crucial assumptions for this analysis is the state of the target English grammar in L1 speakers as described in the theoretical background. If any of the assumptions had failed, it would have to be taken into account in the discussion.

The results for each group of conditions are presented separately in the following sections.

4.3.1. Results for LPSP conditions

A two-way mixed ANOVA was conducted on the LPSP conditions, examining the differences in the English AJTs of all groups according to their proficiency in English.

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[21] n = 40 for the LPSP conditions, due to filtering out speakers of Valencian and Balearic varieties of Catalan.
[22] n = 94 for the LPSP conditions, due to filtering out speakers of Valencian and Balearic varieties of Catalan.
[23] n = 29 for the LPSP conditions, due to filtering out speakers of Valencian and Balearic varieties of Catalan.

Groups L2 and L3 were divided into three subgroups (low, intermediate, and high proficiency), while the L1 group was not. The relevant averages can be found in table 8, but figure 8 is included below to help the reader interpret the current section. Note that items containing the preposition "inside" were excluded from this analysis, since they were meant to be used for a separate analysis which, unfortunately, could not be conducted (see 5.3).
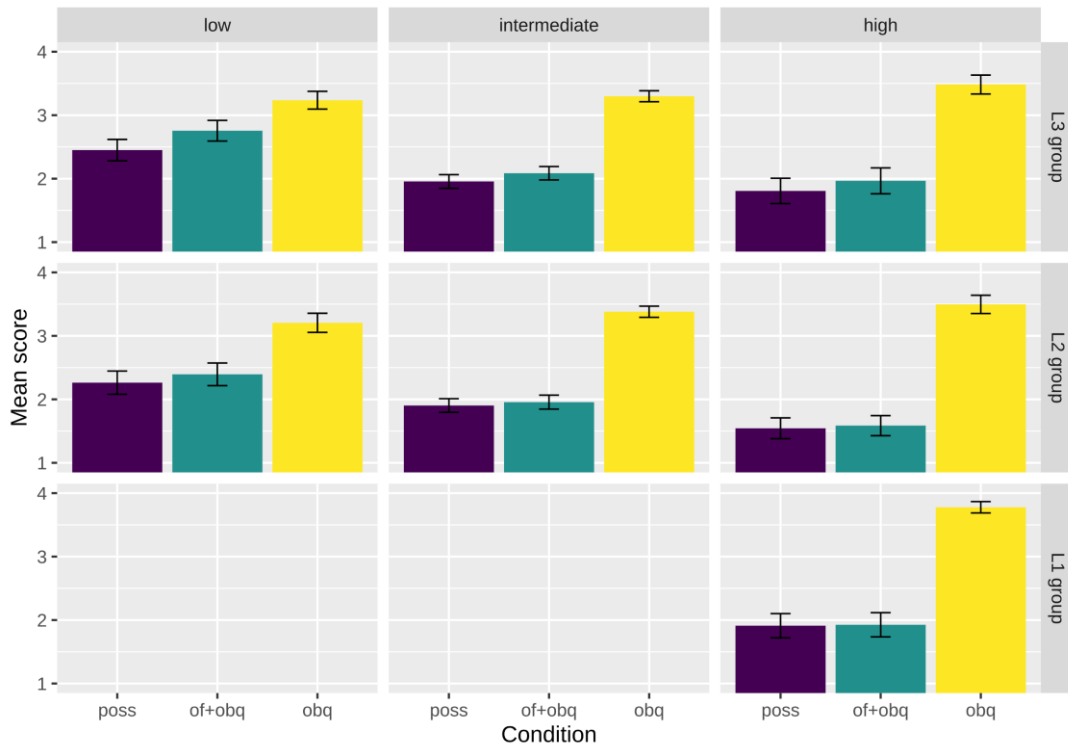
Figure 8. Mean scores of each group, LPSP conditions (English proficiency considered).

The results show that there are significant interaction effects between condition and group, $F(12, 658) = 7.31$, $p < .0001$. To identify the significant effects, a post-hoc test (pairwise t-test with Bonferroni) was conducted. At a low proficiency level, the L3 group rated both *poss* and *of+obq* significantly higher than the L1 group, $p = .013$ and $p < .0001$, respectively. The low proficiency L3 group also rated *obq* significantly lower than the L1 group, $p = .005$. The other L3 proficiency groups displayed no significant differences when compared to the L1 group. It is also worth noting that, at all proficiency levels, there were no significant differences between the scores given within the L3 group to the *poss* and *of+obq* conditions, and the same is true within the L2 group. This means that, within each non-native group, *poss* and *of+obq* received similar scores. When comparing the L2 and L3 groups, the only significant difference was found at the low proficiency level: the L3 low subgroup rated

of+obq significantly higher than the L2 low subgroup, *p* = .041. Finally, there was only one significant difference between the L2 groups and the L1 group: the L2 low proficiency group, like its L3 counterpart, rated *obq* significantly lower than the L1 group, *p* = .0003. No other relevant significant differences were found.

4.3.2. Results for causative conditions

A two-way mixed ANOVA was conducted on the causative conditions, examining the differences in the English AJTs of all groups according to their proficiency in English. Groups L2 and L3 were divided into three subgroups (low, intermediate, and high proficiency), while the L1 group was not. The relevant averages can be found in table 8, but figure 9 is included below to help the reader interpret the current section.
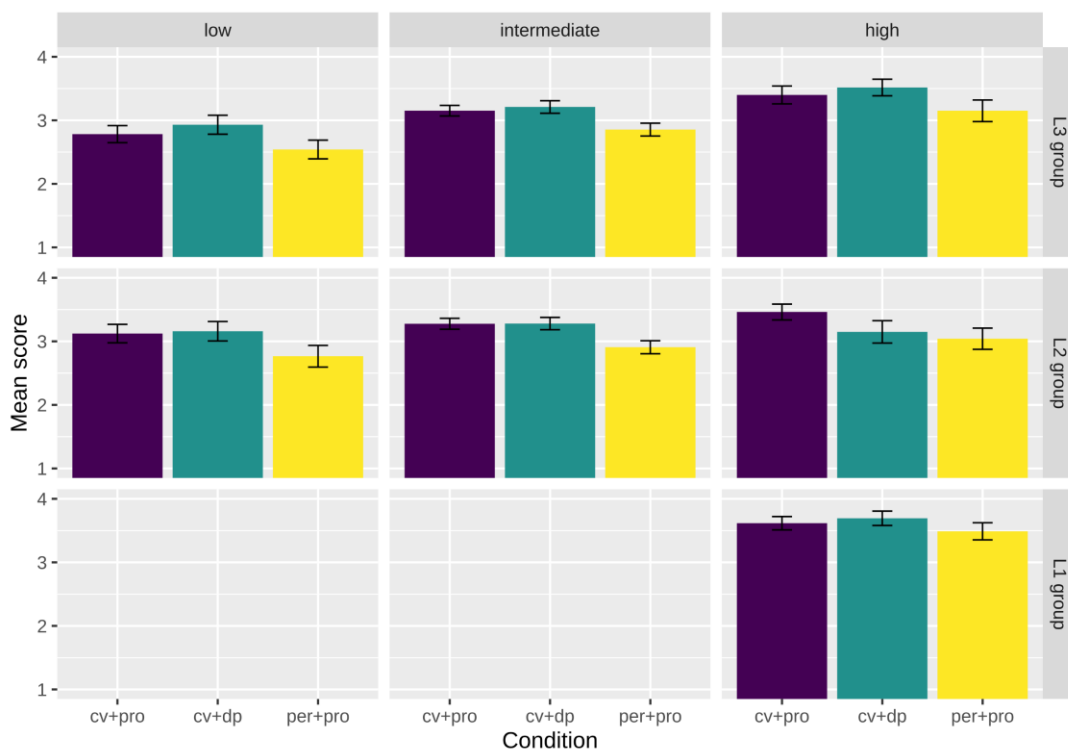
Figure 9. Mean scores of each group, causative conditions (English proficiency considered).

The results show no significant interaction effects between condition and group. Nevertheless, it is worth noting that *per+pro* consistently received lower scores than the other two conditions, and this difference was significant (*p* < .05) in the results of the intermediate and low proficiency subgroups of the L2 and L3 groups. This result stands out because

per+pro is the only causative condition that should be acceptable in Catalan, Spanish, and English according to the theoretical background, so non-native speakers would be expected to perform closer to target in this condition. Possible reasons for this lower rating are discussed in section 5.1.2. No other relevant significant differences were found.

4.3.3. Results for hodiernal conditions

A two-way mixed ANOVA was conducted on the hodiernal conditions, examining the differences in the English AJTs of all groups according to their proficiency in English. Groups L2 and L3 were divided into three subgroups (low, intermediate, and high proficiency), while the L1 group was not. The relevant averages can be found in table 8, but figure 10 is included below to help the reader interpret the current section.
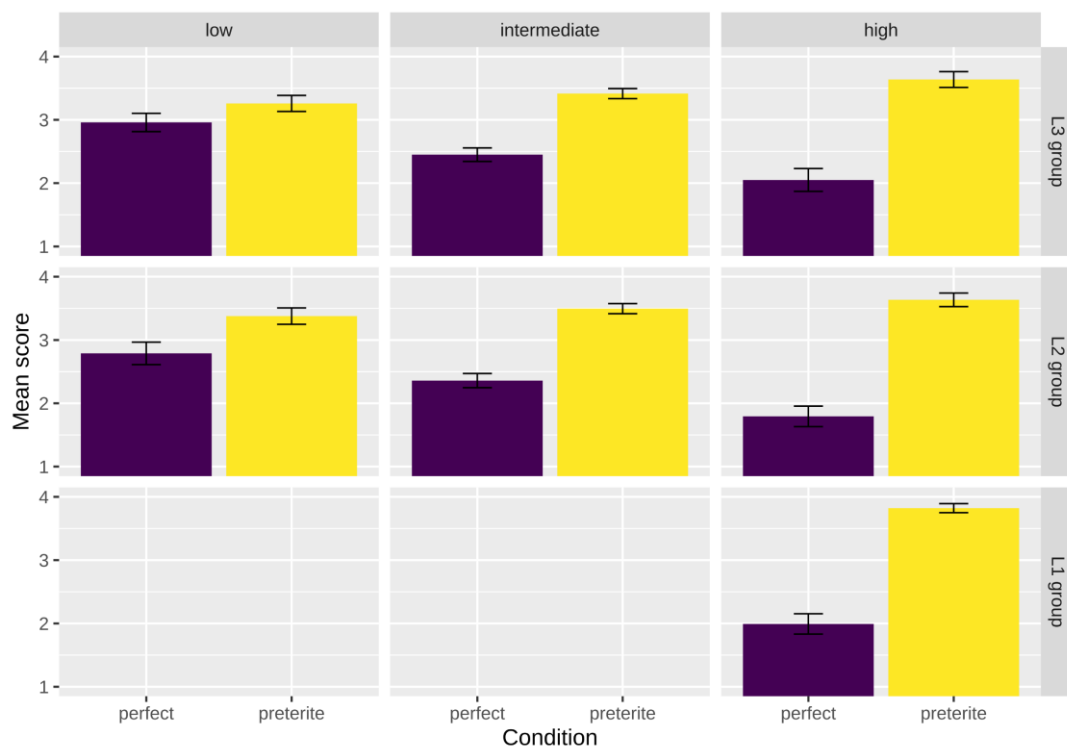
Figure 10. Mean scores of each group, hodiernal conditions (English proficiency considered).

The results show that there are significant interaction effects between condition and group, $F(6, 338) = 18.35$, $p < .0001$. To identify the significant effects, a post-hoc test (pairwise t-test with Bonferroni) was conducted. At low and intermediate proficiency levels, the L3 and L2 groups rated *perfect* significantly higher than the L1 group, $p < .0001$ in all cases. At a

low proficiency level, the L3 group rated *preterite* significantly lower than the L1 group, $p < .0001$. In fact, at the low proficiency level, the difference between the scores that the L3 group gave to *preterite* and *perfect* were not significant, $p = .097$, while this was not the case for the L2 group, $p < .0001$. The low proficiency L2 group also rated *preterite* significantly lower than the L1 group, $p = .015$. No other relevant significant differences were found.

5. Discussion

As explained in previous sections, the experiment carried out for this thesis focused on three separate groups of conditions: (1) LPSPs (locative, projective spatial prepositions) followed by a pronoun, (2) causative structures and (3) tense usage in hodiernal contexts. Three groups of participants were recruited to complete an online survey: L3 speakers of English (who were 2L1 speakers of Catalan and Spanish), L2 English speakers (who were L1 speakers of Spanish), and L1 English speakers. The online survey consisted of a mandatory part with an AJT in English and a background questionnaire, followed by an optional part which included two AJTs (one in Catalan, one in Spanish) in the case of the L3 group and one AJT (in Spanish) for the L2 group. This study was not designed to test any specific models of L3A, though its hypothesis was derived from plausible predictions based on the TPM. The main hypothesis of this study is that transfer effects from L1 Catalan to L3 English can be detected beyond the initial stages, especially in the participants with the lowest level of proficiency in this study.

Before proceeding with the analysis of the results of the English AJT, which is the core part of this study, it is important to check whether the initial assumptions about the L1 grammar(s) of each group of participants were confirmed by the results. Examples of the relevant conditions can be found in sections 5.1.1, 5.1.2, and 5.1.3 below. As evidenced by the results in section 4.3, the English scores from the L1 group did match the assumptions derived from the theoretical background. These results are important because they help solidify the theoretical background based on which the grammars of the L3 speakers are analysed. To give one example, there was a slight concern regarding the *poss* items (e.g. *behind mine), since some of them could have sounded acceptable even to L1 speakers if they imagined a context for them even though the items were provided without context. For instance, the test item "*It bothers me when she stands behind mine" might have been accepted by L1 speakers if they imagined a context such as this: "[Hector doesn't mind that Julia stands behind his car while he parks, but] it bothers me when she stands behind mine". Since *poss* received a low score from the L1 group in the English AJT, as initially expected, we know that it is not the case that native speakers of English were likely to imagine a context for the *poss* items. This

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does not rule out the possibility that L2 or L3 participants might have interpreted the items with that a specific context in mind but, if they did, their interpretation would not be considered native-like.

As for the L2 group, their Spanish AJT scores were also aligned with the initial assumptions. It is worth noting that both hodiernal conditions (*preterite* and *perfect*) received high scores, given the uncertainty in the theoretical background about the acceptability of the *perfect* condition (e.g. *Tristan has arrived two hours ago) in European Spanish, which is reported to have become more acceptable in recent times. Our results confirm that both options are deemed acceptable by speakers of European Spanish, as claimed by many of the papers cited in section 2.5.3. It may look like these results are at odds with the findings of Kempas and López Samaniego (2011), but this is not necessarily the case. In that study, participants were asked to complete sentences with a hodiernal interpretation whose verb was missing, and most of them chose to conjugate the verb in the preterite rather than the perfect. However, since this was a forced choice task, their results do not entail that the perfect is unacceptable, simply that it is less acceptable than the preterite. Indeed, this is what our results show: both conditions received high ratings, but *preterite* (e.g. Tristan arrived two hours ago) was rated significantly higher than *perfect*.

Finally, for the L3 group, two grammars needed to be checked, since participants in this group had two L1s: Catalan and Spanish. All the assumptions about the Catalan grammars of the participants were confirmed. When it comes to the Spanish grammars of the L3 group, however, there was one critical deviation from the initial assumptions in the LPSP structures. Specifically, the *poss* condition in Spanish was rated much higher than expected[24]. This was surprising because *poss* is not acceptable in most varieties of European Spanish, though it is true that no previous data were found in the literature concerning the acceptability of *poss* in the variety of Spanish spoken in Catalonia. The fact is that the L3 group gave the *poss* condition a significantly higher score than the L2 group in the Spanish AJT. The possible causes and implications of this deviation is discussed in detail in section 5.1.1. For now, it is important to point out that this led to a revision of table 4, which was first introduced in section 3.1 and summarised the possible outcomes of the English AJT for the L3 group and

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[24] It is also worth noting that there were also significant differences between the L2 and L3 groups in the *cv+dp* condition in Spanish (which is acceptable in Spanish but not in Catalan), but since the score from the L3 group indicated high enough acceptance, this difference was not considered to affect the initial assumptions.

what each outcome would entail. Because the *poss* condition turned out to be acceptable in both the Catalan and Spanish grammars of the L3 group, this meant that it could no longer be assumed that, if this condition received a high score in the English AJT from the L3 group, it would entail transfer from Catalan. Rather, it might entail transfer from either Catalan or Spanish. Table 9 is a revision of table 4, changes are highlighted with a darker background.

Table 9. Implications of possible outcomes of the English task carried out by the L3 group, revised.

Condition	Example	Implication if result differs significantly from L1 group	Implication if result does not differ significantly from L1 group
poss	*behind mine	negative transfer from Catalan or Spanish	no transfer
of + obq	*behind of me	negative transfer from Spanish	positive transfer from Catalan or no transfer
obq	behind me	negative transfer from Catalan or Spanish	no transfer
cv+pro	made me laugh	negative transfer from Catalan or Spanish	no transfer
cv+dp	made Gina laugh	negative transfer from Catalan	positive transfer from Spanish, or no transfer
per+pro	was making me laugh	-	positive transfer from Catalan or Spanish, or no transfer
perfect	*I have called my mother two hours ago	negative transfer from Catalan or Spanish	no transfer
preterite	I called my mother two hours ago	negative transfer from Catalan	positive transfer from Spanish or no transfer

The following sections will discuss the findings of the English AJT from the L3 group. Each set of conditions is considered separately. Afterwards, the implications of these findings are discussed together and contextualised within the scope the existing literature.

