Polarity in L3 English: The Initial Stages and Beyond

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En memòria del meu germà, Albert,

Freedom is the freedom to say that two plus two make four.
If that is granted, all else follows.
George Orwell, 1984

Abstract

The main goal of this dissertation is to understand how L3/L*n* acquisition unfolds and how studying it transitions to the bigger field of non-native acquisition as well as theoretical proposals for grammatical properties. In an attempt to do so, the compilation of four studies help us answer the three over-arching questions that guide this doctoral dissertation, as presented below:

I. What can the study of multilingualism tell us about the cognitive processes underlying the initial stages and beyond of any instance of non-native acquisition?

II. What do methodological practices in the field of L3/L*n* acquisition tell us about the variability found in the literature?

III. How can the study of multilingualism help us to understand the nature of certain linguistic domains?

In summary, the first study examines the knowledge of Negative Concord Items and Differential Object Marking in the grammar of highly proficient early bilinguals in Catalan and Spanish; and the role language dominance has for the interaction of the languages in early bilingualism. The results show that (a) remaining dominant in the L1 contributes to the maintenance of target-line behavior in the language and (b) that different domains of grammar are affected in different ways. The second study provides an analytical panoramic view of the field of L3/L*n* acquisition by reviewing the majority of available L3 morphosyntactic studies published between 2004 and 2018 systematically, examining (and showing) how the methodological practices can explain some of the variability we find in the literature. In the third study, we provide a snapshot of the initial stages of acquisition and we show how confounding proficiency and exposure can introduce potential noise into the study of transfer. In the fourth study we arrive at the culmination of the dissertation by examining the grammars

of *ab initio* L3 learners of English who are Catalan-Spanish bilinguals. The results show that holistic structural similarity is the most deterministic factor for transfer selection in the case of early bilinguals acquiring a third language. More importantly, results of the longitudinal design reveal that developmental sequencing after initial stages transfer is dynamic and non-uniform depending on language dominance in the previous acquired languages.

The overall picture of the results of the four studies show that holistic structural similarity plays a role at the initial stages of L3/L*n* acquisition, that language dominance plays an important role for L3 development, that certain methodological practices are to be adopted in L3/L*n* acquisition and that the study of multilingualism can give answers to the formalization of Negative Concord Items more generally.

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Abbreviations

ACC	Accusative case
BP	Brazilian Portuguese
CAT	Catalan
CEM	Cumulative Enhancement Model
CLI	Cross-linguistic Influence
CITH	Cumulative Input Threshold Hypothesis
DOM	Differential Object Marking
DN	Double Negation
EN	English
FT/FA	Full Transfer/Full Access
HL	Heritage Language
HS	Heritage Speaker
L1	First Language
2L1	Simultaneous bilingual
L2	Second Language
L2SF	L2 Status Factor
L3	Third Language
L*n*	Further Language
LPM	Linguistic Proximity Model
MTH	Minimal Trees Hypothesis
NC	Negative Concord
NCI	Negative Concord Item
NegP	Negation Phrase
NPI	Negative Polarity Item
NQ	Negative Quantifier
SN	Sentential Negation
SP	Spanish
SM	Scalpel Model
TPM	Typological Primacy Model
UG	Universal Grammar
VFH	Valueless Features

Declaration of authorship

I, Eloi Puig Mayenco, declare that this thesis and the work presented in it are my own and has been generated by me in collaboration with the different co-authors of the studies, but I declare that I have been first author in all four studies and that they all stem from my own original research.

Study 1

Puig-Mayenco, E., Miller, D., Bayram, F., Cunnings, I., Tubau, S., & Rothman, J. (2018). Language Dominance Affects Bilingual Competence and Processing: Evidence from a Bidirectional Study of Unbalanced Catalan/Spanish Bilinguals. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2018.01199

Study 2

Puig-Mayenco, E., González Alonso., & Rothman, J. (2018). A Systematic Review of Transfer Studies in Third Language Acquisition. *Second Language Research*. https://doi.org/10.1177/0267658318809147

Study 3

Puig-Mayenco, E., & Rothman, J. (Submitted). Low Proficiency Does Not Mean *Ab Initio*: A Methodological Footnote for Linguistic Transfer Studies.

Study 4

Puig-Mayenco, E., Rothman, J., & Tubau, S. (Submitted). Language dominance modulates the rate of L3 development above and beyond initial state transfer.

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Chapter 1: Introduction

1.1. General introduction

The main focus of this dissertation is the study of third language (L3) acquisition. L3 acquisition captures the situation in which an individual who is already bilingual, simultaneously or successively, acquires yet an additional language. An obvious question that arises in such situations is whether acquiring an L3 is similar to or different from acquiring a second language (L2). Before recently, it had been assumed (or otherwise taken for granted) that all instances of non-native, sequential language acquisition were fundamentally equivalent. The label second language (L2) acquisition has often been used as an umbrella term for any instance of acquisition other than first language (L1) acquisition. Although work as early as the 1960s primarily concerned with lexical acquisition sought to understand how L3 acquisition might differ from L2 acquisition (e.g., Dewaele, 1998; Ringbom, 1986, 1987; Stedje, 1977; Vildomec, 1963; Weinreich, 1953; Williams & Hammarberg, 1998), it was not until the early 2000s that researchers investigating the acquisition of (morpho-)syntax with a formal linguistic lens began to investigate how acquiring an L2 might be distinct, particularly when considering what the learner brings at the initial state/stages. In doing so, new questions were proposed:

i. What role do previously acquired languages play in the acquisition of L3 grammatical systems?
ii. Will L2 and L3 learners have the same point of departure? If so or if not, how and crucially what explains why this is different or similar?

By asking these relatively simple, if not fairly obvious starting-point questions, research over the past 15 years or so shows that while there are similarities between L2 and L3 acquisition—e.g. each makes use of previous linguistic experience—they present and unfold in significantly

different ways (see Rothman, González Alonso, & Puig-Mayenco, 2019 for comprehensive review and discussion). We know that the point of departure for L2 and L3 can be—predictively—distinct and that the developmental trajectories for both types of acquisition can differ—again predictively as this dissertation shows nicely (see study 3 and 4). As this dissertation shows, having some tentative answers to these general questions does not mean we understand, much less even have all the pieces of the puzzle of L3 acquisition. As underscored most directly in study 2, although there is good coverage for some of the variables argued to condition initial stages L3 interlanguage none of the models in their present forms can account for all the data in the field (be them initial stages or development). As discussed most directly in study 4, we have only begun to scratch the surface of understanding the dynamic nature of L3 although we do know that it is a complex process.

It is prudent to state from the beginning that we are not trying to understand how a specific population acquires a specific language in this dissertation, or how a specific linguistic domain is acquired in X language despite how this might seem at first glance. As is true of all linguistic studies, we use specific populations and specific domains of grammar as testing grounds for more generalizable questions. Our main goal is to understand how morphosyntactic transfer selection unfolds more generally and how this selection impacts on further development. I submit, as is explicitly discussed in each article and a point to which I will return in the final chapter of this dissertation, that what we show of Catalan-Spanish bilinguals herein provides insights far beyond this grouping and the focused upon linguistic domain. Another word of caution is necessary. Theoretical models and linguistic analyses are likely to change over time; thus, the assumptions I make in this dissertation are not meant to be set in stone. That said, the data and the patterns they reveal, while subject to alternative interpretations (now or in the future), are what they are irrespective of the theoretical stance, analysis or interpretation we give of them. These results must be explained by any alternative contemporary perspectives or future ones. In this dissertation and the articles that comprise

it, I have done my best to offer what seem to be tenable and defensible explanations for these data.

The goal of this chapter, given the above discussion, is to synthesize the relevant work on L3/L*n* acquisition over the last two decades and to offer a panoramic perspective of the impact this work has had, not only on the study of multilingualism, but also on the nature of the brain and human cognition. In doing so, the aim is to properly contextualize the articles that form the body of the dissertation, providing insights that space in journal articles either does not afford or information that would be otherwise inappropriate in the context of very specific research questions. This first chapter should serve to make the connection between the individual article ever-clearer and place them as a cohort into the avant-garde discussions of this nascent field. Firstly, in this chapter, I will set the groundwork for some of the concepts that will prove useful throughout the dissertation; for example, what does it mean it be a multilingual speaker/L3 learner? What do I take transfer to be exactly? What factors/variables have been proposed as determining the acquisition of a third language? Both the experimental studies (studies 1, 3 and 4) and the systematic review (study 2) in this dissertation make a strong contribution, showing that methodological practices in experimental designs have important consequences for how we interpret the data and design our studies.

Foreshadowing the studies to appear, the first aims to establish whether using the linguistic domain of negation is suitable for the study of transfer in the context of L3/L*n* acquisition. We do so by showing that early bilinguals do, in fact, have two distinct representations for this domain in Catalan and in Spanish. Testing the domain under investigation prior to the design of the bigger study of L3 acquisition was crucial to establishing whether the selected domain could fairly test the questions we are interested in. In the event that this domain had proven to be vulnerable to cross-linguistic influence in early bilinguals whereby they do not have distinct representations as claimed in the descriptive literature, we would not have been able to use this to test distinct sources of transfer into an

L3. A clear example of this cautionary tale would be the other domain tested in the first study, Differential Object Marking (DOM). We abandoned it in the subsequent studies because of the vulnerability we found in the grammars of early bilinguals for DOM. The second article proved invaluable for the design as it provided a comprehensive overview of the L3 literature and highlighted some crucial elements of task design in order to develop the most sound to make claims about transfer selection in L3/L*n* acquisition. The third and fourth studies we present here were designed carefully based on the insights from the systematic review. The third short paper provides a brief snapshot of the consequences of not testing participants at the right point in time to answer specific questions. From this, we argue that testing at the *ab initio* stages is crucial if we have a focus on understanding initial L3 interlanguage transfer source. The final article combines the findings of the first, second and third studies and examines L3/L*n* acquisition not only at the initial stages, but crucially over development after individual baselines were captured. The findings show that the dynamics of multilingualism are messy and provides future directions for controlled experimental studies in which we are able to isolate different variables to test and understand a little more about the dynamics of multilingualism. This final paper reveals that variables at the initial stages and those that impinge on development can have various weighting throughout time.

Taken together, these four studies offer several insights into the study of adult L3 acquisition and what multilingualism can tell us about the study of language as a window to understanding bigger issues related to language, cognition and the human mind.