5.1. Discussion of separate conditions

5.1.1. LPSPs followed by a pronoun

As a reminder, these are the three conditions that are relevant for this section:

- LPSP + possessive pronoun (abbreviated *poss*): *It bothers me when she stands **behind mine**.
- LPSP + of + oblique pronoun (abbreviated *of+obq*): *It bothers me when she stands **behind of me**.
- LPSP + oblique pronoun (abbreviated *obq*): It bothers me when she stands **behind me**.

First of all, let us examine the *poss* condition. The L3 group with lower English proficiency rated this condition significantly higher than the L1 group. The intermediate and high proficiency subgroups did not differ significantly from the L1 group, and neither did any of the L2 groups. Since this condition is not acceptable in English, and given our knowledge about the Catalan and Spanish grammars of the L3 participants (*poss* is accepted in both grammars), there are several possibilities that might explain the results of the low proficiency L3 subgroup:

a. Transfer from Catalan to English.
b. Transfer from Catalan to Spanish and then from Spanish to English.
c. Transfer from Spanish to English.
d. Combined transfer from Catalan and Spanish to English.

Option a is quite straightforward: as evidenced by the theoretical background, *poss* is acceptable in Central Catalan, which means that Catalan is one possible source of transfer. Option b assumes that the fact that *poss* is acceptable in the Spanish grammars of the L3 group is due to previous influence of Catalan on Spanish. That is to say, when Catalan speakers acquire Spanish, they transfer *poss* to Spanish from Catalan, and then transfer *poss* to English from Spanish. On the other hand, option c assumes that, instead, the condition might just be more acceptable in the variety of Spanish that the L3 speakers have acquired. Finally, option d is meant to reflect the possibility that both Catalan and Spanish may be exerting combined influence on L3 English, something which the LPM (Westergaard et al.,

2017) contemplates. Disentangling these possibilities using the collected data appears to be impossible. As mentioned above, none of the L2 groups displayed any significant differences compared to the L1 group, but the difference between the L2 and L3 low proficiency groups was not significant either. However, the fact that the L3 group gave the *poss* condition a significantly higher score than the L2 group in the Spanish AJT prevents us from establishing a direct comparison between the groups in this specific case. Since the L2 group could not, by definition, have had any major contact with the variety of Spanish spoken in the area where our L3 group grew up, attempting to clarify whether the state of the Spanish grammar of the L3 group is due to transfer from Catalan or dialectal variation is not possible. Exploratory t-tests were conducted to see if any effects of language dominance or order of acquisition[25] could be detected in the L3 group, but neither of the results were significant. Though it is impossible to come to a final conclusion regarding the source of transfer, this situation is a very clear example of why it is vital to check the state of the previously learned grammars in L3A research. Had this not been done, one could have easily (and wrongly) assumed that the only possible source of transfer in the *poss* condition is Catalan. Ultimately, whichever the case may be, we can confidently state that there is evidence of transfer from at least one of the previously learned languages in this condition.

We now turn to *of+obq*. As explained in previous sections, this condition is fully acceptable in European Spanish, but not in Central Catalan, something which the results from the Catalan and Spanish AJTs confirm. In the English AJT, the condition obtained significantly higher ratings from the L3 low proficiency group as compared to the L1 group. This observation is relevant because our hypothesis was that the lower proficiency group would not transfer from Spanish if the effects of wholesale transfer from Catalan in the initial stages were still in effect, but the observed effects of transfer can only be due to the influence of Spanish. Therefore, this result constitutes evidence against our hypothesis, since it was stated that we would only find evidence of transfer from Catalan among the participants with the lowest proficiency levels. However, it is not possible to establish whether the L3 low proficiency group over-accepted *of+obq* due to transfer occurring at the initial stages or later.

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[25] As specified in previous sections, participants in the L3 group are considered 2L1 speakers of both Catalan and Spanish, since they started learning both languages in their early childhood. However, for the purposes of this t-test, participants who had started learning Catalan before Spanish (even if just by one year) were classified as L1 Catalan, and vice-versa. Still, a lot of participants had started learning both languages at the same time, and there was no way to classify them as either L1 Catalan or L1 Spanish. This applies to all similar comparisons in this chapter.

There is yet another result related to *of+obq* which is worth highlighting: the difference between the scores provided by the L2 groups and L1 group was not significant at any level of proficiency. This might seem surprising: if we assume that the L3 group transferred *of+obq* from Spanish, how is it possible that this did not affect the L2 group? Effects of acquisition might explain it, if the L2 group happened to have a better average proficiency in English, but this explanation was rejected since both groups had similar mean scores[26] which were similarly distributed. If we assume wholesale transfer in the initial stages of L3A, it would appear that the combination of L1 Spanish L2 English triggers faster restructuring than 2L1 Catalan/Spanish L3 English. Could the difference be due to an L2 status effect of Spanish? An exploratory t-test conducted only on this condition, for which the L3 group was divided according to the language they first learned, showed no significant differences between those who had started learning Catalan first and those who had started learning Spanish first. In fact, the L2 status factor is usually associated with adult L2 learners, and the L3 group learned both Catalan and Spanish at really young ages, making it unlikely for the L2 status factor to play a role in the observed results. Could it be due to language dominance? Another exploratory t-test showed no significant differences between participants who were dominant in Catalan and those who were dominant in Spanish. There could be other factors at play, which were not tested in this study due to being out of scope, but these differences are certainly worth examining in future research efforts.

Finally, the *obq* condition received a significantly lower score from the lower proficiency speakers in the L3 group when compared to the L1 group. No significant differences were found between the other L3 proficiency groups and the L1 group. The L2 low proficiency group also rated *obq* significantly lower than the L1 group, and there were no significant differences between the L2 group and the L3 group at any level of proficiency, indicating that they behaved similarly. These results suggest that the significant difference found between the low proficiency L3 group and the L1 group could be due to negative influence from either Catalan or Spanish, since neither of these languages accepts *obq*. These results show that lower proficiency speakers are more susceptible to transfer, which is to be expected. As for our hypothesis, they neither confirm nor refute it. Even though the results indicate that negative transfer might have taken place, establishing its source is not possible. Since the

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[26] L3 group: $M = 108.36$. L2 group, $M = 110.70$. Scale is 0 to 180.

source of transfer cannot be established, the results cannot provide support for any of the theories discussed in this study.

5.1.2. Causative conditions

The following three conditions are discussed in this section:

- Causative verb + short pronoun + infinitive (abbreviated *cv+pro*): The teacher **made them read** a book.
- Causative verb + DP + infinitive (abbreviated *cv+dp*): The teacher **made the students read** a book.
- Periphrasis with a causative verb + short pronoun + infinitive (abbreviated *per+pro*): The teacher **was making them read** a book.

As shown in section 4.3.2, all groups displayed similar rating patterns: all conditions were rated quite high, with *per+pro* consistently receiving the lowest score. The results of the English AJT are discussed below in more detail. First of all, however, it might be worthwhile to review the results of González Alonso et al. (2020), which also included these conditions.

Remember that the participants in the study by González Alonso et al. (2020) were bilingual speakers of Catalan and Spanish and had English as an L3 but, unlike the participants in the present study, all of them were in the initial stages of L3 acquisition and had been learning English for two months at the time of testing. The results of the Spanish AJT from the L3 group in the present study pattern with those of González Alonso et al. (2020), but there is one remark to be made regarding the results of the Catalan AJT: although the overall scores for all three conditions follow a similar pattern, the difference between *cv+dp* and *cv+pro* in our results was highly significant, which was not the case in their study. These results could be due to differences in dominance or linguistic background of the participants, though this has not been explicitly checked in our data due to time constraints.

In the English AJT, González Alonso et al. (2020) found that sentences with a short pronoun in which the causative verb was part of a periphrasis (what we call *per+pro*) received the highest ratings, *cv+pro* received the second-highest ratings (which were significantly lower than those of *per+pro*), and *cv+dp* received the lowest ratings (which were significantly lower than those of *cv+pro*). While the *per+pro* condition received the highest scores in the English AJT in the study by González Alonso et al. (2020), it was the condition with the

lowest scores across all groups in the present study[27]. This is puzzling if one considers that *per+pro* was the only condition in this set which is acceptable in Catalan, Spanish, and English, and would thus be expected to receive the highest scores from the L3 group. Why is it, then, that it scored lower? A possible explanation is that *per+pro* is, inherently, a quite challenging condition to create items for, as it requires a periphrasis. It could be that the items used in the present study sounded less natural than those used by González Alonso et al. (2020), thus leading to slightly different rating patterns. In fact, in the English AJT, *per+pro* received a significantly lower rating than the other two conditions from the L2 and L3 groups at low and intermediate proficiency, while the difference was not significant in the L2 and L3 groups at high proficiency, nor in the L1 group. This suggests that the complexity of the items may have made them more difficult to interpret for all participants, especially those who were less proficient in English, which would explain the lower scores. Fortunately, the impact on the results of the present study appears to be negligible because all groups were similarly affected.

Our analysis found no significant differences for the interaction between group and condition, indicating that all participants in our study gave each condition a similar relative score. This could be due to the non-native participants having acquired these conditions successfully. In conclusion, the results of the causative conditions do not provide evidence in favour or against the hypothesis of this study, since all groups performed close to target.

5.1.3. Hodiernal conditions

The two conditions relevant for this section are the following:

- Hodiernal sentence with a verb in the past simple (abbreviated *preterite*): The president **gave** a speech on TV two hours ago.
- Hodiernal sentence with a verb in the present perfect (abbreviated *perfect*): *The president **has given** a speech on TV two hours ago.

Remember that *perfect* received higher scores than *preterite* from the L3 group in the Catalan AJT, while both conditions received very high scores from the L3 and L2 groups in the

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[27] Though it still scored relatively high: $M = 2.84$ from the L3 group, $M = 2.92$ from the L2 group, and $M = 3.48$ from the L1 group.

Spanish AJT. This confirms our expectation that both conditions are equally acceptable in the Spanish grammars of the participants, while only *perfect* is acceptable in the Catalan grammars. As evidenced by the results of the two-way ANOVA in section 4.3.3, the L3 low proficiency group rated the *perfect* condition in the English AJT significantly higher than the intermediate and high proficiency L3 groups. In fact, for the L3 group with lower proficiency, the difference between the scores for *perfect* and *preterite* was not significant. This suggests that there is negative transfer from Catalan or Spanish (or both) in the *perfect* condition, and that this influence diminishes as L3 speakers become more proficient. The same pattern is observed for the L2 group, which makes sense because this property is also present in Spanish. With the available data, it is impossible to tell whether transfer in the case of L3 speakers is due to Catalan, Spanish, or the combined influence of the two. An exploratory t-test found no significant differences between the scores provided by L3 participants who had started acquiring Spanish earlier than Catalan and those who acquired them in the opposite order. The same happened with another exploratory t-test, aimed at uncovering possible effects of language dominance.

When it comes to the *preterite* condition, something else stands out. Even at low proficiency, L3 participants gave this condition a very high score ($M = 3.26$). This could very well be due to participants having learned this condition by the time they were tested, but it is remarkable that they appear to learn that *perfect* is unacceptable more slowly than they learn that *preterite* is acceptable. The L2 participants also gave *preterite* a very high score at low proficiency levels. There are two possibilities for the effects observed in relation to *preterite*, which is acceptable in Spanish and English but not in Catalan: either there is no transfer at all, or there is positive transfer from Spanish. Whichever the case, there seems to be no evidence of negative transfer from Catalan, as *preterite* was not rejected.

The findings for these conditions do not provide any clear evidence in favour of or against our hypothesis. As anticipated in the theoretical background, even though there is evidence of transfer in the *perfect* condition, it is impossible to tell whether this is due to influence from Catalan or Spanish, since the condition is acceptable in both languages.

5.2. General discussion

The hypothesis of this study, as stated in section 3.1, was that evidence of transfer from Catalan would be observed, and that transfer effects would be stronger in lower proficiency speakers of L3 English. Stronger effects in lower proficiency speakers might indicate that transfer occurred in the initial stages but that is not the only possibility, as the L3 grammars of the participants in this study might have been reconfigured prior to their participation. After analysing the results, these are the general outcomes for each condition:

Table 10. Outcomes of the English AJT carried out by the L3 group.

Condition	Example	Outcome
poss	*behind mine	evidence of negative transfer from Catalan or Spanish[28]
of + obq	*behind of me	evidence of negative transfer from Spanish
obq	behind me	evidence of negative transfer from Catalan or Spanish
cv+pro	made me laugh	no evidence of transfer
cv+dp	made Gina laugh	no evidence of transfer
per+pro	was making me laugh	no evidence of transfer
perfect	*I have called James two hours ago	evidence of negative transfer from Catalan or Spanish
preterite	I called James two hours ago	evidence of positive transfer from Spanish or no transfer

No evidence of transfer was found in the analysis of the causative conditions, since participants appear to have acquired them successfully. The other conditions all suggest transfer to some degree, but in all but one it was not possible to determine the source of transfer. As a result, the hypothesis is neither supported nor disconfirmed by the results of most conditions. The results of *of+obq* (one of the LPSP conditions) even appear to disconfirm it, since there appear to be transfer effects which cannot be attributed to Catalan given that the condition is only acceptable in Spanish but was accepted by the L3 speakers in English. This suggests that negative transfer from Spanish is taking place.

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[28] Note that this condition was meant to provide negative evidence of transfer from Catalan only, but our findings about the Spanish grammar of the L3 group made the results more difficult to interpret than initially anticipated (see section 4.1 for further details).

In the case of the hodiernal conditions, the fact that both were rated highly by the L3 group in the Spanish AJT made it difficult to tease apart the source of transfer for *perfect*. It is also difficult to state with certainty that there is positive transfer for *preterite*, since the participants in this study had already been exposed to English for a long time and might have had time to acquire the condition successfully. When it comes to the LPSP conditions, all results suggest evidence of transfer. There is evidence of negative transfer in the *obq* condition for lower proficiency speakers. Since *poss* was accepted in both the Catalan and the Spanish grammars of L3 participants, it was impossible to establish which language acts as the source of transfer in *poss*, but transfer does seem to take place.

The picture that these results reveal is undoubtedly a complex one, but it is no surprise that language acquisition is a complex process. This study has found what seems to be evidence of negative transfer in several cases: *poss*, *of+obq*, *obq*, and *perfect*. There is one potential case of positive transfer, the *preterite* condition, but the results might be confounded by the effects of acquisition. The only case in which transfer seems to be unquestionably influenced by just one of the previously acquired languages was in the *of+obq* condition. In that case, Spanish seems to have been the language influencing transfer. In the following paragraphs, we will examine these results in the context of previous similar studies.

As shown in section 2.4.4, a total of six studies dealing with the same combination of languages and order of acquisition have been found in the literature. All of them found evidence of transfer from Catalan, and none of them found evidence of transfer from Spanish (cf. the studies listed in table 1). In that regard, the present study stands out, since there is evidence that the condition *of+obq* transfers from Spanish into English. We will now focus on a few of these previous studies to better contextualise the results of the present study.

Several of the factors that may have influenced the results of the present study have already been put forward in previous studies. For a relevant example, consider the 2018 paper by Puig-Mayenco and Marsden, which examined the acquisition of negative polarity items by learners of L3 English who had already acquired Catalan and Spanish. In that study, the authors tested both beginner (in the initial stages) and advanced L3 learners and compared them to beginner and advanced learners of English as an L2 whose L1 was Spanish, similarly to the present study. Their results show evidence of transfer from Catalan in the L3 groups, both in the beginner and advanced groups. Even though the present study did not include participants in the initial stages, the results presented here can still be considered to be

consistent with theirs in terms of development: both sets of results show that the effects of transfer can still be detected beyond the initial stages. Furthermore, Puig-Mayenco and Marsden (2018) also found that non-facilitative transfer appeared to be overcome more slowly in the L3 group than in the L2 group. In their case, this was observed through different conditions: one condition that appeared to lead to negative transfer from Spanish in the L2 group appeared to have been overcome by the advanced speakers in that group to a higher degree than the advanced speakers in the L3 group overcame a condition that appeared to lead to negative transfer from Catalan. This observation is worth focusing on because we observed similar patterns, though none of our effects were significant. For instance, for the *perfect* condition, which is acceptable in both Catalan and Spanish but not in English, both the L2 and L3 groups displayed evidence of negative transfer which was stronger at the lower level of proficiency, but all L2 proficiency subgroups gave the condition a consistently lower rating (which, in this case, means closer to target) than the corresponding L3 subgroups.

Another finding of the present study that is echoed by previous work is the fact that language dominance does not appear to play a prominent role in the selection of the source of transfer in L3A. These results are consistent with a longitudinal study carried out by Puig-Mayenco et al. (submitted), whose participants had the same linguistic background as our L3 group: L3 speakers of English who had already acquired Catalan and Spanish. The only difference is that, in their study, participants were in the initial stages of L3A, while our participants were not. Since the study by Puig-Mayenco et al. (submitted) was longitudinal, it provided evidence that language dominance, while not a determining factor for transfer selection, does influence the development of L3A. This, unfortunately, cannot be checked in the present study, given that it is cross-sectional.

We must also consider that some of the presumed transfer effects observed in the present study may not be the result of exclusive influence from one of the previously learned languages, but that both might be playing a role, as posited by the LPM (Westergaard et al., 2017). The possible consequences of the interaction of both previously acquired languages on transfer were examined by Westergaard et al. (2017) in a paper which focused on the acquisition of L3 English by 2L1 Norwegian/Russian speakers compared to L1 Norwegian and L1 Russian controls. One of their conditions examined adverb placement in English, which is similar in Russian but different in Norwegian. The ratings provided by the 2L1 Norwegian/Russian speakers were closer to target than the ratings from the L1 Norwegian group, but not as close as the ratings from the L1 Russian group. According to the authors,

this suggests that 2L1 speakers experienced both facilitative influence from Russian and non-facilitative influence from Norwegian. Some of our results appear to be in line with these observations: for example, *preterite* and *cv+dp*, both of which are acceptable in Spanish but not in Catalan, received lower scores (though not significantly so) from the L3 low and intermediate proficiency groups when compared to their L2 counterparts, which would be the expected outcome if one assumes combined influence from Catalan (non-facilitative) and Spanish (facilitative). However, there is at least one result in our study which appears to be contradictory: the *of+obq* condition, which is acceptable in Spanish but not in English or Catalan, received a higher rating from the L3 groups than the L2 groups in the English AJT[29]. For our results to be fully in line with the findings of Westergaard et al. (2017), L3 speakers would have had to provide a lower rating than the L2 group, since the L3 group would be subject to facilitative influence from Catalan and non-facilitative influence from Spanish. However, note that even if our results were completely in line with those of Westergaard et al. (2017), we would be missing one part of the picture: data from L1 speakers of Catalan who learned English as an L2. As explained in section 1.1, the sociolinguistic situation of Catalan-speaking areas makes it difficult to find speakers of L1 Catalan whose L2 is English, since the vast majority of Catalan speakers learns at least one other language during childhood. This lack of possible participants notwithstanding, the fact is that our study did not include an L1 Catalan L2 English group, which means that our findings cannot be confidently interpreted against those of Westergaard et al. (2017). They do, however, highlight the need for further research in this direction.

The specific influence that the L2 may exert on transfer in L3A is also an important point for this discussion. While it is true that several studies have provided evidence which is incompatible with the L2 status factor (Bardel & Falk, 2012), that does not mean we should completely disregard the idea that the L2 may have some particular effects on transfer in L3A that the L1 does not. For instance, Stadt et al. (2018), in a study that examined the acquisition of L3 French by speakers of L1 Dutch and L2 English, found that influence of the L2 on the L3 was correlated with higher proficiency in the L2 and the L3. These findings cannot be compared directly to our results due to two main reasons: (1) our participants cannot be cleanly described as L1 Catalan L2 Spanish or the other way around due to them acquiring

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[29] Note that the difference was only significant at lower levels of proficiency.

both languages very close to each other[30], and (2) even if Catalan or Spanish could be neatly defined as the L2 of all of our participants, they would still not be comparable to the participants in Stadt et al. (2018) because our participants' L2 would have been acquired in very early childhood, whereas the participants in Stadt et al. (2018) acquired their L2 later in childhood. Despite these limitations, it is important to consider that an L2 may have transfer effects on the L3 which the L1 does not, as it might explain why the L3 group in our study rated *of+obq* (which is acceptable in Spanish but not Catalan or English) significantly higher than the L1 group while the L2 group did not.

It is also worth noting that the methods used in L3A morphosyntactic transfer studies, though similar, exhibit some variation. Highly relevant to the present study is the fact that some authors hold opposing views regarding what the optimal group distribution should be. Puig-Mayenco et al. (2020) emphasise the importance of testing L3A on mirror-image groups, that is, testing two groups with the same L3 whose order of acquisition of the L1 and the L2 mirror each other[31]. Westergaard (2019), on the other hand, argues that mirror-image designs are not the best option, at least for studies meant to test the LPM properly, and that efforts should instead be focused on comparing L3 learners to two groups of L2 learners whose L1s are the same as the previously acquired languages of the L3 learners[32]. The present study set out to compare groups in a similar fashion to Westergaard's (2019) proposal, but the impossibility of finding L1 Catalan speakers who had not acquired an additional language before learning English made it impossible to fully adopt this setup.

Finally, we must remark on the importance of testing the grammatical representations of the L1 and the L2 in L3 research participants. Recall that, based on the theoretical background, we initially assumed that the *poss* condition would be rejected by both the L3 and the L2 group in the Spanish AJT, since this condition is generally not acceptable in European Spanish. The fact that this would have allowed us to test for transfer from Catalan (where *poss* is acceptable) was the rationale for including this condition in the study. While the L2 group confirmed our expectations, the L3 group did not, showing that their Spanish grammar

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[30] In fact, in most cases, participants in our study claimed to have been exposed to both Catalan and Spanish since birth.

[31] For example: L1 Spanish / L2 English / L3 German, and L1 English / L2 Spanish / L3 German.

[32] For example: L1 Spanish / L2 English / L3 German compared against L1 Spanish / L2 German and L1 English,/ L2 German.

was either influenced by Catalan or subject to dialectal variation, which we had not anticipated. Had the L2 of the participants not been checked, the results of the English AJT, which showed that the L3 group over-accepted *poss*, would have only been interpreted as evidence of negative transfer from Catalan. Testing the L2 of the participants added a layer of depth to our data and allowed us to identify the over-acceptance of *poss* as transfer from Catalan, Spanish, or both. In the systematic review by Puig-Mayenco et al. (2020), only 16 out of a total of 71 studies were found to have tested at least the L2, if not both the L1 and the L2, of the participants. As the authors of this review highlight, L3A research cannot operate on the assumption that L3 learners have acquired their L2 successfully in all domains. Even though it is probably unlikely for the participants in our study not to have acquired Spanish successfully, we must still take into account the fact that both of their previously learned languages may have been influenced by language contact, especially when the languages involved are as closely related as they are in our case. Thus, the specific variety of each of the languages at hand must be carefully taken into account in L3A reasearch.

In conclusion, the results of the present study show one important difference compared to previous studies of the same language combinations. When it comes to transfer selection, previous studies on the same language combination have not found evidence of transfer from Spanish into English, but our results suggest that it may be possible for L1/L2 Spanish to transfer into L3 English. This piece of evidence, combined with the fact that previous studies on the same language combination focused mostly on the initial stages of L3A and ours did not, highlights the need for further research on the subsequent developmental stages of L3A. When it comes to the models that this study focuses on, all are compatible with the results of the present study, so no evidence is provided in favour or against any of them. At most, one might argue that the fact that transfer from Catalan has previously been attested in 2L1 Catalan/Spanish speakers learning L3 English and this study provides evidence of transfer from Spanish can be interpreted as evidence in favour of the LPM or the scalpel model, but further research is needed to confirm this.

5.3. Limitations of the study

The present study has some limitations, many of which have already been pointed out in previous sections. Without reflecting on the limitations of the study, it is not possible to make

the most of it moving forward, both for the author of the study and for others who might be interested in conducting further research in the field of L3A.

To begin with, it must be noted that, by definition, this study is limited in that it only examines the later stages of L3A. While this is intentional, since the study required a defined scope, it cannot be denied that the obtained data only show part of the picture, and that further research, focusing on earlier stages of acquisition, would be needed to achieve deeper insights.

In the case of most conditions where evidence of transfer was found, the source of transfer could not be established. This was expected for the hodiernal conditions, which is why they were not the central part of the study as originally intended, but not for the *poss* condition, which according to the theoretical background was generally not acceptable in European Spanish but received an unexpectedly high rating from the L3 group in the Spanish AJT. This leads us to another limitation, in this case, a sociolinguistic one. A way to obtain a clearer picture for conditions where the source of transfer could not be determined would have been to compare the L3 speakers not only to L2 speakers of English whose L1 was Spanish, but also to L2 speakers of English whose only L1 was Catalan, or at least did not learn an L2 until later in life. Unfortunately, speakers whose only L1 is Catalan are virtually impossible to find due to the sociolinguistic situation in Catalan-speaking areas (see section 1.1).

The dataset has some limitations as well, which prevent us from examining some of the observed effects at a deeper level. The number of items was capped because too many items would have discouraged participants from completing the survey, but there are conditions which could have benefitted from a more detailed analysis if more items were included. This concerns mostly cases where dialectal variation is involved. For example, in Spanish, the *poss* condition is much more acceptable with the LPSP *alrededor* (around)[33] than with most other prepositions. It is not possible to examine whether this specific preference has any influence on L3 English, since each participant only saw one *poss* item containing *alrededor*. Similarly, another way in which the analysis could be expanded would be by including more items where the pronoun after *poss* and *of+obq* refers to the third person, since even prepositions that normally license *poss* (both in Central Catalan and European Spanish) show a preference for *of+obq* in these cases (IEC, 2018; Marttinen Larsson & Bouzouita, 2018).

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[33] See Salgado & Bouzouita (2017).

As with the previous limitations, these were unavoidable because the scope of the project required that the LPSP conditions only be broadly analysed.

When it comes to the analysis, one limitation stands out very prominently. The time frame in which the study was to be conducted limited the methods of data analysis which could be used. While the ANOVA was deemed an adequate method to analyse the results of this study, part of the reason why it was chosen is that the learning curve for it did not seem too steep given the limited timeframe for this thesis. Due to this, some continuous independent variables, such as English proficiency, had to be transformed to categorical variables to make them manageable, which involved sacrificing some nuance in the results. Though the ANOVA still provided useful results, it must be acknowledged that other methods, such as the ANCOVA or linear regression, could have yielded more detailed results.

5.4. Suggestions for further research

Since the focus of the present study is L3A beyond the initial stages, examining the same conditions as this study, but in the initial stages of L3A[34] would help obtain a more comprehensive view of how transfer of these conditions develops throughout the process of L3A. To take the idea even further, a longitudinal study which observed the same group of speakers as they progressed through different stages of L3A, as proposed by González Alonso & Rothman (2017), might help further refine our understanding of L3A.

The LPSP conditions used in this study have a lot of potential for further refinement. For instance, transfer effects could be analysed separately based on the preposition involved, since the different languages involved in this thesis each have some prepositions that deviate from the general rules of that language. For instance, as mentioned in section 2.5.1.2, the preposition *alrededor* ("around") in Spanish licenses the *poss* condition according to Salgado & Bouzouita (2017). The present study only included one item with "around" in each condition, but increasing the number of items containing this preposition would make it possible to establish whether the observed transfer effects are modulated by each individual preposition, rather than the general rule. A detailed analysis was attempted in the present

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[34] To my knowledge, only the causative conditions have already been studied in the initial stages (by González Alonso et al., 2020). That is not to say, of course, that further testing of these conditions is no longer needed, simply that a study of these conditions in the initial stages already exists.

study: three items with the LPSP "inside" (which accepts both *of+obq* and *obq* in English, unlike the other LPSPs involved in this study) were included to examine to which extent the optionality of this preposition in English was successfully acquired by the L2 and L3 groups. However, this analysis could not be conducted due to a lack of time.

With regard to the hodiernal conditions, there is also one way in which the present study could be expanded: there is one variable one could experiment with to try and disentangle influence from Catalan and influence from Spanish in the *perfect* condition. Remember that the results of this condition suggest negative transfer, but the condition is acceptable in both Catalan and Spanish, thus making it impossible to establish the source of transfer in our dataset. RAE (2009) states that Spanish speakers show a preference for the preterite in hodiernal conditions when they perceive the action being described as having taken place far from the moment of speaking. Such a differentiation does not exist in Catalan, since *perfect* is the only acceptable option when talking about hodiernal situations. Thus, it might have been useful to test several instances of different locating time adverbials, of varying time reference (e.g. "one minute ago", "thirty minutes ago", "one hour ago", "five hours ago"). If the results of an AJT showed that L3 speakers tend to prefer the preterite in Spanish when the action takes place further away from the moment of speaking, repeating this pattern in the English AJT could mean that Spanish is the only language influencing the negative transfer we have observed in this study. Conversely, if the results of the English AJT patterned with Catalan (that is, participants preferred the perfect irrespective of the time adverbial), it could mean that Catalan is the language influencing transfer in this condition[35]. Though the current study used some items that match these characteristics (three per participant), other items were included as well due to the desire to maintain a wider scope for this study, which prevents a more detailed analysis from being performed.

Finally, promoting research on understudied language combinations is vital, as well as studying populations with different characteristics: for instance, those who acquired their L2 in early childhood (as in this study) and those who acquired it as adults. Additionally, as Westergaard (2019) mentions, another area of interest for future research efforts should be the factors which influence transfer in different phases of the L3A process.

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[35] Admittedly, one could also theorise that both languages might transfer. In this case, results from the English AJT should fall roughly between those of the Catalan AJT and the Spanish AJT.

6. Conclusion

This study set out to analyse morphosyntactic transfer in the acquisition of L3 English by 2L1 speakers of Catalan and Spanish beyond the initial stages of L3A. The hypothesis of the study was that effects of wholesale transfer from Catalan in the initial stages of L3A would be observable in later stages, especially in speakers who are less proficient in English. However, the results of the study did not provide unambiguous evidence of transfer from Catalan, and evidence of transfer from Spanish was found in one case.

Causative conditions did not contribute to testing the hypothesis because the performance of the L3 group was target-like. Hodiernal conditions, as expected, were inconclusive. In LPSP conditions, two conditions were also inconclusive. Results of the *obq* condition show evidence of negative transfer from either Catalan or Spanish, especially at lower levels of proficiency. Additionally, even though the study was set up so that transfer from Catalan could be differentiated from transfer from Spanish in *poss* (*behind mine) and *of+obq* (*behind of me), the results of the Spanish AJT revealed that *poss* in Spanish was more acceptable than expected to L3 participants, while L2 participants generally rated *poss* in Spanish towards the lower end of the scale. Therefore, although the results of the English AJT suggest that the L3 group was influenced by negative transfer in the *poss* condition, it was not possible to discern whether the observed effects were due to the influence of Catalan or Spanish. While results were inconclusive, the case of the *poss* condition is a clear example of why it is necessary to test the L1 and L2 grammars of participants in L3A studies. On the other hand, there is evidence of negative transfer from Spanish for the *of+obq* condition in the English AJT carried out by the L3 group. In this case, transfer could not be attributed to Catalan because the condition is not acceptable in that language, something which was confirmed by the Catalan AJT. This is worth highlighting because previous studies on the same language combination have only found evidence of transfer from Catalan. These previous studies focused mostly on the initial stages of L3A, but one also examined more advanced speakers of L3 English (Puig-Mayenco & Marsden, 2018).

This study did not set out to test any models of L3A explicitly but the results of the present study, combined with those of Puig-Mayenco and Marsden (2018), suggest that transfer from

both Catalan and Spanish is possible at later stages of L3A, which is consistent with two models: the LPM and the scalpel model. These results do not, however, constitute evidence against the TPM, since the TPM only makes predictions about the initial stages of L3A. Further research is still necessary to obtain more details about the process of third language acquisition as a whole, as well as which factors play a role in morphosyntactic transfer throughout the process of third language acquisition.

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Appendices

Appendix A: survey items

English AJT

Table A.1. English AJT, version 1.

Condition group	Condition	Item
LPSPs	obq	Everyone around me started dancing at the same time.
		Is there anyone behind me?
		Don't worry, I'll sit near you.
		Clara and I sat in the garden, looking at the stars above us.
		From the plane, we could see farms and fields under us.
	of+obq	Why are you drawing this circle around of me?
		It bothers me when she stands behind of me.
		I took a picture of the cat playing near of you while you were sleeping.
		The star above of us is called the North Star.
		Emma and her husband live in the apartment under of us.
	poss	People around mine are always lying.
		We have to walk in line now, make sure you stay behind mine.
		Do you know the man who was standing near yours?
		We stopped under the tree and looked at the leaves above ours.
		During the earthquake, we could feel the ground shake under ours.
	obq (inside)	Since my father died, there's a deep sadness inside me.
		The priest insisted that the devil was inside her.
		There's so much hate inside you that I feel like I don't know you.

	of+obq (inside)	Something inside of me refused to admit that he was dead.
		I understand the pain inside of you.
		The doctor said that the tumor inside of him was not dangerous.
	poss (inside)	My grandma's memory lives on inside mine.
		The doctor forgot his keys inside yours during the operation.
		I like Tom because there's so much happiness inside his.
Hodiernal	preterite	Susan called me two hours ago to talk about the party.
		I'm looking for my cat because he disappeared five hours ago.
		The taxi arrived five minutes ago, but Mary is not ready yet.
		Of course I want to go to bed, this morning I woke up at six!
		I don't want pizza for dinner because I ate a lot for lunch today.
	perfect	The president has given a speech on TV two hours ago.
		Tom is at a Star Wars marathon, it has started five hours ago.
		Oh no, we're too late! The bus has left five minutes ago.
		I have to go home by bus because someone has stolen my car this morning.
		You probably can't fall asleep because you have woken up so late this morning.
Causative	cv+pro	They made him wait on a chair in the living room.
		The political situation of her country made her fear a war.
		The singer made them sing a song with her.
		His grandma made him eat all the carrots.
		The trainer made her run for ten minutes.
	cv+dp	The story I told made my sisters cry because it is very sad.
		She makes her son comb his hair until it looks decent.
		After each race, I make my son drink a lot of water.
		Jenny made Monica buy a new bookshelf at Ikea.