1.2. Defining multilingualism

An important working definition for the rest of this dissertation regards what the inclusionary criteria are (or the ones we use) for a multilingual speaker/learner. While definitions can differ along several planes, all converge in agreeing that someone is a multilingual if he or she has

some sort of knowledge of *several* languages. The use of *some* in the previous sentence is not fortuitous. The degree of proficiency when speaking more than one language needed to qualify unambiguously as multilingual is not set in stone (not the least because the same applies to bilingualism). Some definitions mention being able to communicate, others being able to speak or being able to use the language(s) without, typically, clarifying what that entails exactly. Also note the use of *several*, as some definitions mention 'at least two', while others 'more than two languages' or several. Does this mean that a speaker of two languages can be considered multilingual? Is there a difference between speaking three languages and six languages? There is no easy or correct way to answer these questions. The situation actually becomes less clear if we challenge the typical concept of *language* used or assumed in most definitions. What do we consider a language to be? Let us take the case of a fully proficient Spanish-Arabic-English trilingual; no one would deny that this speaker is multilingual. This speaker has three different languages that everyone accepts as being different languages. However, what happens when we have speakers who speak several so-called 'dialects'? Imagine, for example, a speaker of the Cantonese, Mandarin and Hebei dialects. Is this speaker multilingual? Although the lay answer depends on what we consider a language or a dialect to be, linguistic theory provides a less ambiguous answer. Consider the following:

> Everyone grows up hearing many different languages. Sometimes they are called 'dialects' or 'stylistic variants' or whatever, but they are really different languages. It is just that they are [sometimes] so close to each other that we don't bother calling them different languages. So everyone grows up in a multilingual environment. Sometimes the multilingual environment involves systems that are so unlike that you call them different languages. But that is just a question of degree; it is not a question of yes or no.
>
> (Chomsky, 2000:59)

As appreciated from above, speaking a language or a dialect for the average person is a matter of the conceptualizations we make. Linguistics, however, provides us with clearer

definitions. Our interests are not socio-political ones—real as they are—but whether or not the systems described by a label is structurally different (on a scale) to other systems described by other labels. To this end, there is no question that someone who speaks Cantonese, Mandarin and Hebei is a multilingual speaker of several languages. In this dissertation, we will take a similar perspective to the one in Chomsky's quote, and will consider a multilingual speaker to be anyone who has at least three (linguistic) systems that differ significantly—even if they share some level of mutual intelligibility. Of course, we do not mean to imply that these systems need to be equivalent to three different monolingual systems. It might be, as is the case for the population under investigation in this dissertation, that we have early bilinguals in two languages (systems) who have started to acquire a new one. In such a case, it is likely that these two systems affect each other such that their knowledge of each might differ from monolinguals of the same language. In the case of adult L2 speakers who attempt mastery of an L3 in adulthood it is unlikely that their L2 will look like that of monolingual native speakers (and perhaps their L1 will not either, see Schmid and Köpke, 2017 for discussion of bilingualism as attrition).

I do not suppose that the criteria advocated for here are the correct way or the only correct way to conceptualize multilingualism in general; as we know from many decades of work, the definition of multilingualism has taken many different factors into consideration, such as the number of languages, the proficiency in them, age of acquisition, type learning experience and so forth (see Rothman et al. 2019 for overview). What is most important is that we use an appropriate definition that allows us to investigate our specific questions. It is crucial that we know what we refer to when we use the same term; the best way to accomplish this is to be explicit about what each piece of research uses as defining factors for the populations they investigate.

1.3. Defining transfer and cross-linguistic influence

As a main point of this dissertation is to understand the nature of the first interlanguage L3 grammar, it is worth spending some time discussing what we consider transfer to be, particularly with regard to how we use the term throughout this introduction and the remainder of the thesis.

It should first be noted that we are assuming there is, in principle, a potential distinction between our linguistic (mental) representations (competence) and our linguistic (surface) manifestations (performance) in line with work done within the generative grammar paradigm. In simple terms, the idea is that competence reflects the actual mental representation of a language, and performance is the actual use of the speaker's language in a specific context (pulling from competence but not uniquely so). The relationship between these two manifestations of language is something that has also been the focus of debate (see, e.g. Cunnings, 2017; Lewis & Phillips, 2015, for a review). If one extrapolates this distinction to the field of non-native acquisition, we can argue that the learners build (a) a mental representation for the language being learned and also (b) have actual manifestations of this language in their using of the language. Good evidence for this distinction, in fact, comes from L2 acquisition where studies have shown speakers can under (and even over) perform in production what their comprehension seems to reveal more clearly (see Lardiere's 1998, 2007, 2009 work on Patty for a detailed case study and discussion). In addition to the mental representation of the additional language being learned, the learner has the mental representations for their first language in place. The relevant question for us, then, is to what extent and at what points in L2 development does the native language representations have an impact on the non-native interlanguage systems at the level of transferred representations. In the early 1990s, there was a vast increase in research that discussed the notion of transfer within formal approaches to non-native acquisition, as we will review briefly in the next

section. At this stage, it suffices to say that we consider transfer to qualify as such (and not mere cross-linguistic influence) only when it is clear (and methodologically speaking it can be clear *a priori*) that we are (or have a good chance at) capturing transferred representation of a previously acquired language to a new one. We will mostly use the term *transfer* in the second, third and fourth study of the dissertation when we refer to the fact that learners will transfer a system from either the L1 or L2 to the L3.

We should acknowledge some implications of assuming that transfer entails copying of a previous acquired grammar (whether domain by domain or in its entirety). The most obvious one is that the learners' behavior should be somewhat consistent and systematic; in other words, the newly acquired language should show, with some allowance for barring processing limitations and missing lexical knowledge, patterns of production, but especially comprehension to the system that had supposedly been copied initially. Decades of research across L2 acquisition, from all paradigms, have demonstrated that it is not only possible, but in fact quite probable, to reveal systematicity in behavior that can be reasonably likened to transfer proper (Alonso Alonso, 2016; Bley-Vroman, 1989, 2009; De Angelis, Jessner, & Kresic, 2015; Epstein, Flynn, & Martohardjono, 1996a; Flynn, 1987; Jarvis & Pavlenko, 2008; Odlin, 1989a, 2008, 2012; White, 2003). However, this does not mean that pattern likened to transfer is completely unambiguous and/or consistent, in the sense that the non-native learners show no variation in performances. Relatively small levels of inconsistencies at initial stages might be explained by the type of data and tasks employed to examine the nature of transfer. Grüter (2006) noted that showing inconsistencies in "production" at the beginning stages of L2 acquisition is not necessarily evidence for a lack of transfer. Her study showed that English speakers who were at the initial stages of L2 German showed systematic interpretations of ambiguous wh-questions. She argued that quite a bit of the variability surrounding the debate of what is and what is not transferred might be explained by the fact that many studies used production data. How this relates to L3/L*n* acquisition is a point taken

up in the second study in this dissertation, where the systematic review reveals similar method-dependent conditioning.

Another implication arising from the assumption above is that we need an additional term to refer to other types of influence that do not pertain to the copying of mental linguistic representations into L*n* interlanguage. Even though the terms cross-linguistic influence (CLI) and transfer are commonly used interchangeable, I use them as distinct labels for distinct processes, as has been done by several others (see e.g., Rothman et al. 2019; González Alonso & Rothman, 2017; Herdina & Jessner, 2002; Paradis, 2004). I will use the term CLI, then, to refer to any influence that we see that is not representational, yet reflects an in-the-moment borrowing from another system available to the individual. It is, therefore, predicted to be (a) variable and most abundant in production (slips of tongue, bleeding) and (b) more susceptible to processing and/or specific context considerations. Instances of CLI could include the wrong lexical choice selection, the momentary activation of a specific syntactic pattern, variation in phonological production and so on. We will mostly use this label in the first study of this dissertation where we examine how the interaction of two languages lead to cross-linguistic influence from one to the other one. This is not to say, as we will argue in the first empirical study in the dissertation, that this type of influence might not lead to the restructuring of a specific property in mental representations (e.g., Dussias & Sagarra, 2007). In fact, as has recently been argued by Perpiñán (2018) in a context that is very similar to that in our study, the constant influence of one language on the other in the case of bilinguals might actually lead to linguistic change and, therefore, affect the mental representation of these bilingual speakers. Regardless, the main point here is a qualitative one of what, in my view, demarcates two properties that are distinct and have unique consequences. If on the right track, this makes it all the more important they have separate labels and are understood as only partially-overlapping constructs.

1.4. Transfer in generative approaches to non-native language acquisition

In the following, we will provide an overview of (a) how transfer has been conceptualized in generative approaches to L2 acquisition, the literature from which the L3 literature has emerged over time and (b) how transfer selection in L3 acquisition might differ from L2 acquisition.

1.4.1. Transfer and L2 acquisition

The role of the L1 in the acquisition of an L2 has been the center of much of the theoretical and experimental work conducted within the Generative Second Language Acquisition (GenSLA) framework since its inception (e.g., Bley-Vroman, 1989, 2009; Epstein et al., 1996; Flynn, 1987; White, 1989, 2003). The extent to which the L1 would influence the development of the L2 (if at all) embodied the main point of theoretical discussion throughout the 1990s. Different positions were proposed. Some argued that copying of L1 representations would not take place—CLI in the way I defined above might explain some apparent instances of performance, but this would be at a surface, superficial level (e.g., Epstein, Flynn, & Martohardjono, 1996). Others argued that there would be partial transfer of L1 representations at the initial state—either a subset of linguistic categories, lexical but not functional categories (Vainikka & Young-Scholten, 1996) or both lexical and functional categories yet not their language-specific feature specification (Eubank, 1994). Still others argued for complete, wholistic transfer at the initial state (Schwartz & Sprouse, 1994, 1996).

Even though Flynn and Martohardjono (1994) and Epstein et al. (1996) did not strictly address the role the L1 might play at a more superficial level—i.e. they do not necessarily ignore the influence an L1 has, but do directly challenge such influence as representational transfer—, they proposed the Full Access Hypothesis, which argues that Universal Grammar (UG) is the initial state in L2 acquisition. In order words, Flynn and colleagues implicitly argued that there was no representational transfer at all at the beginning of L2 acquisition.

Evidence for their proposal comes from a study on child and adult L2 learners of English in an elicited imitation task. Their results showed that for L1 Japanese-L2 learners of English free relative clauses followed the developmental trajectories of L1 English speakers, contrary to the results of the L1-Spanish speakers who indicated a cumulative positive effect from Spanish to L2 English at a surface level.

Advocating for a partial transfer of the L1 on the L2, Vainikka and Young-Scholten, (1996, 2006, 2011) suggest that parts of the L1 would constitute the initial state of the L2. They called this proposal the Minimal Trees Hypothesis (MTH). The MTH envisions the initial state of the L2 as lacking functional categories; thus, only the feature composition of L1 lexical categories would be transferred at the beginning, along with the basic syntactic properties that follow (e.g. head-directionality). These functional categories (such as Complementizer Phrases, Tense Phrases and Negation Phrase) are expected to emerge as a consequence of development itself and display no hallmarks of true representational transfer. The MTH originated from empirical claims in the field of L1 acquisition in which proposals with similar tenets had also been posited, such as the Maturation Hypothesis (Borer & Wexler, 1987, 1992) and the Weak Continuity Hypothesis (e.g., Clahsen, Eisenbeiss, & Penke, 1996; Clahsen, Eisenbeiss, & Vainikka, 1994). Evidence for the MTH was argued to come from several studies examining the interlanguage of L2 German by speakers of different L1s (Spanish, Italian, Turkish and Korean). These studies examined their production and, noted striking differences between the speakers of Romance languages (head-initial languages) and the speakers of the other two languages (head-final). Upon examination of the data, it was concluded that the initial grammars of the learners were lacking subject-verb agreement, the incidental occurrence of auxiliaries and a lack of empirical proof for syntactic movement such as verb raising. Taken together, this was considered evidence that functional projections were lacking but the influence of the L1 was nonetheless systematically visible for properties that

could be gleaned at the lexical category level (see Vainikka & Young-Scholten, 1994 and 1996 for more details, and White, 2003, for a scrutiny of this proposal).