		He makes his son shower before school.
	per+pro	My mother is making him peel all the potatoes.
		The teacher was making her repeat the exam.
		Helen is making them wash the dishes.
		The doctor is making him exercise thirty minutes every day.
		The teacher was making them read a book.
Fillers		You have to read this book, no matter how boring it is.
		Alfred ordered a new pair of shoes for the wedding.
		Kate bought this computer because everyone says it's highly reliable.
		You can't unfasten your seatbelt during this flight.
		I know we're all busy, but let's set a time for our meeting once and for all.
		There are no parks in the vicinity of Fred's apartment.
		Give the chair a wipe before you sit on it.
		Sorry about the noise, I didn't mean to disturb you.
		I'd rather you did your homework before dinner.
		In my small town, I had no opportunity to meet new people.
		Wendy has a cup of tea every day after lunch.
		She did her best to help him, but it was useless.
		She advised him to come back at once if he didn't want to face severe consequences.
		Victor always takes off his shoes before to go into the house.
		The dress I bought on Wednesday wasn't much expensive.
		It rains a lot in June, but more even in July.
		Is a big lake where our house used to be.
		The tailor began to fix the suit made a mistake.
		I cleaned the chair on that Rachel stood.
		The kittens played together until they will fall asleep.

	Can you help me? I'm look for the Sagrada Família.
	Sara is angry because you didn't helped her.
	Read a lot it's important for young children.
	The man waited outside for two hours, despite it was very cold.
	The actress was very happy because she winned an Oscar.
	I'll make pizza for dinner tonight because I have a lot of hunger.
	We must to ask for permission before opening the window.
	Alice said that Richard hurt herself with the hammer.
	It makes five years that the town was destroyed by an earthquake.
	Vicky's hair is such long that it touches the floor.
	The glass fell because you left it at the border of the table.
	The pianist ended the concert in his favourite song.
	Tom looks forward to travel to New York this summer
	It was only two weeks ago since Paula's baby was born
	Iris was thinking to go to bed when the phone rang.
	They bought the house already a year ago.
	She can't buy a new car because she has very few money
	It is important to consider all perspectives of the problem
	Boris and Carla got lost and had to remake their steps to find their way back home.

Table A.2. English AJT, version 2.

Condition group	Condition	Item
LPSPs	obq	People around me are always lying.
		We have to walk in line now, make sure you stay behind me.
		Do you know the man who was standing near you?
		We stopped under the tree and looked at the leaves above us.
		During the earthquake, we could feel the ground shake under us.
	of+obq	Everyone around of me started dancing at the same time.
		Is there anyone behind of me?
		Don't worry, I'll sit near of you.
		Clara and I sat in the garden, looking at the stars above of us.
		From the plane, we could see farms and fields under of us.
	poss	Why are you drawing this circle around mine?
		It bothers me when she stands behind mine.
		I took a picture of the cat playing near yours while you were sleeping.
		The star above ours is called the North Star.
		Emma and her husband live in the apartment under ours.
	obq (inside)	Something inside me refused to admit that he was dead.
		I understand the pain inside you.
		The doctor said that the tumor inside him was not dangerous.
	of+obq (inside)	My grandma's memory lives on inside of me.
		The doctor forgot his keys inside of you during the operation.
		I like Tom because there's so much happiness inside of him.
	poss (inside)	Since my father died, there's a deep sadness inside mine.
		The priest insisted that the devil was inside hers.

		There's so much hate inside yours that I feel like I don't know you.
Hodiernal	preterite	The president gave a speech on TV two hours ago.
		Tom is at a Star Wars marathon, it started five hours ago.
		Oh no, we're too late! The bus left five minutes ago.
		I have to go home by bus because someone stole my car this morning.
		You probably can't fall asleep because you woke up so late this morning.
	perfect	Susan has called me two hours ago to talk about the party.
		I'm looking for my cat because he has disappeared five hours ago.
		The taxi has arrived five minutes ago, but Mary is not ready yet.
		Of course I want to go to bed, this morning I have woken up at six!
		I don't want pizza for dinner because I have eaten a lot for lunch today.
Causative	cv+pro	The story I told made them cry because it is very sad.
		She makes him comb his hair until it looks decent.
		After each race, I make him drink a lot of water.
		Jenny made her buy a new bookshelf at Ikea.
		He makes him shower before school.
	cv+dp	My mother makes my brother peel all the potatoes
		The teacher made Janine repeat the exam.
		Helen makes the children wash the dishes.
		The doctor makes Paul exercise thirty minutes every day.
		The teacher made the students read a book.
	per+pro	They were making him wait on a chair in the living room.
		The political situation of her country was making her fear a war.
		The singer was making them sing a song with her.
		His grandma was making him eat all the carrots.
		The trainer was making her run for ten minutes.

Fillers	You have to read this book, no matter how boring it is.
	Alfred ordered a new pair of shoes for the wedding.
	Kate bought this computer because everyone says it's highly reliable.
	You can't unfasten your seatbelt during this flight.
	I know we're all busy, but let's set a time for our meeting once and for all.
	There are no parks in the vicinity of Fred's apartment.
	Give the chair a wipe before you sit on it.
	Sorry about the noise, I didn't mean to disturb you.
	I'd rather you did your homework before dinner.
	In my small town, I had no opportunity to meet new people.
	Wendy has a cup of tea every day after lunch.
	She did her best to help him, but it was useless.
	She advised him to come back at once if he didn't want to face severe consequences.
	Victor always takes off his shoes before to go into the house.
	The dress I bought on Wednesday wasn't much expensive.
	It rains a lot in June, but more even in July.
	Is a big lake where our house used to be.
	The tailor began to fix the suit made a mistake.
	I cleaned the chair on that Rachel stood.
	The kittens played together until they will fall asleep.
	Can you help me? I'm look for the Sagrada Família.
	Sara is angry because you didn't helped her.
	Read a lot it's important for young children.
	The man waited outside for two hours, despite it was very cold.
	The actress was very happy because she winned an Oscar.
	I'll make pizza for dinner tonight because I have a lot of hunger.

	We must to ask for permission before opening the window.
	Alice said that Richard hurt herself with the hammer.
	It makes five years that the town was destroyed by an earthquake.
	Vicky's hair is such long that it touches the floor.
	The glass fell because you left it at the border of the table.
	The pianist ended the concert in his favourite song.
	Tom looks forward to travel to New York this summer
	It was only two weeks ago since Paula's baby was born
	Iris was thinking to go to bed when the phone rang.
	They bought the house already a year ago.
	She can't buy a new car because she has very few money
	It is important to consider all perspectives of the problem
	Boris and Carla got lost and had to remake their steps to find their way back home.

Table A.3. English AJT, version 3.

Condition group	Condition	Item
LPSPs	obq	Why are you drawing this circle around me?
		It bothers me when she stands behind me.
		I took a picture of the cat playing near you while you were sleeping.
		The star above us is called the North Star
		Emma and her husband live in the apartment under us.
	of+obq	People around of me are always lying.
		We have to walk in line now, make sure you stay behind of me.
		Do you know the man who was standing near of you?
		We stopped under the tree and looked at the leaves above of us.
		During the earthquake, we could feel the ground shake under of us.
	poss	Everyone around mine started dancing at the same time.
		Is there anyone behind mine?
		Don't worry, I'll sit near yours.
		Clara and I sat in the garden, looking at the stars above ours.
		From the plane, we could see farms and fields under ours.
	obq (inside)	My grandma's memory lives on inside me.
		The doctor forgot his keys inside you during the operation.
		I like Tom because there's so much happiness inside him.
	of+obq (inside)	Since my father died, there's a deep sadness inside of me.
		The priest insisted that the devil was inside of her.
		There's so much hate inside of you that I feel like I don't know you.
	poss (inside)	Something inside mine refused to admit that he was dead.
		I understand the pain inside yours.

		The doctor said that the tumor inside his was not dangerous.
Hodiernal	preterite	Susan called me two hours ago to talk about the party.
		The taxi arrived five minutes ago, but Mary is not ready yet.
		I don't want pizza for dinner because I ate a lot for lunch today.
		Tom is at a Star Wars marathon, it started five hours ago.
		I have to go home by bus because someone stole my car this morning.
	perfect	I'm looking for my cat because he has disappeared five hours ago.
		Of course I want to go to bed, this morning I have woken up at six!
		The president has given a speech on TV two hours ago.
		Oh no, we're too late! The bus has left five minutes ago.
		You probably can't fall asleep because you have woken up so late this morning.
Causative	cv+pro	My mother makes him peel all the potatoes.
		The teacher made her repeat the exam.
		Helen makes them wash the dishes.
		The doctor makes him exercise thirty minutes every day.
		The teacher made them read a book.
	cv+dp	They made the visitor wait on a chair in the living room.
		The political situation of her country made Rita fear a war.
		The singer made the fans sing a song with her.
		His grandma made Charlie eat all the carrots.
		The trainer made Diana run for ten minutes.
	per+pro	The story I told is making them cry because it is very sad.
		She is making him comb his hair until it looks decent.
		After each race, I'm making him drink a lot of water.
		Jenny is making her buy a new bookshelf at Ikea.

		He is making him shower before school.
Fillers		You have to read this book, no matter how boring it is.
		Alfred ordered a new pair of shoes for the wedding.
		Kate bought this computer because everyone says it's highly reliable.
		You can't unfasten your seatbelt during this flight.
		I know we're all busy, but let's set a time for our meeting once and for all.
		There are no parks in the vicinity of Fred's apartment.
		Give the chair a wipe before you sit on it.
		Sorry about the noise, I didn't mean to disturb you.
		I'd rather you did your homework before dinner.
		In my small town, I had no opportunity to meet new people.
		Wendy has a cup of tea every day after lunch.
		She did her best to help him, but it was useless.
		She advised him to come back at once if he didn't want to face severe consequences.
		Victor always takes off his shoes before to go into the house.
		The dress I bought on Wednesday wasn't much expensive.
		It rains a lot in June, but more even in July.
		Is a big lake where our house used to be.
		The tailor began to fix the suit made a mistake.
		I cleaned the chair on that Rachel stood.
		The kittens played together until they will fall asleep.
		Can you help me? I'm look for the Sagrada Família.
		Sara is angry because you didn't helped her.
		Read a lot it's important for young children.
		The man waited outside for two hours, despite it was very cold.
		The actress was very happy because she winned an Oscar.

		I'll make pizza for dinner tonight because I have a lot of hunger.
		We must to ask for permission before opening the window.
		Alice said that Richard hurt herself with the hammer.
		It makes five years that the town was destroyed by an earthquake.
		Vicky's hair is such long that it touches the floor.
		The glass fell because you left it at the border of the table.
		The pianist ended the concert in his favourite song.
		Tom looks forward to travel to New York this summer
		It was only two weeks ago since Paula's baby was born
		Iris was thinking to go to bed when the phone rang.
		They bought the house already a year ago.
		She can't buy a new car because she has very few money
		It is important to consider all perspectives of the problem
		Boris and Carla got lost and had to remake their steps to find their way back home.

Catalan AJT

Table A.4. Catalan AJT, version 1.

Condition group	Condition	Item
LPSPs	obq	Els nens de l'esplai van fer una rotllana al voltant mi.
		Darrere mi hi ha una porta secreta.
		Has vist que la Gemma sempre s'asseu a prop tu?
		Sobre nosaltres, el sostre va començar a esmicolar-se.
		Som soldats de rang inferior, no hi ha ningú sota nosaltres.
	of+obq	L'Aina va col·locar tots els seus peluixos al voltant de mi.
		El nen sempre s'amaga darrere de mi perquè és tímid.

		La palanca per obrir la porta és a prop de tu.
		Com es diu aquesta constel·lació que hi ha just a sobre de nosaltres?
		A sota de nosaltres hi viuen els germans Feliu.
	poss	Mentre em banyava al mar, els peixos nedaven al voltant meu.
		No vaig tenir temps de reaccionar, la porta es va tancar darrere meu.
		Aquella dona que seia a prop teu és la germana de l'Octavi.
		Les gavines volaven per sobre nostre.
		Pel castell de diumenge, el cap de colla diu que em posi a sota teu.
	obq (inside)	Quan va dir que se n'anava, vaig notar una punxada dins mi.
		Tots els remordiments que hi havia dins ell van desaparèixer de cop.
		Després de fer ioga, no sents una sensació de pau dins tu?
	of+obq (inside)	Hi ha un secret dins de mi que no revelaré mai.
		Hi ha molt de potencial dins d'ella.
		Has d'aprendre a canalitzar millor la força que hi ha dins de tu.
	poss (inside)	Sóc la cova del tresor i dins meu hi trobareu muntanyes d'or!
		Ets un gran pianista, hauries de treure l'artista que hi ha dins teu.
		Dins seu s'hi amaga un home cruel i sanguinari, encara que no ho sembli.
Hodiernal	preterite	Els teus pares van arribar fa dues hores.
		Només fa cinc minuts que van obrir les portes, però el museu ja és ple.
		La Berta va aparcar el cotxe davant de casa fa cinc hores i encara hi és.
		Encara no tinc ganes de dinar, avui vaig esmorzar molt tard.
		Aquest matí va sortir el sol molt aviat perquè avui és el solstici d'estiu.
	perfect	Fa dues hores m'han dit que ja venien, no sé on deuen ser.
		L'Olga ha marxat fa cinc minuts per no fer tard a l'assaig.
		Com pot ser que no tinguis gana si fa més de cinc hores que has dinat?

		Vull anar-me'n a dormir ja, que aquest matí m'he despertat a les cinc per culpa del gall.
		He d'agafar el tren per venir al sopar perquè el meu cotxe s'ha espatllat aquest matí.
Causative	cv+pro	Jo feia-la venir a casa meva perquè sóc un mandrós.
		Vam marxar del restaurant perquè no feien-lo callar.
		Els exercicis que li vas recomanar feien-lo millorar molt.
		Fèiem-los sopar aviat perquè venien afamats de l'escola.
		Tu sabies que feies-los patir tant?
	cv+dp	En Joan feia la seva germana arribar tard a la feina.
		Els contes que explicava el professor feien els alumnes somniar.
		El pallasso feia els nens riure amb les seves ximpleries.
		La música alegre de la banda feia la Núria ballar.
		Feien a l'Eulàlia agafar el paraigües perquè no es mullés.
	per+pro	L'Anna va fer-los córrer fins a casa després de classe.
		El seu pare va fer-li escombrar l'escala.
		Què era el que va fer-lo relliscar?
		El final de la cançó va fer-la plorar desconsoladament.
		L'olor del pastís va fer-li agafar gana.
Fillers		Si fas bondat menjarem pizza per sopar.
		No tinc ganes d'anar a la fira amb ell perquè és un pesat.
		Què vols dir, que tot el que ens va dir era mentida?
		L'Arantxa es va treure el carnet de conduir en un mes.
		Les coses importants són les que no ho semblen.
		La cultura és l'opció política més revolucionària a llarg termini.
		Tinc una veïna que fa dies que assaja el mateix monòleg al balcó.
		Ara que hem comprat la tenda nova ja podrem anar d'acampada.

	No diguis blat fins que no sigui al sac i ben lligat.
	Quantes vegades t'ho hauré de repetir?
	Ahir vam fer panellets per celebrar la castanyada.
	Mentre esperes que vingui, pots fer una volta pel parc.
	No entenc per què no em vols dir què et molesta.
	Dissabte vam dur flors a la tomba de l'avi.
	Tens raó, no tornaré a dirigir-li la paraula.
	He trobat aquestes claus al pis de baix, són teves?
	A l'estiu ens agrada molt anar d'excursió pel Pirineu.
	Fa dues hores que sento bordar un gos, però no sé on és.
	La Laia no es trobava bé i va decidir quedar-se a casa.
	El Marc en sap molt, de fer pa, i diu que algun dia obrirà una fleca.
	Quan arribi la teva germana baixarem al parc a jugar una estona.
	Gairebé ja no recordo les cançons que vaig aprendre de petita.
	La poesia i la pintura són les seves grans passions.
	Quina barra que té el teu germà!
	Vols venir a la biblioteca amb nosaltres?
	M'agradava molt jugar a fet i amagar al jardí dels avis.
	Tot això ens passa per no haver fet cas dels filòsofs.
	Per què t'estàs aquí com un estaquirot parat?
	Vam haver de fer mans i mànigues per resoldre'l el problema.
	Val més retirar-se a temps que no fer-ho i penedir-s'hi.
	La Clara va veure un llamp travessar l'arbre del jardí.
	Buscàvem l'encenedor després, ara no tenim temps.
	Som masses persones, no hi cabrem pas, aquí.
	Des dalt el turó podràs veure el mar si fa bon temps.
	No podré venir perquè tinc que anar al metge.

		La directora considera que l'educació musical també està important.
		Va invertir l'herència amb accions d'una cadena de supermercats vegans.
		Van haver de portar al veterinari perquè s'havia fet mal en una pota el gos.
		La Sara ens va dir que tornarà a tallar-se els cabells mai.

Table A.5. Catalan AJT, version 2.

Condition group	Condition	Item
LPSPs	obq	Mentre em banyava al mar, els peixos nedaven al voltant mi.
		No vaig tenir temps de reaccionar, la porta es va tancar darrere mi.
		Aquella dona que seia a prop tu és la germana de l'Octavi.
		Les gavines volaven per sobre nosaltres.
		Pel castell de diumenge, el cap de colla diu que em posi a sota tu.
	of+obq	Els nens de l'esplai van fer una rotllana al voltant de mi.
		Darrere de mi hi ha una porta secreta.
		Has vist que la Gemma sempre s'asseu a prop de tu?
		Sobre de nosaltres, el sostre va començar a esmicolar-se.
		Som soldats de rang inferior, no hi ha ningú sota de nosaltres.
	poss	L'Aina va col·locar tots els seus peluixos al voltant meu.
		El nen sempre s'amaga darrere meu perquè és tímid.
		La palanca per obrir la porta és a prop teu.
		Com es diu aquesta constel·lació que hi ha just a sobre nostre?
		A sota nostre hi viuen els germans Feliu.
	obq (inside)	Hi ha un secret dins mi que no revelaré mai.
		Hi ha molt de potencial dins ella.
		Has d'aprendre a canalitzar millor la força que hi ha dins tu.

	of+obq (inside)	Sóc la cova del tresor i dins de mi hi trobareu muntanyes d'or!
		Ets un gran pianista, hauries de treure l'artista que hi ha dins de tu.
		Dins d'ell s'hi amaga un home cruel i sanguinari, encara que no ho sembli.
	poss (inside)	Quan va dir que se n'anava, vaig notar una punxada dins meu.
		Tots els remordiments que hi havia dins seu van desaparèixer de cop.
		Després de fer ioga, no sents una sensació de pau dins teu?
Hodiernal	preterite	Fa dues hores em van dir que ja venien, no sé on deuen ser.
		L'Olga va marxar fa cinc minuts per no fer tard a l'assaig.
		Com pot ser que no tinguis gana si fa més de cinc hores que vas dinar?
		Vull anar-me'n a dormir ja, que aquest matí em vaig despertar a les cinc per culpa del gall.
		He d'agafar el tren per venir al sopar perquè el meu cotxe es va espatllar aquest matí.
	perfect	Els teus pares han arribat fa dues hores.
		Només fa cinc minuts que han obert les portes, però el museu ja és ple.
		La Berta ha aparcat el cotxe davant de casa fa cinc hores i encara hi és.
		Encara no tinc ganes de dinar, avui he esmorzat molt tard.
		Aquest matí ha sortit el sol molt aviat perquè avui és el solstici d'estiu.
Causative	cv+pro	En Joan feia-la arribar tard a la feina.
		Els contes que explicava el professor feien-los somniar.
		El pallasso feia'ls riure amb les seves ximpleries.
		La música alegre de la banda feia-la ballar.
		Feien-li agafar el paraigües perquè no es mullés.
	cv+dp	L'Anna feia els seus germans córrer fins a casa després de classe.
		El seu pare feia a l'Oriol escombrar l'escala.
		Què era el que feia el pingüí relliscar?
		El final de la cançó feia l'Adela plorar desconsoladament.

		L'olor del pastís feia a la Sònia agafar gana.
	per+pro	Jo vaig fer-la venir a casa meva perquè sóc un mandrós.
		Vam marxar del restaurant perquè no van fer-lo callar.
		Els exercicis que li vas recomanar van fer-lo millorar molt.
		Vam fer-los sopar aviat perquè venien afamats de l'escola.
		Tu sabies que vas fer-los patir tant?
Fillers		Si fas bondat menjarem pizza per sopar.
		No tinc ganes d'anar a la fira amb ell perquè és un pesat.
		Què vols dir, que tot el que ens va dir era mentida?
		L'Arantxa es va treure el carnet de conduir en un mes.
		Les coses importants són les que no ho semblen.
		La cultura és l'opció política més revolucionària a llarg termini.
		Tinc una veïna que fa dies que assaja el mateix monòleg al balcó.
		Ara que hem comprat la tenda nova ja podrem anar d'acampada.
		No diguis blat fins que no sigui al sac i ben lligat.
		Quantes vegades t'ho hauré de repetir?
		Ahir vam fer panellets per celebrar la castanyada.
		Mentre esperes que vingui, pots fer una volta pel parc.
		No entenc per què no em vols dir què et molesta.
		Dissabte vam dur flors a la tomba de l'avi.
		Tens raó, no tornaré a dirigir-li la paraula.
		He trobat aquestes claus al pis de baix, són teves?
		A l'estiu ens agrada molt anar d'excursió pel Pirineu.
		Fa dues hores que sento bordar un gos, però no sé on és.
		La Laia no es trobava bé i va decidir quedar-se a casa.
		El Marc en sap molt, de fer pa, i diu que algun dia obrirà una fleca.

	Quan arribi la teva germana baixarem al parc a jugar una estona.
	Gairebé ja no recordo les cançons que vaig aprendre de petita.
	La poesia i la pintura són les seves grans passions.
	Quina barra que té el teu germà!
	Vols venir a la biblioteca amb nosaltres?
	M'agradava molt jugar a fet i amagar al jardí dels avis.
	Tot això ens passa per no haver fet cas dels filòsofs.
	Per què t'estàs aquí com un estaquirot parat?
	Vam haver de fer mans i mànigues per resoldre'l el problema.
	Val més retirar-se a temps que no fer-ho i penedir-s'hi.
	La Clara va veure un llamp travessar l'arbre del jardí.
	Buscàvem l'encenedor després, ara no tenim temps.
	Som masses persones, no hi cabrem pas, aquí.
	Des dalt el turó podràs veure el mar si fa bon temps.
	No podré venir perquè tinc que anar al metge.
	La directora considera que l'educació musical també està important.
	Va invertir l'herència amb accions d'una cadena de supermercats vegans.
	Van haver de portar al veterinari perquè s'havia fet mal en una pota el gos.
	La Sara ens va dir que tornarà a tallar-se els cabells mai.

Table A.6. Catalan AJT, version 3.

Condition group	Condition	Item
LPSPs	obq	L'Aina va col·locar tots els seus peluixos al voltant mi.
		El nen sempre s'amaga darrere mi perquè és tímid.
		La palanca per obrir la porta és a prop tu.
		Com es diu aquesta constel·lació que hi ha just a sobre nosaltres?
		A sota nosaltres hi viuen els germans Feliu.
	of+obq	Mentre em banyava al mar, els peixos nedaven al voltant de mi.
		No vaig tenir temps de reaccionar, la porta es va tancar darrere de mi.
		Aquella dona que seia a prop de tu és la germana de l'Octavi.
		Les gavines volaven per sobre de nosaltres.
		Pel castell de diumenge, el cap de colla diu que em posi a sota de tu.
	poss	Els nens de l'esplai van fer una rotllana al voltant meu.
		Darrere meu hi ha una porta secreta.
		Has vist que la Gemma sempre s'asseu a prop teu?
		Sobre nostre, el sostre va començar a esmicolar-se.
		Som soldats de rang inferior, no hi ha ningú sota nostre.
	obq (inside)	Sóc la cova del tresor i dins mi hi trobareu muntanyes d'or!
		Ets un gran pianista, hauries de treure l'artista que hi ha dins tu.
		Dins ell s'hi amaga un home cruel i sanguinari, encara que no ho sembli.
	of+obq (inside)	Quan va dir que se n'anava, vaig notar una punxada dins de mi.
		Tots els remordiments que hi havia dins d'ell van desaparèixer de cop.
		Després de fer ioga, no sents una sensació de pau dins de tu?
	poss (inside)	Hi ha un secret dins meu que no revelaré mai.
		Hi ha molt de potencial dins seu.

		Has d'aprendre a canalitzar millor la força que hi ha dins teu.
Hodiernal	preterite	Els teus pares van arribar fa dues hores.
		La Berta va aparcar el cotxe davant de casa fa cinc hores i encara hi és
		Aquest matí va sortir el sol molt aviat perquè avui és el solstici d'estiu
		L'Olga va marxar fa cinc minuts per no fer tard a l'assaig.
		Vull anar-me'n a dormir ja, que aquest matí em vaig despertar a les cinc per culpa del gall.
	perfect	Només fa cinc minuts que han obert les portes, però el museu ja és ple.
		Encara no tinc ganes de dinar, avui he esmorzat molt tard.
		Fa dues hores m'han dit que ja venien, no sé on deuen ser
		Com pot ser que no tinguis gana si fa més de cinc hores que has dinat?
		He d'agafar el tren per venir al sopar perquè el meu cotxe s'ha espatllat aquest matí.
Causative	cv+pro	L'Anna feia-los córrer fins a casa desprès de classe.
		El seu pare feia-li escombrar l'escala.
		Què era el que feia-lo relliscar?
		El final de la cançó feia-la plorar desconsoladament.
		L'olor del pastís feia-li agafar gana.
	cv+dp	Jo feia la Júlia venir a casa meva perquè sóc un mandrós.
		Vam marxar del restaurant perquè no feien el nen callar.
		Els exercicis que li vas recomanar van fer el futbolista millorar molt.
		Fèiem els nens sopar aviat perquè venien afamats de l'escola.
		Tu sabies que feies els teus pares patir tant?
	per+pro	En Joan va fer-la arribar tard a la feina.
		Els contes que explicava el professor van fer-los somniar.
		El pallasso va fer-los riure amb les seves ximpleries.
		La música alegre de la banda va fer-la ballar.

		Van fer-li agafar el paraigües perquè no es mullés.
Fillers		Si fas bondat menjarem pizza per sopar.
		No tinc ganes d'anar a la fira amb ell perquè és un pesat.
		Què vols dir, que tot el que ens va dir era mentida?
		L'Arantxa es va treure el carnet de conduir en un mes.
		Les coses importants són les que no ho semblen.
		La cultura és l'opció política més revolucionària a llarg termini.
		Tinc una veïna que fa dies que assaja el mateix monòleg al balcó.
		Ara que hem comprat la tenda nova ja podrem anar d'acampada.
		No diguis blat fins que no sigui al sac i ben lligat.
		Quantes vegades t'ho hauré de repetir?
		Ahir vam fer panellets per celebrar la castanyada.
		Mentre esperes que vingui, pots fer una volta pel parc.
		No entenc per què no em vols dir què et molesta.
		Dissabte vam dur flors a la tomba de l'avi.
		Tens raó, no tornaré a dirigir-li la paraula.
		He trobat aquestes claus al pis de baix, són teves?
		A l'estiu ens agrada molt anar d'excursió pel Pirineu.
		Fa dues hores que sento bordar un gos, però no sé on és.
		La Laia no es trobava bé i va decidir quedar-se a casa.
		El Marc en sap molt, de fer pa, i diu que algun dia obrirà una fleca.
		Quan arribi la teva germana baixarem al parc a jugar una estona.
		Gairebé ja no recordo les cançons que vaig aprendre de petita.
		La poesia i la pintura són les seves grans passions.
		Quina barra que té el teu germà!
		Vols venir a la biblioteca amb nosaltres?
		M'agradava molt jugar a fet i amagar al jardí dels avis.

	Tot això ens passa per no haver fet cas dels filòsofs.
	Per què t'estàs aquí com un estaquirot parat?
	Vam haver de fer mans i mànigues per resoldre'l el problema.
	Val més retirar-se a temps que no fer-ho i penedir-s'hi.
	La Clara va veure un llamp travessar l'arbre del jardí.
	Buscàvem l'encenedor després, ara no tenim temps.
	Som masses persones, no hi cabrem pas, aquí.
	Des dalt el turó podràs veure el mar si fa bon temps.
	No podré venir perquè tinc que anar al metge.
	La directora considera que l'educació musical també està important.
	Va invertir l'herència amb accions d'una cadena de supermercats vegans.
	Van haver de portar al veterinari perquè s'havia fet mal en una pota el gos.
	La Sara ens va dir que tornarà a tallar-se els cabells mai.

Spanish AJT

Table A.7. Spanish AJT, version 1.

Condition group	Condition	Item
LPSPs	obq	Los jugadores tendrán que pasarse la pelota alrededor mí sin que yo se la quite.
		Encontrarás el llavero en la mesa que hay detrás mí.
		Si se vuelve a sentar cerca ti, avísame.
		Encima nosotros hay varias capas de cimiento armado.
		¿Crees que el suelo que hay debajo nosotros cederá?
	of+obq	Había cinco policías alrededor de mí y tres alrededor de Úrsula.
		Ya sé que no hay nadie detrás de mí, pero me siento observada.
		En realidad vivo bastante cerca de ti, a dos minutos andando.

		De repente, las nubes se abrieron encima de nosotros y pudimos ver la luna.
		Siempre estarán debajo de nosotros porque somos mucho mejores.
	poss	Cuando me desperté en el prado había unas cuantas vacas comiendo alrededor mío.
		La cola no es demasiado larga, ahora hay tres personas detrás mío.
		¿Puedes abrir la puerta que está cerca tuyo?
		La mancha que hay en la pared, justo encima nuestro, es de moho.
		Nos paramos en mitad del puente, mientras el río rugía debajo nuestro.
	obq (inside)	Ellos no lo notaron, pero dentro mí se arremolinaban un montón de dudas.
		Estoy convencida de que dentro ti se esconde una persona encantadora.
		El adivino dijo que detectaba mucho dolor dentro ella.
	of+obq (inside)	Raquel cree que la clave está dentro de él.
		Dentro de ti sólo hay amargura, se nota cuando hablas.
		Siento un gran vacío dentro de mí desde que se fue Juan.
	poss (inside)	Dentro suyo hay un veneno que le acabará matando.
		Por mucho que me esfuerzo no consigo cerrar la herida que dejaste dentro mío.
		Hay un héroe anónimo en todos nosotros, también dentro tuyo.
Hodiernal	preterite	Por suerte he llegado a tiempo, me avisaron hace dos horas.
		Lucía y Pablo llegaron hace cinco horas.
		Empezó a llover hace cinco minutos.
		Esta mañana nos encontramos con Teresa de camino al puerto.
		Estoy muy lleno porque comí tres platos de pasta al mediodía.
	perfect	Hace dos horas, mientras dormías, han llamado tus padres.
		Hace cinco horas que se ha ido y ya oscurece, ¿no deberíamos llamarle?
		¿Ya te vas? ¡Pero si has llegado hace cinco minutos!
		Hoy, nada más salir de casa, mi coche se ha estropeado.

		Claro que no para de bostezar, ¡con lo temprano que se ha levantado hoy!
Causative	cv+pro	Harele comprar el periódico de camino a casa.
		El profesor harales leer en silencio cada día hasta que se comporten.
		Harele dejar los zapatos en la entrada para que no ensucie el salón.
		Las condiciones del mercado haranles subir los precios.
		¿Te das cuenta de lo mucho que harasles sufrir si no confiesas?
	cv+dp	Este chiste seguro que hará a todos los invitados reír.
		Isabel hará a Sandra preparar un ramo de rosas
		La canción que cantaremos hará a Rocío pensar en su pasado.
		El entrenador hará a los futbolistas correr alrededor del campo.
		Haré a los niños guardar los juguetes antes de acostarse.
	per+pro	Voy a hacerles pensar en lo que han hecho, ya verás como se arrepienten.
		¿Vas a hacerle llegar tarde otra vez?
		Si no llegas a la hora acordada vas a hacerles sospechar.
		Voy a hacerle repetir el poema hasta que se lo aprenda de memoria.
		El comisario va a hacerle sudar la gota gorda en el interrogatorio.
Fillers		Las croquetas que hace mi abuela son las mejores del mundo.
		Las flores que me regalaron ayer ya están mustias.
		Ya es mala suerte que se estropeara el telesilla justo cuando subimos nosotros.
		La inundación estropeó la mitad de los libros de la librería de la esquina.
		Pues ahora mismo no me acuerdo de su nombre.
		Creo que una de las ruedas del coche está más desgastada que el resto.
		Si Julián sigue comiendo tantas golosinas se pondrá enfermo.
		Los militantes apoyaron a la dirección del partido con ciertas reservas.
		Hablar japonés no es tan difícil como parece.
		No hables tan alto, puede que nos estén escuchando.

		El rey le exigió al presidente que se callara.
		Memorizad bien las ortográficas reglas para el examen de mañana.
		No me puedo creer que Blanca hayas tirado la toalla con tanta facilidad.
		El mago insistía que la baraja no estaba trucada.
		Lo raro hoy en día es que el tren llegando a la hora.
		El billete débese validar antes de bajar al andén.
		Voy guardar los tres trapos en el cajón.
		Patricia le publicaron un artículo en el periódico.
		El mío jersey favorito encogió en la lavadora.
		No dejar la taza tan cerca del borde de la mesa, por favor.
		Cristina nos contó de que había hablado con Martín ayer.
		¿Qué sospecha Julia que sus padres harán mañana?
		La Nieves llegó tarde al trabajo por culpa de la lluvia.
		Las ruedas no medían por lo menos de 26 centímetros de diámetro.
		Los arqueólogos descubrieron un sinfín en la cueva de pinturas rupestres.
		Todos consiguieron de llegar a la meta en menos de cinco horas.
		A lo mejor el televisor se ha estropeado porque ya era viejo demasiado.

Table A.8. Spanish AJT, version 2.