Similar to the MTH, Eubank (1994) proposed a theory that predicted partial transfer from the L1, called the Valueless Features Hypothesis (VFH). The main argument was that the initial state of the L2 would consist of all syntactic features (lexical and functional categories) transferred from the L1; however, the valuation of such features would transfer. VFH was predicated on a then current theory of syntax, which postulated features as coming in two values: weak or strong whereby the strong version was responsible for syntactic transformations (+strong wh feature, for example, would induce wh-movement). Since the transferred features were inertly valued, the learner would show variation in syntactic operations from the outset—sometimes there would be movement in line with the L1, and other times not. Eubank made this proposal on the basis of several empirical data sets (e.g., Gerbault, 1978; White, 1990), examining different properties related to verb movement across adverbs and across Negation Phrases (NegP). Follow-up studies by Eubank, Bischof, Huffstutle, Leek, and West (1997) and Eubank and Grace (1998) led them to suggest an even stronger position for the VFH whereby the feature would not only be inert at an early stage, but would remain so across development (Beck, 1998; but see Schwartz & Sprouse, 1996; White, 2003 for alternative interpretations of their data).

Alternatively, Schwartz and Sprouse (1994, 1996) proposed that the initial state of the L2 would be a by-product of Full Transfer from the L1. In other words, the initial state of L2 acquisition is a copy of the specified L1 grammar in nearly all respects, excluding only the phonetic matrices of lexical and morphological items.

> According to the FT/FA model, the entirety of the Ll grammar (**excluding the phonetic matrices of lexical/morphological items**) is the L2 initial state (hence the term 'Full Transfer'). This means that the starting point of L2 acquisition is quite distinct from that of Ll acquisition: in particular, it contends that all the principles and parameter values as instantiated in the Ll grammar immediately carry over as the initial state of a new grammatical system on first exposure to input from the target language (TL).
>
> (Schwartz & Sprouse, 1996: 41)

Schwartz and Sprouse expanded their argument to model development in L2 acquisition and argued that the L2 was by no means limited or restricted to what was transferred in the first place. According to the Full Transfer/Full Access (FT/FA) model, the L2 learner should be able to restructure the initial L2 grammar upon parsing input that does not align with such a grammar. Upon parsing L2 input, the parser, after encountering a computational failure based on the current grammatical settings will use UG to reconfigure whatever is needed from L1 transfer. A common misunderstanding is that the FT/FA model predicts native-like attainment across the board; as Schwartz and Sprouse (1996: 42) put it, "it may be that the L2 acquirer will never be able to arrive at the TL grammar: either the data needed to force restructuring simply do not exist [...] or the positive data needed are highly obscure being very complex and/or very rare". In such cases, remnants of L1 transfer might still be perceivable in very advanced and near-native speakers of the L2. Evidence for the Full Transfer aspect of the model come from a case study of word order and nominative case in which Schwartz and Sprouse (1994) examined L2 German production data by a Turkish speaker at different stages of development. Further support for the model comes from Grüter (2006), Haznedar and Schwartz (1997), Slabakova (2000) and Yuan (1998).

Although the extent and scope of L1 transfer in L2 acquisition is not entirely agreed up, there is no question it plays a crucial role in shaping the initial stages and further development of the L2. Observations in the actual data are not tied to the theoretical analysis one attributes

to it; thus, irrespective of the paradigm, theory and conceptualization of linguistic transfer, the body of data showing that the L1 has an effect on the L2 is not only abundant, but also a construct that defies paradigmatic traditions.

1.4.2. Transfer in L3/Ln acquisition

In the same way that transfer has been a significant focus in L2 acquisition studies, especially in generative L2 acquisition (GenSLA), the role of previously acquired languages in L3 acquisition has been the focus of the nascent L3 field over the past 15 years. A major focus within the L3 remit of so-called transfer studies is the modelling of source, type and timing of transfer selection in L3/L*n* acquisition, being a more complex situation than L2 acquisition. A crucial difference between the two regards what is, in principle, available for transfer. Whereas in L2 acquisition the possibilities are limited to no, partial or full transfer from the L1, in L3/L*n* acquisition, the possibilities are, *a priori*, more:

(a) No representational transfer will take place,
(b) the L1 will be the main source of transfer by default,
(c) the L2 will be the main source of transfer by default,
(d) There is no default, both L1 and the L2 constitute the absolute initial state and how/when selection is hypothesized to obtain demarcates various non-default models)
    (d*) either the L1 or L2 is selected in its entirety as the first L3 interlanguage grammar
    (d**) either the L1 or L2 will (partially) constitute the initial state of L2 acquisition.

These logical possibilities have been either discussed to explain individual data sets or formalized into models since the early 2000s. Although logical scenario (a) above has never been suggested in L3 acquisition research. I now review the remaining possibilities and how they have played out in the L3 literature.

1.4.2.1. The privileged role of the L1

Some of the work in L3 morphosyntax shows what they claim is evidence for a robust L1 transfer effect (e.g., Jin, 2009; Lozano, 2003; Na Ranong & Leung, 2009). In relative terms to the age of the field, many of these studies are early in the literature. As such, these studies attempted to explore and describe L3 acquisition without being encumbered by trying to test particular models that did not yet exist. They merely find L1 transfer and report this, as opposed to claiming that the L1 is necessarily a default. In these cases, the semblance of L1 transfer could very well be consistent with the tenets of later formal models claiming transfer is based on other factors that happen to coincide with L1 status in these specific cases. Later work by Hermas (2010, 2015) claimed that the L1 could be the default language for transfer without fully formalizing the proposal as a citable model *per se*. Hermas investigated Moroccan Arabic-French bilinguals with different degrees of proficiency in French who were acquiring L3 English; in these studies, he showed a strong L1 effect (Arabic) on the L3 (English). However, he also pointed out the fact that some of his speakers had quite low proficiency levels in French and noted some effects of their Arabic in their tested French. In other words, the L2 grammar of many of these learners was not yet target-like. This introduces potential noise into his studies, in that it is difficult to determine whether transfer came directly from the L1 to the L3 or from the L1 to the L3 via the L2, a point to which we return in Study 2.

Even though studies such as the one by Hermas (2010, 2015), Jin (2009), Na Ranong and Leung (2009) and others have shown an L1 effect, no explanation has actually been presented regarding why this should be so. In other words, why is it predictable *a priori* as opposed to descriptively capturing observations *a posteriori* in these specific cases. It is worth pointing out again that most of the studies that have shown (and claimed) a unique, strong effect of the L1 on the L3 were carried out before the models of L3/L*n* acquisition were

conceived; thus, such data might very well be compatible with other claims that are currently available in the field via other formalized models (see Article 2 for more details on this point). Even though there has not been yet a formalized proposal for such scenario, we can conclude that this possibility is testable; accordingly, many studies have examined whether the order of acquisition can be a deterministic factor for transfer selection in L3/L*n* acquisition. It is important to mention that the scenario involving the privileged role of the L1 is a very strong hypothesis—if evidence of transfer from the L2 is found, it would be direct evidence questioning such a proposal. From a 2019 perspective, as we will see in the systematic review, it seems unlikely that such a proposal is on the right track, particularly when one considers the vast amount of studies that show transfer from the L2, either exclusively or in combination with transfer from the L1.

1.4.2.2. The L2 Status Factor Hypothesis

The main claim of the L2 Status Factor model (L2 SF; Bardel & Falk, 2007; Falk & Bardel, 2011), as originally formulated, is that an L2 acquired post-puberty will have a privileged status in transfer selection in L3/L*n* acquisition. Bardel and Falk (2012) offer an explanation for why an L2 might have a privileged default status, aligning the L2SF with Paradis' (2009) Declarative/Procedural model, which contends that any grammar acquired post-puberty is sustained and stored in a different memory system. The L1 (or any language acquired during puberty) is claimed to be acquired via the procedural memory system and the L2 (or any language acquired post-puberty) the declarative memory system. Bardel and Falk (2012) contend that the L2 is the default for transfer precisely because the L3/L*n* is destined to be acquired, maintained and stored via the same memory system; thus, the L2 and L3 will be cognitively more similar in their status.

As we will see in study 2, there is ample evidence showing that the L2 is, in fact, not the unique source of apparent transfer. Bardel and Sánchez (2017) and Falk, Lindqvist and Bardel

(2015) acknowledge that sometimes L1 transfer obtains and discuss how this can be accommodated via a modified L2SF that maintains the original tenets. This revised L2SF is also particularly relevant for situations in which the L3 learners are early bilinguals; that is, where there is not necessarily a clear L2 (e.g. in simultaneous bilinguals with two L1s). In these cases, Bardel and Sánchez (2017) claim that individual differences in cognitive functioning, such as working memory capacity and attention control, might help override privileged status of the L2 in the case of a clear L2 learner and correlate to individual differences in L3 transfer source in young bilinguals. Lindqvist et al. (2015) also argue that, if learners have received substantial metalinguistic training in their L1, this leads to L1-specific grammatical knowledge in declarative memory, which would then be available for transfer selection and could explain some L1 transfer in true adult L2 learners of an L3. The first instantiation of the L2SF is a strong hypothesis, as any evidence suggesting that the L1 might play a role in L3/L*n* acquisition falsifies the model directly. Although these amendments to the original theory are helpful and represent good-faith attempts at covering some apparent counter evidence to its predictions, we now need more fine-grained studies that are able to tap into the individual differences that might potentially override this L2 status.

1.4.2.3. The Cumulative Enhancement Model

The Cumulative Enhancement Model (CEM; Berkes & Flynn, 2012; Flynn, Foley, & Vinnitskaya, 2004; Flynn, Vinnitskaya, & Foley, 2008) was the first model in the literature. It argues that both languages acquired previously will be available for transfer selection at any point in the process of L3 acquisition. The model's main tenets are based on the principles of non-redundancy and maximal facilitation in successive language acquisition, which means that transfer from previously acquired languages is only expected to obtain when this facilitates the acquisition of the target L3/L*n* property. Of course, this suggests that the parser has had

sufficient input to evaluate the property to be transferred to the L3, and, thus transfer can happen along the developmental continuum as needed.

There is a main implication of this. When one of the two previous languages has the same distribution for the property to be acquired in the target L3, this language will be selected for transfer for this specific property. The CEM proposes transfer to unfold on a property-by-property basis in order for the parser to have time to evaluate the input and make the most optimal decision for the acquisition of a new grammar. The CEM, together with the two scenarios presented above, is also a very strong hypothesis because any instance of non-facilitation in L3/L*n* acquisition serves as falsifying evidence. As we will see in study 2 of this dissertation, there seems to be ample evidence suggesting that the CEM contention that transfer would only be facilitative is definitely on the wrong track.

1.4.2.4. The Typological Primacy Model

The Typological Primacy Model (TPM; Rothman, 2010, 2011, 2013, 2015) argues that all previously acquiring languages will be available for transfer selection at the beginning of L3 acquisition. The TPM assumes that transfer will occur in a wholesale manner from one of the two languages; the principle underlying this assumption parallels that of Schwartz and Sprouse's (1994, 1996) Full Transfer/Full Access model of L2 acquisition. As the TPM is a model principally concerned with describing initial stages transfer to the first L3 interlanguage grammar, it is crucial to understand that its predictions are most applicable to early levels of L3 proficiency. In study 3, we show the potentially pitfall consequences of using post-beginner learners to test models of transfer where teasing apart transfer from effects of L3 learning itself comes increasingly more difficult. The fact that the TPM is a model of the initial stages, however, does not mean that one cannot draw knock-on developmental inferences from its predictions; we return to this in study 4. The TPM also claims that transfer will take place as soon as the parser has had sufficient input to evaluate which of the two has the highest degree

of typological (structural) proximity, which means that timing for selection depends on the language pairings (see Rothman et al., 2019 for detailed discussion of this and other aspects related to the epistemology of the hierarchy).

Rothman (2015) proposed an implicational hierarchy of linguistic cues that the parser is hypothesized to use to evaluate the input and determine which of the two languages acquired previously has the greatest degree of similarity to the L3 overall (i.e. not property-by-property).

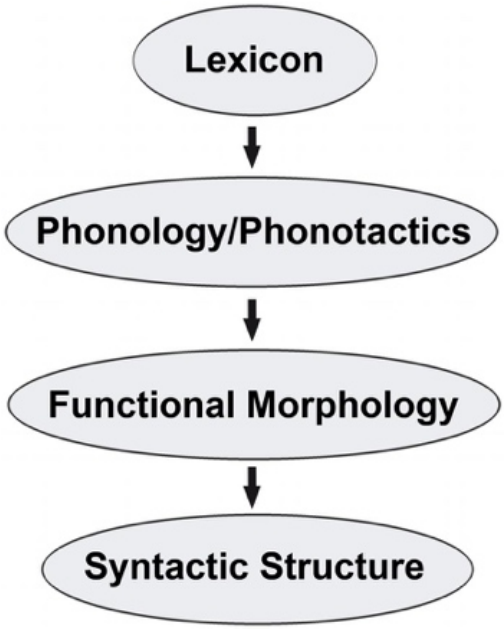

Figure 1.1 TPM's implicational hierarchy of linguistic cues.

(taken from Rothman, Alemán Bañón, & González Alonso, 2015)

The parser will first scan the lexicon of the L3 input, assessing the degree of similarity. If the first level of the hierarchy does not prove useful for determining the typologically closer language, the parser moves onto the second level, and so on. In study 4, we discuss how this implicational hierarchy can be applied to the population under investigation in this dissertation. Considering that it is an implicational hierarchy, this means that the lower levels of the hierarchy may not always be considered.

Because this model predicts wholesale transfer from one of the two languages acquired previously, it makes strong, testable predictions. Evidence of transfer from the language in

which there is the least degree of structural similarity based on the implication hierarchy would be evidence against the predictions of the model. Evidence of transfer from both languages simultaneously would also be evidence against a stipulation of the model, that is, the claim of wholesale transfer although not necessarily against the main argument relating source selection to typological proximity.

Similarly to the L2SF, the fact that only one of the prior languages is selected for transfer means that the outcome of transfer will be non-facilitative in some cases. Unlike theories advocating transfer on a when-needed, domain-by-domain basis (e.g., Flynn et al., 2004; Slabakova, 2017; Westergaard et al., 2017), there is no need for the model to posit additional factors in order to explain a particular non-facilitative outcome of transfer, since this possibility follows straightforwardly from the relative amount of mismatch between the transferred and target grammars.

1.4.2.5. The Linguistic Proximity Model

The Linguistic Proximity Model (LPM; Mykhaylyk, Mitrofanova, Rodina, & Westergaard, 2015; Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017) also argues that all languages acquired previously are available for transfer selection at the onset and subsequent stages of L3 acquisition. In line with the argument of the CEM, the LPM rejects the notion of wholesale transfer and envisions transfer to occur on a property-by-property basis. This means that neither the L1 nor the L2 are selected at the very beginning, but will be available for transfer when a new L3 representation is required across development over time.

Contrary to the initial predictions of the CEM, the LPM does not preclude non-facilitation. In other words, it does not predict transfer to necessarily be maximally facilitative. This model acknowledges that influence from either the L1 or L2 might be both facilitative and non-facilitative. In order for the parser to establish which property to transfer, the model predicts that structural proximity at the property level will be the determining factor. Thus,

the parser will scan the specific property in the L3 input, juxtapose its distribution to the L1 and L2, and select the one that is structurally more similar to the L3. In some cases, this will lead to facilitation and to non-facilitation in others. It, however, does not offer any way to determine *a priori* when transfer will be non-facilitative, that is, when or why property-by-property transfer should sometimes result in the wrong choice. Thus, it is difficult to make specific predictions for every linguistic triad nor is it presently clear what the conceptualization of a property is that the LPM assumes and/or how the parser would determine structural proximity.

1.4.2.6. The Scalpel Model of Third Language Acquisition

The Scalpel Model (SM: Slabakova, 2017) shares its main tenet with the LPM and the CEM, arguing that transfer occurs on a property-by-property basis. Against the predictions of the CEM, but like the LPM, the SM acknowledges that non-facilitation in L3/L*n* acquisition occurs and finds it logical that it would do based on factors that can divert, so to speak, the parser from always choosing the better option between the two available previous systems. The SM proposes a multi-dimensional approach to transfer in L3 acquisition in that several factors are argued to come into play to delimit transfer source selection. Some of the factors that are put forward are unambiguous input, construction frequency and the prevalent use of previous languages, as well as language dominance. In study 4 we will see that language dominance does not play a role in transfer selection in our study, but does have a deterministic one for subsequent development (recovery from non-facilitative transfer). Whereas all the suggestions of the model are welcome and indeed necessary for the field to advance, it is not clear how all these different variables would (or should) interact to delimit transfer source selection. More to the point, it is simply not clear when SM predicts non-facilitation to occur and when it does not. So, while its claims are compatible with non-facilitative transfer, like the LPM, it currently provides no metric to predict its occurrence *a priori*. The SM claims the

parser has scalpel-like precision—hence the name of the model itself—and so, a question that arises is why would non-facilitation occur if transfer happens conservatively, property-by-property? What are the precise predictions of when non-facilitation will occur and what variables condition it in such a way that the model can be properly tested and, thus, be the most useful? Future instantiations of the model should schematize how the parser is envisioned to weigh all these variables so that we can devise experimental designs that allow us to test the model.

1.5. Situating the Study of Polarity and Negation

Across the articles that comprise this dissertation, we use polarity (broadly understood as the distinction between positive and negative forms) as a tool to answer bigger questions. It is worth situating the study of polarity in the theoretical literature, particularly as it relates to the syntactic and semantic nature of words such as *nothing, anything* in English*, nada* 'nothing/anything' in Spanish*,* and *res* 'nothing/anything' in Catalan.

We know from the literature on L1 development that negation is a phenomenon that is acquired relatively early in most languages (e.g., Bel, 1996; Bloom, 1980; Klima & Bellugi, 1966). However, the way in which it is expressed varies significantly. In some languages, several apparently 'negative' elements can co-exist within the same local domain without cancelling the semantic meaning of the utterances (such as in Catalan, Spanish, Japanese, Greek and so on). These languages have been labelled Negative Concord (NC) languages (e.g. Watanabe, 2004; Zeijlstra, 2004). As we see in study 1, 3 and 4 there is variation within the set of languages we use regarding their treatment of negative elements. In some other languages, the appearance of several negative elements within the same local domain results in cancellation of the semantic meaning of negation (for example, in Standard English, Standard Dutch and the like). These languages have sometimes been referred to as Double Negation (DN) languages (e.g., Tubau, 2008; Watanabe, 2004; Zeijlstra, 2004).

In Standard English, Negative Quantifiers (NQs) cannot co-occur with any other negative element if a single negation reading is intended.[1] When two negative elements co-occur in the sentence, the negation is cancelled (compare 1 to 4).[2]

(1) Nobody said this was easy.
(2) Nobody did NOT say this was easy. (=Everybody said this was easy)
(3) Laura said nothing.
(4) Laura did NOT say nothing. (=Laura said something)

In contrast to NQs, a post-verbal Negative Polarity Item needs to be licensed (i.e. c-commanded) by a negative element for the clause to have a negative reading, (8). Examples (5)-(7) are ungrammatical because the Negative Polarity Item *anybody* either lacks an appropriate licensor, (5) and (7), or it outscopes the negative element, (6). Negative Polarity Items (NPIs) can also have existential readings and free-choice readings in certain contexts, a point elaborated on in Articles 3 and 4.[3]

(5) *Anybody said this was easy.
(6) *Anybody did NOT say this was easy.
(7) *Laura said anything
(8) Laura did NOT say anything.

It is interesting for our study that Catalan and Spanish only have one potential lexical item that corresponds to all these contexts. As we will see in study 1, 3 and 4, there are micro-parametric differences in the distribution and interpretation of the Spanish and Catalan equivalents of *nothing/anything* and *nobody/anybody*, which allows us to test the different hypotheses in bilingualism, transfer in L3 acquisition and subsequent L3 development. An interesting point of discussion about these lexical items is their actual status. In the theoretical literature, it is generally accepted that the English *nothing*, *nobody* and the like are NQs whereas

[1] See Tubau (2016) for a description of non-standard dialects of English that behave like NC languages.
[2] Puskás (2012) for more contexts that enhance the Double-Negation readings.
[3] For the examples in (5) and (7) to be grammatical under a free-choice reading, the context needs to be non-episodic (Giannakidou, 2001: 668), e.g.:
(i) Anybody could say this was easy.
(ii) Laura would say anything.

anything, anyone and the like are NPIs. The question is thus whether Spanish words such as *nada* 'nothing'/'anything' or *nadie* 'nobody'/'anybody' and Catalan words such as *res* 'nothing'/'anything' or *ningú* 'nobody'/'anybody' are quantifiers, polarity items or something else. Even though these lexical items have traditionally been referred to as n-words (Laka, 1990), we will use the label Negative Concord Items (NCIs) throughout this dissertation to avoid committing to any hypothesis or formalization concerning their actual status.

The status of these words has been the center of theoretical debate (e.g., Laka, 1990; Tubau, 2008; Zanuttini, 1991; Zeijlstra, 2004). In languages such as Spanish and Italian, they display an interesting asymmetry between their behavior in pre- and post-verbal positions. Let us consider the following Spanish examples:

(9) Nadie dijo que seria fácil.
N-body say that would-be easy
'Nobody said it was easy'

(10) Laura no dijo nada.
Laura not said n-thing
'Laura did not say anything'

In (9), the pre-verbal *nadie* exhibits the inherent properties of NQs in that they do not need to co-occur alongside an external negative operator to have an inherent negative meaning. In (10), the post-verbal *nadie* exhibits the inherent properties of NPIs, as they need to be licensed by an external negative operator. This is equally applicable to similar lexical items in other languages such as Catalan, Italian and Greek, the languages that belong to the group of NC languages. As we will also see in studies 1, 3 and 4, the case of Catalan is even more complex because it also shows variation within the pre-verbal domain. The asymmetry illustrated in (9-10) raises the question that is the focus of attention in the theoretical debate, namely whether NCIs are NQs, NPIs or something else. We provide below a brief summary of the four most relevant hypotheses.

The first hypothesis is that these types of words are universal NQs (Haegeman & Zanuttini, 1991; Watanabe, 2004; Zanuttini, 1991) that are inherently negative. The claim is

that NCIs have a [NEG] feature that carries the inherent negative meaning. Haegeman and Zanuttini (1991) proposed that this feature needed to be checked formally in order for the derivation not to crash. They further proposed the NEG criterion, which triggers movement of the NCI to the specifier position of the NegP for it to have its formal features checked. This movement is proposed to occur either overtly or covertly, leading to the different distributions of these lexical items that we see. This proposal is controversial. A main argument against this proposal is that, if these items are inherently negative and carry a [NEG] feature, they should be able to give rise to a negative interpretation in ALL possible contexts. As will be seen in study 3 and 4 and as we can appreciate in example (11) below, Catalan and other languages such as Italian or Greek allow their NCIs to appear in the absence of a negative licensor without giving rise to negative readings. This has been directly discussed by Vallduví (1994) and Espinal (2000) with regard to Catalan.