Condition group	Condition	Item
LPSPs	obq	Cuando me desperté en el prado había unas cuantas vacas comiendo alrededor mí.
		La cola no es demasiado larga, ahora hay tres personas detrás mí.
		¿Puedes abrir la puerta que está cerca ti?
		La mancha que hay en la pared, justo encima nosotros, es de moho.
		Nos paramos en mitad del puente, mientras el río rugía debajo nosotros.

	of+obq	Los jugadores tendrán que pasarse la pelota alrededor de mí sin que yo se la quite.
		Encontrarás el llavero en la mesa que hay detrás de mí.
		Si se vuelve a sentar cerca de ti, avísame.
		Encima de nosotros hay varias capas de cimiento armado.
		¿Crees que el suelo que hay debajo de nosotros cederá?
	poss	Había cinco policías alrededor mío y tres alrededor de Úrsula.
		Ya sé que no hay nadie detrás mío, pero me siento observada.
		En realidad vivo bastante cerca tuyo, a dos minutos andando.
		De repente, las nubes se abrieron encima nuestro y pudimos ver la luna.
		Siempre estarán debajo nuestro porque somos mucho mejores.
	obq (inside)	Raquel cree que la clave está dentro él.
		Dentro ti sólo hay amargura, se nota cuando hablas.
		Siento un gran vacío dentro mí desde que se fue Juan.
	of+obq (inside)	Dentro de él hay un veneno que le acabará matando.
		Por mucho que me esfuerzo no consigo cerrar la herida que dejaste dentro de mí.
		Hay un héroe anónimo en todos nosotros, también dentro de ti.
	poss (inside)	Ellos no lo notaron, pero dentro mío se arremolinaban un montón de dudas.
		Estoy convencida de que dentro tuyo se esconde una persona encantadora.
		El adivino dijo que detectaba mucho dolor dentro suyo.
Hodiernal	preterite	Hace dos horas, mientras dormías, llamaron tus padres
		Hace cinco horas que se fue y ya oscurece, ¿no deberíamos llamarle?
		¿Ya te vas? ¡Pero si llegaste hace cinco minutos!
		Hoy, nada más salir de casa, mi coche se estropeó.
		Claro que no para de bostezar, ¡con lo temprano que se levantó hoy!

	perfect	Por suerte he llegado a tiempo, me han avisado hace dos horas.
		Lucía y Pablo han llegado hace cinco horas.
		Ha empezado a llover hace cinco minutos.
		Esta mañana nos hemos encontrado con Teresa de camino al puerto.
		Estoy muy lleno porque he comido tres platos de pasta al mediodía.
Causative	cv+pro	Este chiste seguro que harales reír.
		Isabel harale preparar un ramo de rosas.
		La canción que cantaremos harale pensar en su pasado.
		El entrenador harales correr alrededor del campo.
		Hareles guardar los juguetes antes de acostarse.
	cv+dp	Haré a los chicos pensar en lo que han hecho, ya verás como se arrepienten.
		¿Harás a tu hermano llegar tarde otra vez?
		Si no llegas a la hora acordada harás a tus amigos sospechar.
		Haré a Inés repetir el poema hasta que se lo aprenda de memoria.
		El comisario hará al mafioso sudar la gota gorda en el interrogatorio.
	per+pro	Voy a hacerle comprar el periódico de camino a casa.
		El profesor va a hacerles leer en silencio cada día hasta que se comporten.
		Voy a hacerle dejar los zapatos en la entrada para que no ensucie el salón.
		Las condiciones del mercado van a hacerles subir los precios.
		¿Te das cuenta de lo mucho que vas a hacerles sufrir si no confiesas?
Fillers		Las croquetas que hace mi abuela son las mejores del mundo.
		Las flores que me regalaron ayer ya están mustias.
		Ya es mala suerte que se estropeara el telesilla justo cuando subimos nosotros.
		La inundación estropeó la mitad de los libros de la librería de la esquina.
		Pues ahora mismo no me acuerdo de su nombre.

	Creo que una de las ruedas del coche está más desgastada que el resto.
	Si Julián sigue comiendo tantas golosinas se pondrá enfermo.
	Los militantes apoyaron a la dirección del partido con ciertas reservas.
	Hablar japonés no es tan difícil como parece.
	No hables tan alto, puede que nos estén escuchando.
	El rey le exigió al presidente que se callara.
	Memorizad bien las ortográficas reglas para el examen de mañana.
	No me puedo creer que Blanca hayas tirado la toalla con tanta facilidad.
	El mago insistía que la baraja no estaba trucada.
	Lo raro hoy en día es que el tren llegando a la hora.
	El billete débese validar antes de bajar al andén.
	Voy guardar los tres trapos en el cajón.
	Patricia le publicaron un artículo en el periódico.
	El mío jersey favorito encogió en la lavadora.
	No dejar la taza tan cerca del borde de la mesa, por favor.
	Cristina nos contó de que había hablado con Martín ayer.
	¿Qué sospecha Julia que sus padres harán mañana?
	La Nieves llegó tarde al trabajo por culpa de la lluvia.
	Las ruedas no medían por lo menos de 26 centímetros de diámetro.
	Los arqueólogos descubrieron un sinfín en la cueva de pinturas rupestres.
	Todos consiguieron de llegar a la meta en menos de cinco horas.
	A lo mejor el televisor se ha estropeado porque ya era viejo demasiado.

Table A.9. Spanish AJT, version 3.

Condition group	Condition	Item
LPSPs	obq	Había cinco policías alrededor mí y tres alrededor de Úrsula.
		Ya sé que no hay nadie detras mí, pero me siento observada.
		En realidad vivo bastante cerca ti, a dos minutos andando.
		De repente, las nubes se abrieron encima nosotros y pudimos ver la luna.
		Siempre estarán debajo nosotros porque somos mucho mejores.
	of+obq	Cuando me desperté en el prado había unas cuantas vacas comiendo alrededor de mí.
		La cola no es demasiado larga, ahora hay tres personas detrás de mí.
		¿Puedes abrir la puerta que está cerca de ti?
		La mancha que hay en la pared, justo encima de nosotros, es de moho.
		Nos paramos en mitad del puente, mientras el río rugía debajo de nosotros.
	poss	Los jugadores tendrán que pasarse la pelota alrededor mío sin que yo se la quite.
		Encontrarás el llavero en la mesa que hay detrás mío.
		Si se vuelve a sentar cerca tuyo, avísame.
		Encima nuestro hay varias capas de cimiento armado.
		¿Crees que el suelo que hay debajo nuestro cederá?
	obq (inside)	Dentro él hay un veneno que le acabará matando.
		Por mucho que me esfuerzo no consigo cerrar la herida que dejaste dentro mí.
		Hay un héroe anónimo en todos nosotros, también dentro ti.
	of+obq (inside)	Ellos no lo notaron, pero dentro de mí se arremolinaban un montón de dudas.
		Estoy convencida de que dentro de ti se esconde una persona encantadora.
		El adivino dijo que detectaba mucho dolor dentro de ella.
	poss	Raquel cree que la clave está dentro suyo.

	(inside)	Dentro tuyo sólo hay amargura, se nota cuando hablas.
		Siento un gran vacío dentro mío desde que se fue Juan.
Hodiernal	preterite	Por suerte he llegado a tiempo, me avisaron hace dos horas.
		Empezó a llover hace cinco minutos.
		Estoy muy lleno porque comí tres platos de pasta al mediodía.
		Hace cinco horas que se fue y ya oscurece, ¿no deberíamos llamarle?
		Hoy, nada más salir de casa, mi coche se estropeó.
	perfect	Lucía y Pablo han llegado hace cinco horas.
		Esta mañana nos hemos encontrado con Teresa de camino al puerto.
		Hace dos horas, mientras dormías, han llamado tus padres.
		¿Ya te vas? ¡Pero si has llegado hace cinco minutos!
		Claro que no para de bostezar, ¡con lo temprano que se ha levantado hoy!
Causative	cv+pro	Hareles pensar en lo que han hecho, ya verás como se arrepienten.
		¿Harasle llegar tarde otra vez?
		Si no llegas a la hora acordada harasles sospechar.
		Harele repetir el poema hasta que se lo aprenda de memoria.
		El comisario harale sudar la gota gorda en el interrogatorio.
	cv+dp	Haré a Beatriz comprar el periódico de camino a casa.
		El profesor hará a los alumnos leer en silencio cada día hasta que se comporten.
		Voy a hacer a Fernando dejar los zapatos en la entrada para que no ensucie el salón.
		Las condiciones del mercado van a hacer a los comerciantes subir los precios.
		¿Te das cuenta de lo mucho que harás a tus padres sufrir si no confiesas?
	per+pro	Este chiste seguro que va a hacerles reír.
		Isabel va a hacerle preparar un ramo de rosas.
		La canción que cantaremos va a hacerle pensar en su pasado.

		El entrenador va a hacerles correr alrededor del campo.
		Voy a hacerles guardar los juguetes antes de acostarse.
Fillers		Las croquetas que hace mi abuela son las mejores del mundo.
		Las flores que me regalaron ayer ya están mustias.
		Ya es mala suerte que se estropeara el telesilla justo cuando subimos nosotros.
		La inundación estropeó la mitad de los libros de la librería de la esquina.
		Pues ahora mismo no me acuerdo de su nombre.
		Creo que una de las ruedas del coche está más desgastada que el resto.
		Si Julián sigue comiendo tantas golosinas se pondrá enfermo.
		Los militantes apoyaron a la dirección del partido con ciertas reservas.
		Hablar japonés no es tan difícil como parece.
		No hables tan alto, puede que nos estén escuchando.
		El rey le exigió al presidente que se callara.
		Memorizad bien las ortográficas reglas para el examen de mañana.
		No me puedo creer que Blanca hayas tirado la toalla con tanta facilidad.
		El mago insistía que la baraja no estaba trucada.
		Lo raro hoy en día es que el tren llegando a la hora.
		El billete débese validar antes de bajar al andén.
		Voy guardar los tres trapos en el cajón.
		Patricia le publicaron un artículo en el periódico.
		El mío jersey favorito encogió en la lavadora.
		No dejar la taza tan cerca del borde de la mesa, por favor.
		Cristina nos contó de que había hablado con Martín ayer.
		¿Qué sospecha Julia que sus padres harán mañana?
		La Nieves llegó tarde al trabajo por culpa de la lluvia.
		Las ruedas no medían por lo menos de 26 centímetros de diámetro.

	Los arqueólogos descubrieron un sinfín en la cueva de pinturas rupestres.
	Todos consiguieron de llegar a la meta en menos de cinco horas.
	A lo mejor el televisor se ha estropeado porque ya era viejo demasiado.

Appendix B: background questionnaire

Questionnaire for the L3 group

The following questions were answered by the L3 group, in the order in which they are presented. The questions have been translated from Catalan into English for the reader's convenience. They were mandatory unless otherwise stated.

Thank you for completing the first part of the survey! In this second part, you will be asked about the languages you speak and how you use them.

1. How old are you?   _____

2. Select your gender: ❑ male   ❑ female   ❑ non-binary   ❑ rather not say

3. Have you completed any sort of non-compulsory education?   ❑ yes   ❑ no

    - In which field? _____ (optional)

4. Country of birth: _____

5. If you have ever lived in any other countries, fill in the following table with the required information: (optional)

Country	Your age when you moved there	The amount of years you lived there
_____	_____	_____

6. If your parents or grandparents were born in a different country than you, explain it here: (optional)   _____

7. Select any autonomous communities[36] you have ever lived in:
    [multiple checkboxes listing all the autonomous communities in Spain, plus an "Other" option with a free text field]

8. Select the autonomous communities in which your parents and grandparents were born:

---

[36] An autonomous community is the first-level of political and administrative division of Spain.

[multiple checkboxes listing all the autonomous communities in Spain, plus an "Other" option with a free text field]

9. Which languages do you speak? List them here: _____

10. Have you ever had: (optional)

	If yes, please specify:	List corrections here, if relevant:
… a vision problem?		
… a hearing impairment?		
… a language disability?		
… a learning disability?		

-------------------(new section)

When answering each of the questions in this section, bear in mind that the answers are independent from each other. For instance, if Mary went to a school that taught subjects in both Catalan and Spanish for 16 years and also learned English there for 5 years, she will answer that she had 16 years of classes in Catalan, 16 years of classes in Spanish, and 5 years of classes in English in questions 17, 18, and 19, respectively.

11. How old were you when you started learning Catalan?
[options: I learned it from birth, 1, 2, 3… 19, 20 or older]

12. How old were you when you started learning Spanish?
[options: I learned it from birth, 1, 2, 3… 19, 20 or older]

13. How old were you when you started learning English?
[options: I learned it from birth, 1, 2, 3… 19, 20 or older]

14. At which age did you first feel comfortable speaking Catalan?
[options: Since I can remember, 1, 2, 3 … 19, 20 or older, I don't feel comfortable yet]

15. At which age did you first feel comfortable speaking Spanish?
[options: Since I can remember, 1, 2, 3 … 19, 20 or older, I don't feel comfortable yet]

16. At which age did you first feel comfortable speaking English?
[options: Since I can remember, 1, 2, 3 … 19, 20 or older, I don't feel comfortable yet]

17. How many years of classes (grammar, history, math...) have you had in Catalan (primary school through university)?

[options: 0, 1, 2, 3 … 19, 20 or more]

18. How many years of classes (grammar, history, math...) have you had in Spanish (primary school through university)?

[options: 0, 1, 2, 3 … 19, 20 or more]

19. How many years of classes (grammar, history, math...) have you had in English(primary school through university)?

[options: 0, 1, 2, 3 … 19, 20 or more]

20. How many years have you spent in a country/region where Catalan is spoken?

[options: 0, 1, 2, 3 … 19, 20 or more]

21. How many years have you spent in a country/region where Spanish is spoken?

[options: 0, 1, 2, 3 … 19, 20 or more]

22. How many years have you spent in a country/region where English is spoken?

[options: 0, 1, 2, 3 … 19, 20 or more]

23. How many years has Catalan been spoken in your family?

[options: 0, 1, 2, 3 … 19, 20 or more]

24. How many years has Spanish been spoken in your family?

[options: 0, 1, 2, 3 … 19, 20 or more]

25. How many years has English been spoken in your family?

[options: 0, 1, 2, 3 … 19, 20 or more]

26. How many years have you spent in a work environment where Catalan is spoken?

[options: 0, 1, 2, 3 … 19, 20 or more]

27. How many years have you spent in a work environment where Spanish is spoken?

[options: 0, 1, 2, 3 … 19, 20 or more]

28. How many years have you spent in a work environment where English is spoken?

[options: 0, 1, 2, 3 … 19, 20 or more]

-------------------(new section)

29. In an average week, what percentage of the time do you use the following languages with friends?

	Percentage
Catalan	_____ %
Spanish	_____ %
English	_____ %

30. In an average week, what percentage of the time do you use the following languages with your family?

	Percentage
Catalan	_____ %
Spanish	_____ %
English	_____ %

31. In an average week, what percentage of the time do you use the following languages at school or at work?

	Percentage
Catalan	_____ %
Spanish	_____ %
English	_____ %

32. How often do you think, or talk to yourself, in each of the following languages?

	Percentage
Catalan	_____ %
Spanish	_____ %
English	_____ %

33. How often do you count in each of the following languages?

	Percentage
Catalan	____ %
Spanish	____ %
English	____ %

-------------------(new section)

34. How well do you understand spoken Catalan?

[options ranging from "I don't understand it at all" to "Very well"]

35. How well do you understand spoken Spanish?

[options ranging from "I don't understand it at all" to "Very well"]

36. How well do you understand spoken English?

[options ranging from "I don't understand it at all" to "Very well"]

37. How well do you speak Catalan?

[options ranging from "I don't speak it at all" to "Very well"]

38. How well do you speak Spanish?

[options ranging from "I don't speak it at all" to "Very well"]

39. How well do you speak English?

[options ranging from "I don't speak it at all" to "Very well"]

40. How well can you read in Catalan?

[options ranging from "I can't read it at all" to "Very well"]

41. How well can you read in Spanish?

[options ranging from "I can't read it at all" to "Very well"]

42. How well can you read in English?

[options ranging from "I can't read it at all" to "Very well"]

43. How well can you write in Catalan?

[options ranging from "I can't write in it at all" to "Very well"]

44. How well can you write in Spanish?

[options ranging from "I can't write in it at all" to "Very well"]

45. How well can you write in English?

[options ranging from "I can't write in it at all" to "Very well"]

-------------------(new section)

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In this section, we ask you to indicate how much you agree with the following statements related to Catalan and Spanish.

46. I feel like myself when I speak Catalan.

    [options ranging from "Completely disagree" to "Fully agree"]

47. I feel like myself when I speak Spanish.

    [options ranging from "Completely disagree" to "Fully agree"]

48. I identify with a Catalan-speaking culture.

    [options ranging from "Completely disagree" to "Fully agree"]

49. I identify with a Spanish-speaking culture.

    [options ranging from "Completely disagree" to "Fully agree"]

50. It is important for me to speak Catalan like a native speaker.

    [options ranging from "Completely disagree" to "Fully agree"]

51. It is important for me to speak Spanish like a native speaker.

    [options ranging from "Completely disagree" to "Fully agree"]

52. I want others to think I am a native speaker of Catalan.

    [options ranging from "Completely disagree" to "Fully agree"]

53. I want others to think I am a native speaker of Spanish.

    [options ranging from "Completely disagree" to "Fully agree"]

-------------------(new section)

54. If you have any further comments about any of the previous questions, or the survey as a whole, please write them here:

    [free text field]

[option to finish the survey or continue on to the Catalan and Spanish AJTs]

Questionnaire for the L2 group

The following questions were answered by the L2 group, in the order in which they are presented. The questions have been translated from Spanish into English for the reader's convenience. They were mandatory unless otherwise stated.

Thank you for completing the first part of the survey! In this second part, you will be asked about the languages you speak and how you use them.