(11) La Laura em trucarà si la Lily fa res.
Laura will-call-me if Lily does n-thing
'Laura will call me if Lily does anything'

Another hypothesis is that these lexical items are NPIs (Bosque, 1980; Laka, 1990). Note, however, that the fact that these lexical items have been labelled NPIs does not necessarily mean that they are inherently negative. The term NPI is used to capture the fact that an existential expression has to be licensed by a syntactic operator. In many cases, this operator will be a negative one but, crucially, it does not have to be one as these lexical items can be licensed in contexts such as questions or conditions (See Giannakidou, 1998, 2006, 2011 for the distinction between anti-veridical and non-veridical operators). To account for pre-verbal NCIs without an apparent negative element in the same local domain, Laka (1990) argued that the licensing negative operator could be a null one.

NCIs have also been proposed to be non-negative indefinites (Ladusaw, 1992, 1994; Penka, 2011; Tubau, 2008; Zeijlstra, 2004). Under this view, NCIs lack implicational quantificational force. They attain such force by means of an abstract negative operator.

Zeijlstra (2004) argued that these NCIs were non-negative indefinites that carry an uninterpretable feature [uNeg], suggesting that they are syntactically flagged to participate in negation chains, but not semantically negative. This requires the negative operator in the sentence (overt or covert) to check the [uNeg] feature and assign the syntactic chain formed by the operator and the NCI a semantic negative reading.

Finally, it has been argued that these words are lexically ambiguous in terms of NQs and NPIs (Herburger, 2001). According to this proposal, there are two sets of homophonous NCIs. The first set consists of the elements that can appear by themselves (such as in the pre-verbal position for Spanish, (9)), while the second set consists of those elements that need to co-occur with an overt negative operator, (10). Herburger argued that the NCIs in the first set are inherently negative and thus behave in the same way as NQs, and that the NCIs in the second set are NPIs. Herburger's main line of argument was that languages in which NCIs displayed this asymmetric distribution were probably at an intermediate stage of Jespersen's Cycle (Jespersen, 1917),[4] with NCIs slowly losing their NPI properties and becoming more inherently negative. In recent work, Espinal and Tubau (2016) applied a similar argument to explain the variation found in Catalan with regard to the co-occurrence of a pre-verbal NCI with sentential negation (a relevant characteristic of Catalan which is briefly addressed at the end of this section). They suggested that Catalan might have two homophonous lexical items for *no* 'not' that are in competition, an expletive one that can co-occur with the pre-verbal NCI and a truly negative one that cannot. We will discuss this last point in the general discussion in connection with some of the unexpected results we present in study 4.

Irrespective of the actual nature of NCIs in theoretical terms, when relevant, we will present the differences in their distribution and interpretation between Catalan and Spanish throughout the dissertation, and will compare their distribution to English when pertinent.

[4] The Jespersen's cycle captures the fact that negation has changed diachronically and argues that there are six different stages that account for the diachronic changes. These stages capture different possibilities and combinations of negative elements.

We will return to the debate on the nature of NCIs in the general discussion, in which we will discuss the implications of our findings in light of this debate overall. We will also show how empirical work in acquisition research can potentially shed some light on questions relevant for the formalization of language.

Apart from investigating the nature of NCIs, scholars working on NC have also addressed a further asymmetry in the distribution of pre-verbal NCIs across languages. As shown in (12), Spanish does not allow NCIs to occur in the pre-verbal position with sentential negation, whereas other languages such as Romanian require sentential negation to be present, (13). This led to the division of NC into two main types: Strict NC if pre-verbal NCIs have to occur with the sentential negative marker in all contexts, and Non-Strict NC if pre-verbal NCIs have to occur with the sentential negative marker when they are post-verbal, but cannot when they occur pre-verbally (Giannakidou 1998). To account for this distinction, Zeijlstra (2004) suggested that sentential negation in these two types of NC differed. Sentential negation for Non-Strict NC languages such as Spanish is claimed to carry an interpretable [iNeg] feature that makes sentential negation inherently negative, while the negative marker for Strict NC languages such as Romanian does not.[5]

(12)	*Nadie	no	habla	japonés	Spanish
(13)	Nimeni	nu	vorbeşte	japonez	Romanian
	N-body	not	speak	japanese	
	"Nobody speaks Japanese"				

The case of Catalan poses an additional problem for this proposal because NCIs in Catalan can freely occur in the pre-verbal position with and without a sentential negative marker. Zeijlstra (2004) proposed that there were two distinct dialects in Catalan to account for this variability, one that behaves like Spanish (i.e. a Non-Strict NC dialect) and another that

[5] Zeijlstra (2004) assumes negative markers in Strict NC languages to bear an uninterpretable negative feature [uNeg], very much like NCIs. This means that a null operator specified as [iNeg] is inserted in the derivation as a Last Resort to license not only the NCI, but also the negative marker.

behaves similarly to Romanian (i.e. a Strict NC dialect). As pointed out by Déprez, Tubau, Cheylus and Espinal (2015) and as we will see in study 4 and the general discussion the existence of two different dialects of Catalan seems unlikely because there is no divide amongst speakers in that they all allow for this optionality in their grammars. We will return to this point in the general discussion and how the empirical data of this dissertation thus helps us to adjudicate between proposals.

1.6. The acquisition of polarity in L1, L2 and L3 acquisition

Although there has been a line of research that has examined the acquisition of NPIs, NQs and NCI items in most instances of language acquisition (e.g., L1: Bel, 1996; Capdevila-Batet & Llinàs Grau, 1995; O'Leary & Crain, 1994; Tieu, 2010; Tieu & Lidz, 2016; Xiang, Conroy, Lidz, & Zukowski, 2006; Heritage Language Acquisition: Albirini & Benmamoun, 2015; Austin, Blume, & Sánchez, 2013; and L2 acquisition: Gil & Marsden, 2013; Meisel, 1997; Swart, 2009), very few studies have examined them in the context of multilingualism. An exception is a recent study by Puig-Mayenco and Marsden (2018) that investigated the acquisition of the NPI *anything* in L3 English by L1-Catalan-L2-Spanish learners. In this study, the authors examined the potential role of transfer in L3 acquisition in a context of micro-variation. They examined the judgements of *anything* in four separate contexts by Catalan-Spanish bilinguals whose L1 was Catalan and their L2 was Spanish. Their findings showed that the language that seemed to play a more important role in the initial stages was Catalan for all the learners. They attributed their findings to the fact that Catalan was selected as the source of transfer instead of Spanish. Although it should be acknowledged that their design did not allow for discrimination between an L1-default scenario and the predictions of the Typological Primacy Model, since Catalan was the L1 of all the participants, the provide

convincing points that the tenets of the TPM were supported and why this is the most likely scenario.

Studies such as Puig-Mayenco and Marsden's (2018) and the ones we will see in studies 3 and 4 of this dissertation are important in the field of L3/L*n* acquisition because they examine the models of morphosyntactic transfer in relation to less clear-cut choices than does the widely studied Romance/Germanic → L3 Romance combination; a Romance/Romance →L3 Germanic combination allows for the possibility of testing the TPM's hierarchy at a deeper level, namely the second level. However, the design employed in Puig-Mayenco and Marsden's (2018) studies has two main shortcomings that do not allow us to tease apart the predictions of an L1 scenario and those of the TPM. They did not employ a mirror-image methodology. A second shortcoming of their study was the use of beginning proficiency as a cut-off point as an inclusion criterion to explore morphosyntactic transfer selection in L3 acquisition. As pointed out by González Alonso and Rothman (2017) and as we will see in study 3, confounding proficiency and exposure can have important effects on the results, making it more difficult to differentiate between what has been acquired what it was transferred from initially.

1.7. This dissertation

By now it is clear that the overarching theme of this dissertation relates to understanding how multilingualism operates and how studying multilingualism transitions to the bigger field of non-native acquisition as well as theoretical proposals for grammatical properties. The compilation of articles couples together to help us answer the three bigger questions that guide this doctoral dissertation, as presented below:

I. What can the study of multilingualism tell us about the cognitive processes underlying the initial stages and beyond of any instance of non-native acquisition?
II. What do methodological practices in the field of L3/L*n* acquisition tell us about the variability found in the literature?

III. How can the study of multilingualism help us to understand the nature of certain linguistic domains?

In summary, the first Study examines the knowledge of NCIs and differential object marking in the grammar of highly proficient early bilinguals in Catalan and Spanish. In this study we test two groups of Catalan-Spanish bilinguals in their early 20s. This first study is of crucial importance to establish what phenomena are suitable for the study of L3 acquisition. As we will see across the other studies, two significant contributions are made: (a) each bilingual is tested in both languages, which allows us to examine the potential effects of directionality, and (b) two different methodologies are used for each bilingual, which allows us to explore asymmetries between off-line and on-line measures. The second study provides an analytical panoramic view of the field of L3/L*n* acquisition by reviewing the majority of available L3 morphosyntactic studies published between 2004 and 2018 systematically, examining how the methodological practices can explain some of the variability we find in the literature. The newness of the field allows us to take a step back and to take stock to see where we are and where we need to go as a field. In addition, the findings of this study were of importance to devise a methodology to explore L3/L*n* acquisition in the most responsible way possible. In the third study, we provide a snapshot of the initial stages of acquisition and show how confounding proficiency and exposure can introduce potential noise into the study of transfer. To do so, we test two different groups of Catalan-Spanish bilinguals, who are in fact older than the ones tested in study 1. In the fourth study we arrive at the culmination of the dissertation by examining the grammars of *ab initio* L3 learners of English. These participants are the same two groups of participants that are presented in the third study. Here, we show what factors can account for the initial stages of L3 transfer and, more importantly, what factors condition the shape of developmental patterns in L3 acquisition. To our knowledge, this study is the first in the field of multilingualism to describe developmental patterns using a longitudinal design. We offer some insights into ways in which the field is now ready to start

examining what happens after the initial point of departure after establishing a proper baseline of comparison for individuals' development. As a conclusion to the dissertation, we return to these bigger questions.

Chapter 2: NCIs in early Bilinguals (Study 1)

Language Dominance Affects Bilingual Performance and Processing Outcomes in Adulthood[1]

Abstract

This study examines the role of language dominance (LD) on linguistic competence outcomes in two types of early bilinguals: (i) child L2 learners of Catalan (L1 Spanish-L2 Catalan and, (ii) Child Spanish L2 learners (L1 Catalan-L2 Spanish). Most child L2 studies typically focus on the development of the languages during childhood and either focus on L1 development or L2 development. Typically, these child L2 learners are immersed in the second language. We capitalize on the unique situation in Catalonia, testing the Spanish and Catalan of both sets of bilinguals, where dominance in either Spanish or Catalan is possible. We examine the co-occurrence of Sentential Negation (SN) with a Negative Concord Item (NCI) in pre-verbal position (Catalan only) and Differential Object Marking (DOM) (Spanish only). The results show that remaining dominant in the L1contributes to the maintenance of target-line behavior in the language.