1. How old are you? _____

2. Select your gender: ❑ male ❑ female ❑ non-binary ❑ rather not say

3. Have you completed any sort of non-compulsory education? ❑ yes ❑ no
   - In which field? _____ (optional)

4. Country of birth: _____

5. If you have ever lived in any other countries, fill in the following table with the required information: (optional)

Country	Your age when you moved there	The amount of years you lived there
_____	_____	_____

6. If your parents or grandparents were born in a different country than you, explain it here: (optional) _____

7. Select any autonomous communities[37] you have ever lived in:
   [multiple checkboxes listing all the autonomous communities in Spain, plus an "Other" option with a free text field]

8. Select the autonomous communities in which your parents and grandparents were born:
   [multiple checkboxes listing all the autonomous communities in Spain, plus an "Other" option with a free text field]

9. Which languages do you speak? List them here: _____

10. Have you ever had: (optional)

	If yes, please specify:	List corrections here, if relevant:
… a vision problem?		
… a hearing impairment?		
… a language disability?		
… a learning disability?		

---

[37] An autonomous community is the first-level of political and administrative division of Spain.

--------------------(new section)

When answering each of the questions in this section, bear in mind that the answers are independent from each other. For instance, if Mary went to a school that taught subjects in Spanish for 16 years and also learned English there during the last 5 years of school, she will answer that she had 16 years of classes in Spanish and 5 years of classes in English in questions 15 and 16, respectively.

11. How old were you when you started learning Spanish?

    [options: I learned it from birth, 1, 2, 3… 19, 20 or older]

12. How old were you when you started learning English?

    [options: I learned it from birth, 1, 2, 3… 19, 20 or older]

13. At which age did you first feel comfortable speaking Spanish?

    [options: Since I can remember, 1, 2, 3 … 19, 20 or older, I don't feel comfortable yet]

14. At which age did you first feel comfortable speaking English?

    [options: Since I can remember, 1, 2, 3 … 19, 20 or older, I don't feel comfortable yet]

15. How many years of classes (grammar, history, math...) have you had in Spanish (primary school through university)?

    [options: 0, 1, 2, 3 … 19, 20 or more]

16. How many years of classes (grammar, history, math...) have you had in English(primary school through university)?

    [options: 0, 1, 2, 3 … 19, 20 or more]

17. How many years have you spent in a country/region where Spanish is spoken?

    [options: 0, 1, 2, 3 … 19, 20 or more]

18. How many years have you spent in a country/region where English is spoken?

    [options: 0, 1, 2, 3 … 19, 20 or more]

19. How many years has Spanish been spoken in your family?

    [options: 0, 1, 2, 3 … 19, 20 or more]

20. How many years has English been spoken in your family?

    [options: 0, 1, 2, 3 … 19, 20 or more]

21. How many years have you spent in a work environment where Spanish is spoken?
[options: 0, 1, 2, 3 … 19, 20 or more]

22. How many years have you spent in a work environment where English is spoken?
[options: 0, 1, 2, 3 … 19, 20 or more]

-------------------(new section)

23. In an average week, what percentage of the time do you use the following languages with friends?

	Percentage
Spanish	____ %
English	____ %

24. In an average week, what percentage of the time do you use the following languages with your family?

	Percentage
Spanish	____ %
English	____ %

25. In an average week, what percentage of the time do you use the following languages at school or at work?

	Percentage
Spanish	____ %
English	____ %

26. How often do you think, or talk to yourself, in each of the following languages?

	Percentage
Spanish	____ %
English	____ %

27. How often do you count in each of the following languages?

	Percentage
Spanish	____ %
English	____ %

-------------------(new section)

28. How well do you understand spoken Spanish?

[options ranging from "I don't understand it at all" to "Very well"]

29. How well do you understand spoken English?

[options ranging from "I don't understand it at all" to "Very well"]

30. How well do you speak Spanish?

[options ranging from "I don't speak it at all" to "Very well"]

31. How well do you speak English?

[options ranging from "I don't speak it at all" to "Very well"]

32. How well can you read in Spanish?

[options ranging from "I can't read it at all" to "Very well"]

33. How well can you read in English?

[options ranging from "I can't read it at all" to "Very well"]

34. How well can you write in Spanish?

[options ranging from "I can't write in it at all" to "Very well"]

35. How well can you write in English?

[options ranging from "I can't write in it at all" to "Very well"]

-------------------(new section)

In this section, we ask you to indicate how much you agree with the following statements related to Spanish and English.

36. I feel like myself when I speak Spanish.

[options ranging from "Completely disagree" to "Fully agree"]

37. I feel like myself when I speak English.

[options ranging from "Completely disagree" to "Fully agree"]

38. I identify with a Spanish-speaking culture.

[options ranging from "Completely disagree" to "Fully agree"]

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39. I identify with an English-speaking culture.

[options ranging from "Completely disagree" to "Fully agree"]

40. It is important for me to speak Spanish like a native speaker.

[options ranging from "Completely disagree" to "Fully agree"]

41. It is important for me to speak English like a native speaker.

[options ranging from "Completely disagree" to "Fully agree"]

42. I want others to think I am a native speaker of Spanish.

[options ranging from "Completely disagree" to "Fully agree"]

43. I want others to think I am a native speaker of English.

[options ranging from "Completely disagree" to "Fully agree"]

-------------------(new section)

44. If you have any further comments about any of the previous questions, or the survey as a whole, please write them here:

[free text field]

[option to finish the survey or continue on to the Spanish AJT]

Questionnaire for the L1 group

The following questions were answered by the L1 group, in the order in which they are presented. They were mandatory unless otherwise stated.

Thank you for completing the first part of the survey! In this second part, you will be asked about the languages you speak and how you use them.

1. How old are you?   _____

2. Select your gender: ❑ male   ❑ female   ❑ non-binary   ❑ rather not say

3. Have you completed any sort of non-compulsory education?   ❑ yes   ❑ no

    - In which field? _____ (optional)

4. Country of birth: _____

5. If you have ever lived in any other countries, fill in the following table with the required information: (optional)

Country	Your age when you moved there	The amount of years you lived there
_____	_____	_____

6. If your parents or grandparents were born in a different country than you, explain it here: (optional)   _____

7. Which languages do you speak? List them here: _____

8. Have you ever had: (optional)

	If yes, please specify:	List corrections here, if relevant:
… a vision problem?		
… a hearing impairment?		
… a language disability?		
… a learning disability?		

-------------------(new section)

9. If you have any further comments about any of the previous questions, or the survey as a whole, please write them here:

    [free text field]

[survey end]

Appendix C: consent form

The following consent form was displayed to participants before starting the survey. The consent form was translated into Catalan and Spanish, but is now reproduced in English for the reader's convenience.

Thank you for taking part in this research project!

This project is being carried out as part of a master's thesis. NTNU (the Norwegian University of Science and Technology) is the institution responsible for the project.

The main purpose of this project is to study how Catalan/Spanish bilinguals learn English. If you decide to participate in this project, you will be asked to answer questions that are meant to capture your intuitions as a speaker of English. Afterwards, you will have to fill in a survey about your personal background and how you use the languages you speak. The survey will take approximately 20 minutes to complete. Your answers will be recorded electronically.

Participation in this project is voluntary. If you choose to participate, you can withdraw your consent at any time without giving a reason. All information about you will be made anonymous. There will be no negative consequences for you if you choose not to participate or later decide to withdraw.

We will only use your personal data for the purposes specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act). The people who will have access to the data will be the student conducting the research (Laura Nogueira Sánchez) and her supervisor (Anne Dahl). Your directly identifying personal data will be stored separately from the rest of the collected data. All data will be stored securely throughout the duration of the project. Participants will not be recognizable in publications.

The project is scheduled to end 31 of December 2020. At the end of the project, personal data will be anonymized.

So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

We will process your data based on your consent. Based on an agreement with NTNU, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?

If you have questions about the project or want to exercise your rights, contact:

- NTNU via [student and supervisor names and e-mail addresses].
- Our Data Protection Officer: [name and e-mail address].
- NSD - The Norwegian Centre for Research Data AS, by email: (personverntjenester@nsd.no) or by telephone: +47 55 58 21 17.

I confirm that I have read and understood the information I have been given about the project and have been given the opportunity to ask questions. I am over 17 years old. I give consent to participate in an online survey. I also give consent for my personal data to be processed until the end date of the project, approx. 31 of December 2020.

❑ Yes   ❑ No

Appendix D: AJT instructions

The following instructions (or similar ones) were given at the start of each AJT.

 In this part of the survey, we will ask you to score English sentences on a scale from 1 to 4 based on how natural they sound to you. If you find it difficult to decide, imagine that a friend just said the sentence you're reading and think about whether you would think they are a native speaker of English or not based on that sentence. If you would think they are NOT a native speaker, choose a 1; if you would think they ARE a native speaker, choose a 4.

Bear in mind that some of these sentences might sound natural to you even if they do not follow the rules you were taught in school. In this case, score the sentence according to how it sounds, even if this means contradicting the rules. In fact, try not to think too much about it, it's better to just go with your gut.

Appendix E: R packages used in the analysis

- base (R Core Team, 2019)
- car (Fox & Weisberg, 2019)
- ez (Lawrence, 2016)
- gdata (Warnes et al., 2017)
- pastecs (Grosjean & Ibanez, 2018)
- reshape2 (Wickham, 2007)
- stats (R Core Team, 2019)
- tidyverse (Wickham et al., 2019)
  - dplyr (Wickham, François, et al., 2019)
  - ggplot2 (Wickham, 2016)
  - readr (Wickham et al., 2018)
  - tidyr (Wickham & Henry, 2019)

Appendix F: raw ANOVA and post-hoc outputs

The Catalan and Spanish grammars of the L3 group

LPSP conditions

	Effect <chr>	DFn <dbl>	DFd <dbl>	F <dbl>	p <dbl>	p<.05 <chr>
2	condition	2	86	173.36855	6.695691e-31	*
3	language	1	43	116.29607	8.311181e-14	*
4	condition:language	2	86	92.86253	3.279866e-22	*

Figure F.1. Repeated-measures ANOVA on the L3 group - LPSP conditions.

```
        Pairwise comparisons using t tests with pooled SD

data:  SPdata$zscore and SPdata$con_lang

              obq_Catalan obq_Spanish of+obq_Catalan of+obq_Spanish poss_Catalan
obq_Spanish   1.7e-06     -           -              -              -
of+obq_Catalan 1.1e-07    1           -              -              -
of+obq_Spanish < 2e-16    < 2e-16     < 2e-16        -              -
poss_Catalan  < 2e-16     < 2e-16     < 2e-16        1              -
poss_Spanish  < 2e-16     < 2e-16     < 2e-16        4.1e-05        1.4e-07

P value adjustment method: bonferroni
```

Figure F.2. Pairwise t-test with Bonferroni of the ANOVA in figure F.1.

Causative conditions

	Effect <chr>	DFn <dbl>	DFd <dbl>	F <dbl>	p <dbl>	p<.05 <chr>
2	condition	2	88	273.29182	1.768997e-38	*
3	language	1	44	81.28077	1.476459e-11	*
4	condition:language	2	88	24.45400	3.584013e-09	*

Figure F.3. Repeated-measures ANOVA on the L3 group - causative conditions.

```
        Pairwise comparisons using t tests with pooled SD

data:  Causdata$zscore and Causdata$con_lang

              cv+dp_Catalan cv+dp_Spanish cv+pro_Catalan cv+pro_Spanish per+pro_Catalan
cv+dp_Spanish < 2e-16       -             -              -              -
cv+pro_Catalan < 2e-16      < 2e-16       -              -              -
cv+pro_Spanish < 2e-16      < 2e-16       1.0000         -              -
per+pro_Catalan < 2e-16     0.0015        < 2e-16        < 2e-16        -
per+pro_Spanish < 2e-16     < 2e-16       < 2e-16        < 2e-16        2.1e-11

P value adjustment method: bonferroni
```

Figure F.4. Pairwise t-test with Bonferroni of the ANOVA in figure F.3.

Hodiernal conditions

Effect	DFn	DFd	F	p	p<.05
2 condition	1	44	61.27023	7.144402e-10	*
3 language	1	44	107.99935	2.012004e-13	*
4 condition:language	1	44	43.80058	4.156583e-08	*

Figure F.5. Repeated-measures ANOVA on the L3 group - hodiernal conditions.

```
        Pairwise comparisons using t tests with pooled SD

data:  Hoddata$zscore and Hoddata$con_lang

                 perfect_Catalan perfect_Spanish preterite_Catalan
perfect_Spanish  1               -               -
preterite_Catalan <2e-16         <2e-16          -
preterite_Spanish 1              1               <2e-16

P value adjustment method: bonferroni
```

Figure F.6. Pairwise t-test with Bonferroni of the ANOVA in figure F.5.

The Spanish grammar of the L2 group

LPSP conditions

Effect	DFn	DFd	SSn	SSd	F	p	p<.05
1 (Intercept)	1	111	0.3180102	8.871436	3.978965	4.852267e-02	*
2 condition	2	222	64.5205486	50.326282	142.306973	1.682742e-40	*

Figure F.7. Main results of the ANOVA on the Spanish AJT of the L2 group - LPSP conditions.

Effect	W	p	p<.05
2 condition	0.8651007	0.0003456732	*

Figure F.8. Mauchly's test of the ANOVA on the Spanish AJT of the L2 group - LPSP conditions.

Effect	GGe	p[GG]	p[GG]<.05	HFe	p[HF]	p[HF]<.05
2 condition	0.8811354	5.141844e-36	*	0.8942622	1.643208e-36	*

Figure F.9. Corrected p-values of the ANOVA on the Spanish AJT of the L2 group - LPSP conditions.

```
        Pairwise comparisons using t tests with pooled SD

data:  SPdata$zscore and SPdata$condition

        poss    of+obq
of+obq <2e-16 -
obq    <2e-16 <2e-16

P value adjustment method: bonferroni
```

Figure F.10. Pairwise t-test with Bonferroni of the ANOVA in figures F.7 - F.9.

Causative conditions

	Effect <chr>	DFn <dbl>	DFd <dbl>	SSn <dbl>	SSd <dbl>	F <dbl>	p <dbl>	p<.05 <chr>
1	(Intercept)	1	111	3.264674	13.97393	25.93249	1.458140e-06	*
2	condition	2	222	247.770598	22.48771	1223.00302	1.375449e-120	*

Figure F.11. Main results of the ANOVA on the Spanish AJT of the L2 group - causative conditions.

	Effect <chr>	W <dbl>	p <dbl>	p<.05 <chr>
2	condition	0.9440042	0.04203054	*

Figure F.12. Mauchly's test of the ANOVA on the Spanish AJT of the L2 group - causative conditions.

	Effect <chr>	GGe <dbl>	p[GG] <dbl>	p[GG]<.05 <chr>	HFe <dbl>	p[HF] <dbl>	p[HF]<.05 <chr>
2	condition	0.9469734	2.369427e-114	*	0.9629257	3.151552e-116	*

Figure F.13. Corrected *p*-values of the ANOVA on the Spanish AJT of the L2 group - causative conditions.

```
        Pairwise comparisons using t tests with pooled SD

data:  Causdata$zscore and Causdata$condition

        cv+pro cv+dp
cv+dp   <2e-16 -
per+pro <2e-16 <2e-16

P value adjustment method: bonferroni
```

Figure F.14. Pairwise t-test with Bonferroni of the ANOVA in figures F.11 - F.13.

The results of the English AJT

ANOVAs

	Effect <chr>	DFn <dbl>	DFd <dbl>	SSn <dbl>	SSd <dbl>	F <dbl>	p <dbl>	p<.05 <chr>
1	(Intercept)	1	329	8.265754	56.72652	47.939359	2.313583e-11	*
2	group_prof	6	329	4.549199	56.72652	4.397374	2.719869e-04	*
3	condition	2	658	256.319352	131.94388	639.128283	6.102724e-155	*
4	group_prof:condition	12	658	17.584762	131.94388	7.307888	1.130672e-12	*

Figure F.15. Main results of the ANOVA on the English AJT for all groups, proficiency considered - LPSP conditions.

	Effect <chr>	DFn <dbl>	DFd <dbl>	SSn <dbl>	SSd <dbl>	F <dbl>	p <dbl>	p<.05 <chr>
1	(Intercept)	1	338	161.711870	116.0574	470.9617319	5.021273e-66	*
2	group_prof	6	338	46.168564	116.0574	22.4098440	3.184804e-22	*
3	condition	2	676	15.370176	117.3589	44.2669574	8.587759e-19	*
4	group_prof:condition	12	676	1.366418	117.3589	0.6558934	7.942071e-01	

Figure F.16. Main results of the ANOVA on the English AJT for all groups, proficiency considered - causative conditions.

	Effect <chr>	DFn <dbl>	DFd <dbl>	SSn <dbl>	SSd <dbl>	F <dbl>	p <dbl>	p<.05 <chr>
1	(Intercept)	1	338	52.810082	53.36599	334.47906	1.980362e-52	*
2	group_prof	6	338	1.528926	53.36599	1.61394	1.423609e-01	
3	condition	1	338	127.966729	67.31229	642.56841	3.592756e-80	*
4	group_prof:condition	6	338	21.923988	67.31229	18.34808	1.842033e-18	*

Figure F.17. Main results of the ANOVA on the English AJT for all groups, proficiency considered - hodiernal conditions.

Post-hoc tests

```
        Pairwise comparisons using t tests with pooled SD

data:  SPdata$zscore and SPdata$con_group_prof

                            obq_L1 group_high obq_L2 group_high obq_L2 group_intermediate obq_L2 group_low obq_L3 group_high obq_L3 group_intermediate
obq_L2 group_high           1.00000           -                -                          -               -                -
obq_L2 group_intermediate   1.00000           1.00000          -                          -               -                -
obq_L2 group_low            0.00027           0.00169          0.10259                    -               -                -
obq_L3 group_high           1.00000           1.00000          1.00000                    0.26601         -                -
obq_L3 group_intermediate   0.19103           0.92641          1.00000                    1.00000         1.00000          -
obq_L3 group_low            0.00501           0.02738          1.00000                    1.00000         1.00000          1.00000
of+obq_L1 group_high        < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
of+obq_L2 group_high        < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
of+obq_L2 group_intermediate < 2e-16          < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
of+obq_L2 group_low         < 2e-16           < 2e-16          < 2e-16                    6.5e-12         < 2e-16          < 2e-16
of+obq_L3 group_high        < 2e-16           < 2e-16          < 2e-16                    4.6e-16         < 2e-16          < 2e-16
of+obq_L3 group_intermediate < 2e-16          < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
of+obq_L3 group_low         2.9e-16           4.1e-15          1.9e-15                    0.00745         1.0e-10          1.4e-12
poss_L1 group_high          < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
poss_L2 group_high          < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
poss_L2 group_intermediate  < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
poss_L2 group_low           < 2e-16           < 2e-16          < 2e-16                    7.1e-15         < 2e-16          < 2e-16
poss_L3 group_high          < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
poss_L3 group_intermediate  < 2e-16           < 2e-16          < 2e-16                    < 2e-16         < 2e-16          < 2e-16
poss_L3 group_low           < 2e-16           < 2e-16          < 2e-16                    1.4e-10         < 2e-16          < 2e-16

                            obq_L3 group_low of+obq_L1 group_high of+obq_L2 group_high of+obq_L2 group_intermediate of+obq_L2 group_low
obq_L2 group_high           -                -                    -                    -                            -
obq_L2 group_intermediate   -                -                    -                    -                            -
obq_L2 group_low            -                -                    -                    -                            -
obq_L3 group_high           -                -                    -                    -                            -
obq_L3 group_intermediate   -                -                    -                    -                            -
obq_L3 group_low            -                -                    -                    -                            -
of+obq_L1 group_high        < 2e-16          -                    -                    -                            -
of+obq_L2 group_high        < 2e-16          1.00000              -                    -                            -
of+obq_L2 group_intermediate < 2e-16         1.00000              1.00000              -                            -
of+obq_L2 group_low         1.1e-15          0.31705              0.04819              1.00000                      -
of+obq_L3 group_high        < 2e-16          1.00000              1.00000              1.00000                      1.00000
of+obq_L3 group_intermediate < 2e-16         1.00000              0.19433              1.00000                      1.00000
of+obq_L3 group_low         6.4e-05          4.0e-09              5.4e-11              3.7e-10                      0.04090
poss_L1 group_high          < 2e-16          1.00000              1.00000              1.00000                      0.20794
poss_L2 group_high          < 2e-16          1.00000              1.00000              1.00000                      0.01201
poss_L2 group_intermediate  < 2e-16          1.00000              1.00000              1.00000                      0.43141
poss_L2 group_low           < 2e-16          1.00000              0.83460              1.00000                      1.00000
poss_L3 group_high          < 2e-16          1.00000              1.00000              1.00000                      0.77197
poss_L3 group_intermediate  < 2e-16          1.00000              1.00000              1.00000                      1.00000
poss_L3 group_low           2.7e-14          0.02236              0.00209              0.14942                      1.00000

                            of+obq_L3 group_high of+obq_L3 group_intermediate of+obq_L3 group_low poss_L1 group_high poss_L2 group_high
obq_L2 group_high           -                    -                            -                   -                  -
obq_L2 group_intermediate   -                    -                            -                   -                  -
obq_L2 group_low            -                    -                            -                   -                  -
obq_L3 group_high           -                    -                            -                   -                  -
obq_L3 group_intermediate   -                    -                            -                   -                  -
obq_L3 group_low            -                    -                            -                   -                  -
of+obq_L1 group_high        -                    -                            -                   -                  -
of+obq_L2 group_high        -                    -                            -                   -                  -
of+obq_L2 group_intermediate -                   -                            -                   -                  -
of+obq_L2 group_low         -                    -                            -                   -                  -
of+obq_L3 group_high        -                    -                            -                   -                  -
of+obq_L3 group_intermediate 1.00000             -                            -                   -                  -
of+obq_L3 group_low         7.0e-05              2.0e-06                      -                   -                  -
poss_L1 group_high          1.00000              0.92204                      1.7e-09             -                  -
poss_L2 group_high          1.00000              0.04280                      3.8e-12             1.00000            -
poss_L2 group_intermediate  1.00000              1.00000                      3.3e-12             1.00000            1.00000
poss_L2 group_low           1.00000              1.00000                      0.00090             1.00000            0.26882
poss_L3 group_high          1.00000              1.00000                      1.5e-08             1.00000            1.00000
poss_L3 group_intermediate  1.00000              1.00000                      9.6e-11             1.00000            1.00000
poss_L3 group_low           1.00000              1.00000                      0.31589             0.01335            0.00039

                            poss_L2 group_intermediate poss_L2 group_low poss_L3 group_high poss_L3 group_intermediate
obq_L2 group_high           -                          -                 -                  -
obq_L2 group_intermediate   -                          -                 -                  -
obq_L2 group_low            -                          -                 -                  -
obq_L3 group_high           -                          -                 -                  -
obq_L3 group_intermediate   -                          -                 -                  -
obq_L3 group_low            -                          -                 -                  -
of+obq_L1 group_high        -                          -                 -                  -
of+obq_L2 group_high        -                          -                 -                  -
of+obq_L2 group_intermediate -                         -                 -                  -
of+obq_L2 group_low         -                          -                 -                  -
of+obq_L3 group_high        -                          -                 -                  -
of+obq_L3 group_intermediate -                         -                 -                  -
of+obq_L3 group_low         -                          -                 -                  -
poss_L1 group_high          -                          -                 -                  -
poss_L2 group_high          -                          -                 -                  -
poss_L2 group_intermediate  -                          -                 -                  -
poss_L2 group_low           1.00000                    -                 -                  -
poss_L3 group_high          1.00000                    1.00000           -                  -
poss_L3 group_intermediate  1.00000                    1.00000           1.00000            -
poss_L3 group_low           0.01233                    1.00000           0.06274            0.10004

P value adjustment method: bonferroni
```

Figure F.18. Pairwise t-test with Bonferroni of the ANOVA in figure F.15.

Pairwise comparisons using t tests with pooled SD

data: Causdata$zscore and Causdata$con_group_prof

	cv+dp_L1 group_high	cv+dp_L2 group_high	cv+dp_L2 group_intermediate	cv+dp_L2 group_low	cv+dp_L3 group_high
cv+dp_L2 group_high	1.00000	-	-	-	-
cv+dp_L2 group_intermediate	0.22226	1.00000	-	-	-
cv+dp_L2 group_low	1.6e-05	0.26911	0.18731	-	-
cv+dp_L3 group_high	1.00000	1.00000	1.00000	0.00047	-
cv+dp_L3 group_intermediate	0.04744	1.00000	1.00000	0.97398	1.00000
cv+dp_L3 group_low	4.3e-12	4.7e-06	4.1e-08	1.00000	9.5e-11
cv+pro_L1 group_high	1.00000	1.00000	1.00000	0.00223	1.00000
cv+pro_L2 group_high	1.00000	1.00000	1.00000	0.00076	1.00000
cv+pro_L2 group_intermediate	0.17726	1.00000	1.00000	0.18710	1.00000
cv+pro_L2 group_low	1.2e-05	0.24142	0.15373	1.00000	0.00036
cv+pro_L3 group_high	1.00000	1.00000	1.00000	0.10264	1.00000
cv+pro_L3 group_intermediate	0.00019	1.00000	1.00000	1.00000	0.00619
cv+pro_L3 group_low	< 2e-16	2.2e-09	6.2e-14	0.07009	1.3e-15
per+pro_L1 group_high	1.00000	1.00000	1.00000	0.19285	1.00000
per+pro_L2 group_high	0.02496	1.00000	1.00000	1.00000	0.46814
per+pro_L2 group_intermediate	3.0e-10	0.00040	1.7e-06	1.00000	5.8e-09
per+pro_L2 group_low	< 2e-16	5.7e-10	1.3e-13	0.01273	9.3e-16
per+pro_L3 group_high	0.00807	1.00000	1.00000	1.00000	0.17492
per+pro_L3 group_intermediate	1.6e-11	5.2e-05	2.8e-08	1.00000	2.2e-10
per+pro_L3 group_low	< 2e-16	< 2e-16	< 2e-16	1.8e-09	< 2e-16

	cv+dp_L3 group_intermediate	cv+dp_L3 group_low	cv+pro_L1 group_high	cv+pro_L2 group_high	cv+pro_L2 group_intermediate
cv+dp_L2 group_high	-	-	-	-	-
cv+dp_L2 group_intermediate	-	-	-	-	-
cv+dp_L2 group_low	-	-	-	-	-
cv+dp_L3 group_high	-	-	-	-	-
cv+dp_L3 group_intermediate	-	-	-	-	-
cv+dp_L3 group_low	9.9e-07	-	-	-	-
cv+pro_L1 group_high	1.00000	9.7e-10	-	-	-
cv+pro_L2 group_high	1.00000	2.0e-10	1.00000	-	-
cv+pro_L2 group_intermediate	1.00000	3.1e-08	1.00000	1.00000	-
cv+pro_L2 group_low	0.84587	1.00000	0.00176	0.00059	0.15270
cv+pro_L3 group_high	1.00000	4.2e-07	1.00000	1.00000	1.00000
cv+pro_L3 group_intermediate	1.00000	0.00027	0.03302	0.01042	1.00000
cv+pro_L3 group_low	5.6e-12	1.00000	2.3e-14	3.4e-15	3.1e-14
per+pro_L1 group_high	1.00000	2.6e-06	1.00000	1.00000	1.00000
per+pro_L2 group_high	1.00000	0.01924	1.00000	0.63081	1.00000
per+pro_L2 group_intermediate	6.4e-05	1.00000	6.7e-08	1.3e-08	1.1e-06
per+pro_L2 group_low	6.7e-12	1.00000	1.4e-14	2.3e-15	7.8e-14
per+pro_L3 group_high	1.00000	0.02990	0.53682	0.24385	1.00000
per+pro_L3 group_intermediate	1.8e-06	1.00000	3.1e-09	5.4e-10	1.6e-08
per+pro_L3 group_low	< 2e-16	0.00234	< 2e-16	< 2e-16	< 2e-16

	cv+pro_L2 group_low	cv+pro_L3 group_high	cv+pro_L3 group_intermediate	cv+pro_L3 group_low	per+pro_L1 group_high
cv+dp_L2 group_high	-	-	-	-	-
cv+dp_L2 group_intermediate	-	-	-	-	-
cv+dp_L2 group_low	-	-	-	-	-
cv+dp_L3 group_high	-	-	-	-	-
cv+dp_L3 group_intermediate	-	-	-	-	-
cv+dp_L3 group_low	-	-	-	-	-
cv+pro_L1 group_high	-	-	-	-	-
cv+pro_L2 group_high	-	-	-	-	-
cv+pro_L2 group_intermediate	-	-	-	-	-
cv+pro_L2 group_low	-	-	-	-	-
cv+pro_L3 group_high	0.08874	-	-	-	-
cv+pro_L3 group_intermediate	1.00000	1.00000	-	-	-
cv+pro_L3 group_low	0.05311	4.7e-11	6.3e-09	-	-
per+pro_L1 group_high	0.17171	1.00000	1.00000	1.0e-09	-
per+pro_L2 group_high	1.00000	1.00000	1.00000	8.8e-05	1.00000
per+pro_L2 group_intermediate	1.00000	3.6e-05	0.02469	0.31981	0.00022
per+pro_L2 group_low	0.00955	1.8e-11	4.7e-09	1.00000	2.8e-10
per+pro_L3 group_high	1.00000	1.00000	1.00000	0.00013	1.00000
per+pro_L3 group_intermediate	1.00000	3.0e-06	0.00136	0.84723	2.8e-05
per+pro_L3 group_low	7.7e-10	< 2e-16	< 2e-16	0.04209	< 2e-16

	per+pro_L2 group_high	per+pro_L2 group_intermediate	per+pro_L2 group_low	per+pro_L3 group_high	per+pro_L3 group_intermediate
cv+dp_L2 group_high	-	-	-	-	-
cv+dp_L2 group_intermediate	-	-	-	-	-
cv+dp_L2 group_low	-	-	-	-	-
cv+dp_L3 group_high	-	-	-	-	-
cv+dp_L3 group_intermediate	-	-	-	-	-
cv+dp_L3 group_low	-	-	-	-	-
cv+pro_L1 group_high	-	-	-	-	-
cv+pro_L2 group_high	-	-	-	-	-
cv+pro_L2 group_intermediate	-	-	-	-	-
cv+pro_L2 group_low	-	-	-	-	-
cv+pro_L3 group_high	-	-	-	-	-
cv+pro_L3 group_intermediate	-	-	-	-	-
cv+pro_L3 group_low	-	-	-	-	-
per+pro_L1 group_high	-	-	-	-	-
per+pro_L2 group_high	-	-	-	-	-
per+pro_L2 group_intermediate	0.96191	-	-	-	-
per+pro_L2 group_low	1.7e-05	0.05512	-	-	-
per+pro_L3 group_high	1.00000	1.00000	2.4e-05	-	-
per+pro_L3 group_intermediate	0.28086	1.00000	0.14579	0.44096	-
per+pro_L3 group_low	1.0e-13	2.2e-10	1.00000	9.0e-14	8.1e-10

P value adjustment method: bonferroni

Figure F.19. Pairwise t-test with Bonferroni of the ANOVA in figure F.16.

```
    Pairwise comparisons using t tests with pooled SD

data:  Hoddata$zscore and Hoddata$con_group_prof
```

	perfect_L1 group_high	perfect_L2 group_high	perfect_L2 group_intermediate	perfect_L2 group_low
perfect_L2 group_high	1.00000	-	-	-
perfect_L2 group_intermediate	7.6e-05	0.00143	-	-
perfect_L2 group_low	6.6e-09	1.7e-07	0.38076	-
perfect_L3 group_high	1.00000	1.00000	0.66127	0.00031
perfect_L3 group_intermediate	8.5e-08	2.8e-06	1.00000	1.00000
perfect_L3 group_low	< 2e-16	7.3e-16	1.3e-07	1.00000
preterite_L1 group_high	< 2e-16	< 2e-16	< 2e-16	< 2e-16
preterite_L2 group_high	< 2e-16	< 2e-16	< 2e-16	< 2e-16
preterite_L2 group_intermediate	< 2e-16	< 2e-16	< 2e-16	< 2e-16
preterite_L2 group_low	< 2e-16	< 2e-16	< 2e-16	3.1e-08
preterite_L3 group_high	< 2e-16	< 2e-16	< 2e-16	< 2e-16
preterite_L3 group_intermediate	< 2e-16	< 2e-16	< 2e-16	< 2e-16
preterite_L3 group_low	< 2e-16	< 2e-16	< 2e-16	3.0e-06

	perfect_L3 group_high	perfect_L3 group_intermediate	perfect_L3 group_low	preterite_L1 group_high
perfect_L2 group_high	-	-	-	-
perfect_L2 group_intermediate	-	-	-	-
perfect_L2 group_low	-	-	-	-
perfect_L3 group_high	-	-	-	-
perfect_L3 group_intermediate	0.00796	-	-	-
perfect_L3 group_low	3.5e-11	9.2e-05	-	-
preterite_L1 group_high	< 2e-16	< 2e-16	5.6e-13	-
preterite_L2 group_high	< 2e-16	< 2e-16	4.5e-15	1.00000
preterite_L2 group_intermediate	< 2e-16	< 2e-16	1.0e-13	1.00000
preterite_L2 group_low	< 2e-16	< 2e-16	0.00254	0.01521
preterite_L3 group_high	< 2e-16	< 2e-16	1.1e-11	1.00000
preterite_L3 group_intermediate	< 2e-16	< 2e-16	5.7e-11	0.53203
preterite_L3 group_low	< 2e-16	3.4e-16	0.09669	6.1e-05

	preterite_L2 group_high	preterite_L2 group_intermediate	preterite_L2 group_low	preterite_L3 group_high
perfect_L2 group_high	-	-	-	-
perfect_L2 group_intermediate	-	-	-	-
perfect_L2 group_low	-	-	-	-
perfect_L3 group_high	-	-	-	-
perfect_L3 group_intermediate	-	-	-	-
perfect_L3 group_low	-	-	-	-
preterite_L1 group_high	-	-	-	-
preterite_L2 group_high	-	-	-	-
preterite_L2 group_intermediate	1.00000	-	-	-
preterite_L2 group_low	0.00203	0.55632	-	-
preterite_L3 group_high	1.00000	1.00000	0.13228	-
preterite_L3 group_intermediate	0.08499	1.00000	1.00000	1.00000
preterite_L3 group_low	3.5e-06	0.00152	1.00000	0.00085

	preterite_L3 group_intermediate
perfect_L2 group_high	-
perfect_L2 group_intermediate	-
perfect_L2 group_low	-
perfect_L3 group_high	-
perfect_L3 group_intermediate	-
perfect_L3 group_low	-
preterite_L1 group_high	-
preterite_L2 group_high	-
preterite_L2 group_intermediate	-
preterite_L2 group_low	-
preterite_L3 group_high	-
preterite_L3 group_intermediate	-
preterite_L3 group_low	0.06561

```
P value adjustment method: bonferroni
```

Figure F.20. Pairwise t-test with Bonferroni of the ANOVA in figure F.17.