Key words: Language Dominance, Negative Concord Items, Differential Object Marking, Early bilinguals, Catalan/Spanish

[1] **Puig-Mayenco, E**., Miller, D., Bayram, F., Cunnings, I., Tubau, S., & Rothman, J. (2018). Language Dominance Affects Bilingual Competence and Processing: Evidence from a Bidirectional Study of Unbalanced Catalan/Spanish Bilinguals. ***Frontiers in Psychology***. https://doi.org/10.3389/fpsyg.2018.01199

2.1. Introduction

A large body of studies involving early childhood bilinguals examine the development of linguistic competence during the acquisition process itself, often focusing on how bilingual acquisition is qualitatively similar or different to monolinguals during the developmental period of language learning (see Meisel, 2011; Nicoladis, 2018; Serratrice, 2013, for a review). Furthermore, studies concerned with adult second language acquisition or first language attrition largely focus on similar processes; however, they do so with inherently different contexts concerning age of onset and other deterministic variables (see Rothman & Slabakova, 2017; White, 2018; Wulff & Ellis, 2018; Yilmaz & Schmid, 2018 for updated reviews from various paradigmatic approaches). The focus, thus, is on the acquisition of another language starting in adulthood and the ensuing developmental consequences, as in the case of attrition, on the maintenance of previously acquired languages.

A notable exception to the trends in the above literature is the work on heritage speaker (HS) bilingualism (see Benmamoun, Montrul, & Polinsky, 2013; Kupisch & Rothman, 2016; Montrul, 2008, 2016; Polinsky, 2018; Rothman, 2009). To date, the focus within HS bilingualism has been to examine adult steady-state grammars of (at least) the minority (heritage) language acquired in early childhood. The heritage language is one of the HS's L1s, either acquired simultaneously with the societal majority language (2L1) or as the unique L1 in the case of child L2 acquisition whereby immigration occurs before or at school age (roughly 5-6 years old). Thus, HSs are a subtype of native speaker (Rothman & Treffers-Daller, 2014). This is interesting given that studies generally reveal that adult HS grammars reflect both dominance in the majority language (i.e. whether a simultaneous L1 or child L2 for the HS) and degrees of non-monolingual-like variability in the heritage L1 (see Benmamoun, Montrul, & Polinsky, 2013; Montrul, 2008, 2016).

The typical HS outcomes are, at first glance, surprising in light of child 2L1 and child L2 studies that generally demonstrate greater conformity, whether in qualitative similarities in development and/or ultimate attainment (see for review Chondrogianni, 2018; Haznedar, 2013; Meisel, 2011). After all, HSs tested as adults are the outcomes of 2L1 or child L2 acquisition. As such, we are left to wonder why they differ to such a degree in adulthood from the seemingly successful trajectory that research on child bilingualism suggests they were on (Kupisch & Rothman, 2016). In recent years, several researchers have suggested that HSs' grammatical outcomes in adulthood likely highlight distinctive acquisition paths, reflecting the individual realities of personal, minority language/bilingual situations for variables that become more deterministic in later childhood (e.g., Kupisch & Rothman, 2016; Putnam & Sánchez, 2013). In other words, in addition to effects of L1 attrition and/or arrested development at the individual HS level, linguistic and extra-linguistic variables conspire to change the path of HS grammatical development and, thus, explain the default trend of considerable variation both between HSs and monolinguals, as well as other HSs. The emerging literature has highlighted the following variables, among others: (1) the quality of input affected by language contact (L1 attrition of the older generation); (2) the lack of literacy in the heritage language; (3) the influence of formal properties (features) of the majority language, altering the formal HS learning task; and (4) being outside a bilingual community representing true diglossia. All of these variables reduce opportunities to use the minority language and receive/uptake (quantity/quality) input (e.g., Bayram et al., 2017; Karayayla, 2018; Karayayla & Schmid, 2017; Kupisch & Rothman, 2016; Putnam & Sánchez, 2013).

In the vast majority of work on heritage bilingualism to date, the default context is one of a distinct majority language that subsumes the minority one in all aspects of societal distribution (e.g., only the heritage community is bilingual in the languages under investigation whereby education is typically in the majority language) and there is a palpable imbalance of prestige between the two languages. It is this situation itself that promotes the

abovementioned imbalance in extra-linguistic variables. If the unequal distribution of these extra-linguistic variables across various HS groups or individuals factors into the unique outcomes of HSs (Lloyd-Smith, Bayram, Iverson, Kupisch, & Rothman, submitted), then we should see monolingual-to-bilingual differences significantly diminish or be eradicated in the adult outcomes of 2L1 speakers and especially child L2 bilinguals when the context for bilingualism is more favorable. This should be especially true when the society itself is bilingual in the same languages.

The case of Catalonia is an ideal environment to put the above to test as successful bilingualism is the default in this setting, inclusive of the purposeful efforts in place in the education system to ensure that all young people are formally literate and educated in both languages. The fact that there is near universal success in Catalan-Spanish bilingual outcomes does not negate the fact that the order of acquisition of both languages can vary across individuals, and that depending on where in Catalonia one grows up it could be said that one or the other is more dominant. Moreover, successful bilingualism at the community level does not preclude cross-linguistic influence in developing bilingual grammars. Looking at how differences might obtain even in such a context, and whether this correlates/varies with order of acquisition and other measures of relevant dominance (patterns of use) in one or the other language, can augment the heritage speaker literature more generally. Minimally, showing what is similar and distinct both between our bilinguals here and more typical HS outcomes can reveal what is likely to differ between monolingual and child bilingual outcomes in adulthood universally versus what obtains independently as the byproduct of the less-than-ideal bilingual environments HSs tend to grow up in.[2]

[2] Following neutral definitions for HS inclusion such as (Rothman, 2009) where deficit outcomes are not part of the criteria of defining factors of HSs, one could convincingly make an argument that children of parents who immigrate from monolingual Southern Spain and raise their children even in rural Catalonia as (virtual) monolingual Spanish speakers until they go to school are indeed a specific subtype of HSs. Of course, they would be exposed tangentially to Catalan, just like Spanish HSs are to English in the ubiquitously studied case of Spanish HS bilingualism in the US, before schooling starts. Not being significantly exposed to the other (societal majority language) is in fact even more possible in a place like Catalonia where everyone is bilingual, such that each individual a child encounters can effortlessly switch to the language the child prefers. Indeed, the

In the present study, all bilinguals are formally trained in literacy in both languages. We provide data from two groups of Catalan-Spanish bilinguals who were born and raised in Osona, Catalonia where dominance in Catalan is the default.[3] The first group comprises child L2 learners of Spanish (L1-Cat-L2-Sp) and the second group comprises child L2 learners of Catalan (L1-Sp-L2-Cat). The present study is also one of a select few that tests each bilingual group in both languages, which is needed to understand more fully how the languages of a bilingual interact and how this might differ across bilingual groups depending on factors such as the ones that differentiate our bilingual groups from those pertaining to typical HS environments.

Given this relatively unique environment, one can find bilinguals who are more dominant in one or the other language while highly proficient and literate in both. It is not uncommon to find a child L2 learner of Catalan in Catalonia who remains dominant in their L1 (Spanish), unlike the typical case of immersed child L2 learners. What is especially interesting about Osona is that the minority (Spanish) and the majority (Catalan) languages of the immediate regional society, which should matter most, are the opposite in the national context. This variable will be considered pertaining to the generalizability of the results.[4]

societal status of the languages and all this entails for use and exposure differ significantly between the two contexts we are comparing, but these differences are exactly what we capitalize on as they permit a teasing out of variables otherwise not possible. Whether or not such speakers are in fact accepted as HSs by all is not important for the purposes of our argumentation. In the case they are not, we can only hope that the reason does obtain because of the general success of Catalan-Spanish bilingualism itself. HS bilingualism does not necessarily entail lack of success (Kupisch and Rothman, 2016), which is immediately clear if one accepts that our Spanish L1-Child L2 Catalan group should count as a subtype of HSs.

[3] Language dominance and its measurement have been widely debated (e.g., Bialystok, 2007; Montrul, 2015; Schmeißer et al., 2015; Silva-Corvalán & Treffers-Daller, 2015; Unsworth, 2015). In this study, by dominance we refer to patterns of preferred use and usage frequency in daily life following Unsworth's (2015) suggestion that language exposure/use patterns might be taken as a proxy of LD. As such one should not infer anything with regard to proficiency per se. As stated and will be quantified below, all participants are highly proficient, performing on the standardized measures for both languages with no statistical difference. Following Montrul (2015) and Schmeißer et al. (2015), we do not assume a direct relationship between dominance and proficiency per se, even if in unbalanced bilingual environments there tends to be correlations. As discussed in Perpiñán (2017) and quantified below, Catalan-Spanish bilinguals tend to be highly proficient in both languages, thus, correlating proficiency and language dominance in this context of balanced bilingualism might not prove useful.

[4] Although the majority of people in Catalonia are bilinguals speaking both languages (99% of the population speak and understand Spanish and 96.5% of the population speak and understand Catalan, (Idescat, 2013)). In this study, we targeted an area where Catalan is clearly the majority dominant language of the environment (73% of Catalan in the daily use in this area as opposed to 43% in Catalonia as a whole, (Idescat, 2013)).The reader is

However, Catalonia is certainly not the only context in the world where this applies. Beyond contributing to the literature by offering a study that examines somewhat different conditions for the outcomes of a case of child L2 bilingualism in adulthood (as well as potential consequences to their L1), we endeavor to show how capitalizing on the unique positioning of variables that contexts like Catalonia present by default can inform important questions of theoretical relevance. Minimally, isolating some of these extra-linguistic variables has the potential to explain individual variation across bilingual speakers of the same two languages, even when both languages are readily available in the environment and supported via education.

We investigate two subtle phenomena in Spanish and Catalan: (1) the co-occurrence of Sentential Negation (SN) with a Negative Concord Item (NCI) in pre-verbal position, allowed in Catalan yet disallowed in Spanish and (2) Differential Object Marking (DOM), obligatory in Spanish but not part of the Catalan grammar. We chose these phenomena because they are claimed to be sensitive to variation in the adult grammars of childhood bilinguals (Déprez et al., 2015; Montrul, 2004) in other contexts.

2.2. Theoretical Background

Our chosen properties are of particular interest because they allow us to look at whether order of acquisition and language dominance play a role in the expansion of the distribution of a specific linguistic domain. Negative Concord Items (NCIs) in Catalan have a wider distribution (with and without sentential negation (SN)) than in Spanish (without SN). The distribution of Differential Object Marking (DOM) in Catalan and Spanish also presents differently, whereby Spanish has a wider distribution of DOM than Catalan. Though variable across dialects, DOM in Spanish *par excellence* (i.e., across dialects) is obligatory in certain cases,

referred to Illamola (2015) for an in-depth presentation of the sociolinguistic patterns and the use of both Catalan and Spanish in the specific town (Manlleu, Osona) where the data were collected.

such as marking accusative [+animate/+specific] objects. Indeed, DOM is subject to semantic and discourse constraints in particular contexts (e.g. as it interfaces with modality, indicative versus subjunctive in embedded clauses); however, in the domain of DOM we focus on there is no such considerations affecting its use. In other words, it is a morphosyntactic reflex of obligatory (accusative) case marking. DOM is more restricted in Catalan and is ungrammatical in the Spanish-canonical position of [+animate/+specific] objects in their base-generated position. In both cases, the smaller distribution is subsumed by the language with the larger distribution: (a) all contexts in which DOM exists in Catalan exist in Spanish, but Spanish has more obligatory DOM contexts and (b) all contexts where Spanish NCI is allowed hold true for Catalan, although Catalan also allows it with SN. And so, assuming that influence will proceed from a subset to a superset, choosing these two domains allows us to look without prejudice for one language over the other into whether CLI will obtain accordingly in relatively balanced bilingualism (no differences related to relative dominance), or if CLI is conditioned by relative dominance in one or the other language.[5]

2.2.1. Negative Concord Items (NCIs) in Catalan and Spanish

NCIs have been argued to be negative Universal Quantifiers (Haegeman & Zanuttini, 1991; Zanuttini, 1991), positive Polarity Items (Laka, 1990), negative indefinites (Suñer, 1995) and non-negative indefinites (Tubau, 2008; Zeijlstra, 2004). Herein, we adopt Zeilstra's 2004 analysis of NCIs specifically for Catalan and Spanish while considering some modifications offered by (Espinal & Tubau, 2016).

Both Catalan and Spanish are Negative Concord (NC) languages. NC languages are typified by two main varieties: strict NC Languages, in which the sentential negation (SN) is always obligatory, as in Romanian; and non-strict NC languages, in which the sentential negation is obligatory when the NCI is in post-verbal position and disallowed when the NCI

[5] See Appendix A for a summary of how these properties work in the two languages.

is in pre-verbal position, such as in Spanish. Note that there is a third option that is universally marked, which is essentially a weak version of the strict NC language option described above. In such cases, the negative marker is possible with a pre-verbal NCI but not obligatory. Among the members of the Romance family, Catalan seems to be the only language that allows for optionality of the negative marker when the NCI is in pre-verbal position (Espinal, 2000; Quer, 1993; Tubau, 2008; Vallduví, 1994). All of this can be seen in the grammaticality of (1a-1b) and (4a-4b), the ungrammaticality in (2a-2c) and the variation in grammaticality of (3a-3b) and (4a-4b).

(1)	a.	No vindrà	ningú	a la festa.	Catalan
	b.	No vendrá	nadie	a la fiesta.	Spanish
		Not will.come	n-person	to the party	
		'Nobody will come to the party.'			

(2)	a.	*Vindrà	ningú	a la festa.	Catalan
	b.	*Vendrá	nadie	a la fiesta.	Spanish
		Will.come	n-person	to the party	
		'Nobody will come to the party.'			

(3)	a.	Ningú	no	vindrà	a la festa.	Catalan
	b.	*Nadie	no	vendrá	a la fiesta.	Spanish
		n-person	not	Will.come	to the party	
		'Nobody will come to the party.'				

(4)	a.	Ningú	vindrà	a la festa.	Catalan
	b.	Nadie	vendrá	a la fiesta.	Spanish
		n-person	Will.come	to the party	
		'Nobody will come to the party.'			

2.2.2. Differential Object Marking

Differential Object Marking (DOM) is the overt morphological expression used by some languages to mark Case on some accusative objects. Spanish is known to be a DOM language (e.g. Leonetti, 2004; López, 2012). Unlike Spanish, Catalan presents a less clear case;[6] however, it is well attested that in both Standard Catalan and the Central Catalan dialect, which are the

[6] DOM is present in some varieties of Catalan (potentially stemming from cross-linguistic influence issues related to Spanish as well), e.g., Balearic and Valencian Catalan (Escandell-Vidal, 2009; GIEC, 2016), however, DOM is definitively not part of the dialects spoken by the participants included in our study.

dialects relevant to our bilingual groups herein, DOM is not expected (Escandell-Vidal, 2009; GIEC, 2016).

Rodríguez-Mondoñedo (2007) suggests that there are two important dimensions which help determine the marking of the object: animacy and specificity.[7] As pointed out by Leonetti (2004), animacy has been labelled as the dominant factor. If we use these two dimensions, there are four possible scenarios for objects: [+specific/+animate], [+animate/-specific], [-animate/+specific] and [-animate,-specific]. In Spanish, the object is obligatorily marked when the object is [+specific, + animate] as in (5a-b).

(5) a. María vio a Laura. Spanish
b. *María vio ø Laura.
María saw DOM Laura
'María saw Laura.'

When the object is [-animate/+specific] or [-animate/-specific], then the object is obligatorily unmarked. The case of [+animate/-specific] can be marked, this this depends on various semantic and discourse features that we highlight here for the sake of being complete. As we only focus on [+animate/+specific] contexts in which the marker is obligatory and, to our knowledge, not subject to dialectal variation as other subtypes are, we will not comment further on the inherent variation of DOM cross-dialectically

Importantly, the distribution of DOM in Standard Catalan and Central Catalan is more restricted than in Spanish. For example, in Catalan [+animate/+specific] full DP objects are left unmarked (compare 8a-b). Thus, the experiments herein contain full DPs.

(6) a. La Maria buscava ø la Laura Catalan
*La Maria buscava a la Laura
b. The Maria looked.for DOM the Laura
'Maria was looking for Laura'

[7] The notion of specificity has been widely debated in the literature. We take a widely accepted notion that specificity expresses a semantic property of the element that determines the referent of the element in a particular way (see Farkas, 1995; Leonetti, 2004; López, 2012; von Heusinger, 2002; von Heusinger & Kaiser, 2003; for a more detailed description and analysis of specificity).

However, the fact that the marker does not appear in this context does not mean that DOM is non-existent in Catalan, a point to which we return in the discussion when we discuss the input. As reported in GIEC (2016), DOM is required when the [+animate/+specific] is a full pronoun or in cases where the full DP object is found in focalized constructions. In sum, the above illustrates that DOM occurs in certain contexts in Catalan, but, crucially, does not occur in the context under investigation, which entails that its distribution is somewhat more restricted than in Spanish.

2.2.3. Studies on Catalan-Spanish bilingualism

Although there is a line of research that has looked at developmental patterns in Catalan-Spanish bilinguals (e.g. Bel, 1996, 2001, 2003; Bosch & Sebastían-Gallés, 2001; Guijarro-Fuentes, 2012; Guijarro-Fuentes & Marinis, 2009; Illamola, 2015; Perpiñán, 2017; Simonet, 2011, 2014), there are relatively few studies that have examined Catalan/Spanish bilingualism outcomes in adulthood. In that respect, Perpiñán (2017) stands out as a noteworthy study examining the effects of early bilingualism in adulthood in the domain of non-personal clitics in Catalan that are lacking in Spanish (i.e., the partitive clitic (*en*) and the locative clitic (*hi*)). Her results show that the group of Spanish-dominant speakers were significantly less sensitive to instances of ungrammaticality than the Catalan-dominant speakers. This is an expected, though significant, result. It is often the case that bilingual knowledge differs significantly from the anticipated monolingual outcome. However, in a context like Catalonia where relatively balanced bilingualism is likely, and both languages are supported at all levels, it is reasonable to hypothesize that bilingual grammars would differ less from monolinguals than in other cases of bilingualism. Indeed, this expectation has some evidence. Recall that the Catalan-dominant group is also bilingual, yet conforms to monolingual norms significantly more and thus reveals that dominance, even in a society where access to both languages is ubiquitous, matters.

Studies like Perpiñán (2017) are significant because they show more of the same, that is, they highlight the effects of bilingualism that exist despite a context that is maximally supportive for success and, crucially, seem to suggest that dominance—and not proficiency per se—matters. Consequently, it is clear that bilingualism effects are real, meaning some differences in bilingual grammars obtain because of bilingualism itself (Sorace, 2011) and not merely because of extra-linguistic considerations such as poor access to input, low prestige of a weaker language, etc., that define the reality of many, or perhaps most, of the realities of individual bilinguals. However, the fact that bilingualism itself, even under ideal contexts, can invite monolingual base-line differences—bilingualism is not multiple instances of monolingualism in the same mind/brain (Grosjean, 1989)—does not mean that lack of such a supportive environment and the entailed beneficial byproducts of it would not further exaggerate monolingual-bilingual differences. In other words, what would the speakers in Perpiñán (2017) look like if they grew up in a less supportive bilingual environment, such as a typical HS environment? On the basis of this work, we expect some cross-linguistic influences in our Catalan-Spanish bilinguals, but, like Perpiñán (2017), we expect them to be subtle differences and not subject to a large amount of inter-speaker variation as is the default when typical HSs are tested.

2.2.4. DOM and NCIs in Catalan-Spanish bilingualism

Although there has been considerable work in recent years examining the acquisition of DOM in L2 Spanish (e.g. Bowles & Montrul, 2008; Farley & McCollam, 2004; Guijarro-Fuentes, 2012; Guijarro-Fuentes & Marinis, 2009; Montrul, 2004), and how it appears in HS Spanish grammars in North America (e.g. Montrul, 2004; Montrul & Bowles, 2009; Montrul & Sánchez Walker, 2013) to various degrees of successful convergence, we are aware of only one study that examines it in the context of Catalan-Spanish bilingualism (Guijarro-Fuentes & Marinis, 2009). In this study, the authors showed that Catalan-Spanish sequential bilinguals,

although outperforming English learners of L2 Spanish, were still considerably different from Spanish monolinguals in the sense that they over-accepted the accusative makers in contexts where they were not grammatical. Guijarro-Fuentes and Marinis (2009) make no mention of having tested for language dominance (LD); however, given the context and the fact that they are home speakers of Catalan, it is fair to assume that if they were not balanced bilinguals, LD for the group would be in Catalan. From their results, we know that grammatical sensitivity to Spanish DOM can be affected by the more restricted domain of DOM in Catalan. What we do not know, however, is if the restricted DOM in Catalan can be affected (expanded) by Spanish in the opposite direction of LD. This latter point is addressed by the present bi-directional study.

Contrary to the case of DOM, there is a dearth of available studies looking at NCIs from an acquisition perspective in the Catalan-Spanish bilingual literature. However, experimental research in syntax has been done to corroborate current theoretical descriptions in both languages. Déprez, Tubau, Cheylus, and Espinal (2015) examine the interpretation of pre-verbal NCI when occurring with Sentential Negation (SN) in Catalan. They examined whether the co-occurrence of the SN would trigger Double Negation (DN) readings of the NCI as opposed to NC readings. Their findings suggest that the default reading of a pre-verbal NCI in Catalan with the SN is a generally an NC one, which is not possible in Spanish (Déprez et al., 2015; Espinal, Tubau, Borràs-Comes, & Prieto, 2016).

2.3. Research questions and predictions

The main overarching research question that motivated the present study was:

⇒ What role do order of acquisition and language dominance have—independent of overall linguistic proficiency—in the competence and performance of early child bilinguals tested in adulthood?

As is true of all specific research, overarching questions must be packaged in testable ways, examining specific domains of grammar in specific sub-groups of participants under appropriate contexts as proxies. And so, question (a) can be asked as (b):

⇒ What is the respective role of order of acquisition and dominance in Catalan and Spanish regarding the competence and performance outcomes of NCIs and DOM among early child bilinguals tested in adulthood?

Our hypotheses are:

⇒ Language dominance matters. Cross-linguistic influence (CLI) from Catalan-to-Spanish and Spanish-to-Catalan is *a priori* possible for both groups. Perhaps, irrespective of dominance, some CLI will be noted. We also predict that greater degrees of CLI might correlate to relative dominance, in which case there would be significant differences across the two groups. We also hypothesize that the domain of grammar matters. CLI is conditioned by the comparative status of the properties in the two grammars; CLI will influence expansion in the grammar with a more restricted distribution. This means we expect emerging optionality in Spanish NCIs and/or expansion of DOM in Catalan contexts where it is prohibited via influence of the larger distribution in the other grammar, but not vice versa. That is, Catalan may lose optionality in NCI interpretation or Spanish may lose DOM in canonical contexts not supported by Catalan. We further predict that there could be differences across the two domains of grammar, whereby NCIs are either not affected or they are less affected because Catalan's larger grammar reflects optionality which contains the Spanish obligatory option, compared to the case of DOM where Spanish, the larger grammar, reflects obligatory use of DOM in unattested contexts of Catalan.

2.4. Methodology

2.4.1 Participants

We tested two groups of participants who differ in their order of acquisition and their reported language use and exposure. We included only participants whose proxy for dominance, assessed by means of reported use and exposure via the Language Experience and Proficiency Questionnaire (LEAP-Q) (Marian, Blumfeld, & Kaushanskaya, 2007), indicated accordance between their L1 (Spanish or Catalan) and their dominance in adulthood. Although the default assumption of HS bilingualism in general is that dominance in adulthood will be in the L2, we are interested in knowing what effects bilingualism has in the case that one can and does remain dominant in their L1 even if, like the typical HS situation, it is not the preferred, majority language of the bilingual situation. Thus, in an effort to not muddy the waters, we examined bilinguals who were balanced in proficiency across the two languages, yet each group remains dominant in their L1. The first group of participants consists of Spanish-Catalan bilinguals who were exposed to Spanish from birth and Catalan at schooling age: L1Sp-L2Cat speakers (n=23). Though the schooling system is generally in Catalan and the language of the environment is Catalan, they reported high levels of use of and exposure to Spanish.[8] The second group is comprised of Catalan-Spanish bilinguals who were exposed to Catalan at home and whose first significant exposure to Spanish was at school age: L1Cat-L2Sp speakers (n=21).

All participants were vetted to ensure fulfilment of the inclusion criteria: 1) Catalan/Spanish bilinguals with no other native languages, 2) minimum proficiency in any

[8] It is crucial to recall here that our claim of the clear-cut nature of Catalan being the majority language relates to the specific location, central rural Catalonia. Such a claim would not be so evidently true in large Metropolitan areas, such as Barcelona. For example, Sorolla (2009) shows that children whose native language (home language) is Spanish tend not to use Catalan as much, even with peers, despite being educated in Catalan primarily. This is not so surprising given the demographics of such a large metropolitan area, the very reason we decided to test in rural Catalonia where the incidence of ethnic Catalans as discussed in footnote 3 (see work by Illamola, 2015).

foreign languages,[9] 3) high native scores in both Catalan and Spanish proficiency tests and 4) residence in the geographical (Osona) area where data were collected (Central Catalan dialect). Spanish proficiency was measured through the DELE, which is standardly used as a measure of proficiency in the field (e.g. Bruhn de Garavito & Valenzuela, 2008; Montrul & Slabakova, 2003; Slabakova, Kempchinsky, & Rothman, 2012; Slabakova & Montrul, 2003). Catalan proficiency was measured using a part of the *Certificat Superior de Llengua Catalana* implemented by the *Centre de Normalització Lingüística.*

The Leap-Q was used to assess overall language use and exposure, which we used as a proxy for dominance. We also examined answers from the Catalan version of the Leap-Q questionnaire. We first looked at their responses of the questionnaire:[10] question 1 (dominant language), question 3 (exposure to each language), question 5 (use of both languages); and their responses in the questions for each language: question 2, 4 and 5 (exposure in different environments). Such questions probed self-reported percentages of use and exposure to each language, as well as assessing amount of exposure on a scale from 1 to 10 (1=not much exposure; 10=a lot of exposure). A participant was categorized as dominant in one language or the other when two or three of the following conditions were met: (a) reported exposure in one language was higher than the other, (b) reported use in one language was higher than the other and (c) the self- rated exposure to one of the languages was higher than the other. The following table provides the participant profiles after the inclusion criteria had been applied.

[9] We would have wanted to exclude participants with knowledge of foreign languages, but English is mandatory in the system and they all had, at least, minimal exposure to it.
[10] See the corresponding questions in the English version of the Leap-Q questionnaire in Appendix A.

Table 2.1. Details of the participants

	L1Sp-L2Cat (N=23)	L1Cat-L2Sp (N=21)
Mean age	22	20
Proficiency in Catalan	34/40	36/40
Proficiency In Spanish	46/50	45/50
Dominant Language	Spanish	Catalan
Mean (%) exposure to Spanish	59%	18%
Mean (%) exposure to Catalan	41%	82%
Mean (%) use of Spanish	66%	85%
Mean (%) use of Catalan	34%	15%
Rate (1-to-10) of exposure to Spanish	6.5/10	2.5/10
Rate (1-to-10) of exposure to Catalan	3.5/10	7.5/10

This study was carried out in accordance with the recommendations of Research Ethics Committee. The protocol was approved by the School of Psychology and Clinical Language Science's Research Ethics Committee at the University of Reading. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

2.4.2 Tasks

Participants took part in two separate experimental tasks: an off-line Grammaticality Judgement Task and a non-cumulative, moving window Self-Paced Reading Task in both languages.[11] Presentation by language was counter-balanced: half of the participants were asked to do the Catalan experiments first and vice versa. All the tasks were delivered using IBEX FARM software and the experiments were done in a controlled lab environment.

2.4.2.1 Grammaticality Judgement Task

All participants completed two Grammaticality Judgement Tasks: one in Spanish and another in Catalan. Each task consisted of 48 items which were distributed across six conditions (four target conditions + two filler conditions) with eight items per condition. The four target conditions are described below.

[11] The raw data of the experimental task will be made available by the authors, without undue reservation, to any qualified researcher.

Condition a) (NCI+SN) consisted of sentences with a Negative Concord Item (NCI) (*nadie*, Sp or *ningú*, Cat; '*nobody*' in pre-verbal position followed by the negative marker *no*. This structure is ungrammatical in Spanish, but grammatical in Catalan (see examples in (7a-b)). The items in condition b) (NCI-SN) were target sentences containing an NCI without the negative marker—a structure which is acceptable in both Catalan and Spanish. (See examples in (8a-b)).

(7) a. Ningú no portarà globus per la festa de demà. Catalan
b. *Nadie no traerá globos para la fiesta de mañana. Spanish
Nobody not will.bring balloons for the party of tomorrow.
'Nobody will bring balloons for tomorrow's party.'

(8) a. Ningú portarà globus per la festa de demà. Catalan
b. Nadie traerá globos para la fiesta de mañana. Spanish
Nobody will.bring balloons to the party of tomorrow.
'Nobody will bring balloons for tomorrow's party.'

Condition c) (+DOM) consisted of items with a [+animate,+specific] marked DP object by the Accusative Marker '*a*'. In Spanish, this is grammatical, whereas in Central Catalan and Standard Catalan it is ungrammatical. Condition d) (-DOM) consisted of items in [+animate, + specific] without the accusative marker. This is grammatical in Catalan and ungrammatical in Spanish. See examples (9a-b) and (10a-b).

(9) a. *Les noies coneixeran a la Maria a la festa de demà Catalan
b. Las chicas conocerán a María en la fiesta de mañana Spanish
The girls will meet DOM Mary in the party of tomorrow
'The girls will meet Mary in tomorrow's party'

(10) a. Les noies coneixeran la Maria a la festa de demà Catalan
b. *Las chicas conocerán María en la fiesta de mañana Spanish
The girls will meet Mary in the party of tomorrow
'The girls will meet Mary in tomorrow's party'

The sentences in these two tasks were judged on a 6-point Likert scale where 1 was completely odd and 6 was completely natural. There was also an option of 'I'm not sure'. Participants were instructed to answer as fast as possible and to leave aside any prescriptive

judgements by rating the sentences according to their own intuitions. There were eight practice items, after which the experimental items started.

2.4.2.2 Self-Paced Reading Task

The Self-Paced Reading Task was also administered in each language and used the same four experimental conditions (a) NCI+SN, b) NCI-SN, c) +DOM and d) -DOM), each of which contained eight items, in addition to four filler conditions (n=64). The filler conditions consisted of sentences with similar structures but without the occurrence of NCIs or DOM. Each item was divided into regions of interest which were then used to examine reaction times and spill-over effects. An example of this division can be seen in (11a-b) below:

(11) a. Ningú / no / portarà / globus / per / la festa / de / demà Catalan
b. Nadie / no / traerá / globos / para / la fiesta / de / mañana Spanish

We created two lexical sub-contexts such that the sentences did not become repetitive: half of the experimental items had vocabulary related to a party and half of them to a market. Examples of experimental items can be seen in (7-10) above as we used similar sentences to those in the GJT. Participants were instructed to read the sentences at a normal pace and respond to comprehension questions. They were instructed to do the first three items and to ask any questions, after which the experiment started with six distractor items, then the 64 items were presented in a random fashion.

2.5. Results

2.5.1 Grammaticality Judgement Tasks

2.5.1.1 Descriptive Analysis

Tables 2 presents the Grammaticality Judgement data in both Catalan and Spanish from the two experimental groups: L1Cat-L2Sp (n=21) and L1Sp-L2Cat (n=23) for the two properties and all the conditions. In order to conduct the statistical analysis, the responses in the 6-point

Likert scale were converted using a binary coding: responses from 1 to 3 were coded as rejection '0' and responses from 4 to 6 were coded as acceptance '1'.[12]

Table 2.2. Raw count of acceptance by condition for the two properties and two groups[13]

	CATALAN		SPANISH	
NCI CONDITIONS				
	NCI+SN	**NCI-SN**	**NCI+SN**	**NCI-SN**
L1Cat-L2Sp (n=21)	127/168	141/168	36/168	147/168
L1Sp-L2Cat (n=23)	147/184	163/184	35/184	160/184
DOM CONDITIONS				
	-DOM	**+DOM**	**-DOM**	**+DOM**
L1Cat-L2Sp (n=21)	112/168	106/168	72/168	162/168
L1Sp-L2Cat (n=23)	129/184	114/184	51/164	168/184

The results for the NCI+SN and NCI-SN conditions in table 2 show the expected distribution as predicted by the theoretical analysis, that is, acceptance of both conditions in Catalan, which confirms the optionality of the SN *no*. In Spanish, there is a strong acceptance of the NCI-SN condition and rejection of the NCI+SN, confirming the lack of optionality of sentential negation with preverbal Negative Concord Items. Recall that all DOM targets in Spanish only require the accusative *a* marker and therefore, what is reported as –DOM is when the *a* is missing (ungrammatical in Spanish, yet the only grammatical in Catalan) and +DOM is when the *a* is present (grammatical in Spanish and ungrammatical in Catalan). The results for the –DOM condition in Catalan indicate target-like performance for both groups, however, both groups have high acceptance of the +DOM condition in Catalan (ungrammatical). When the participants are tested in Spanish, they each show target-like acceptance of the +DOM sentences, but, in the ungrammatical condition (-DOM), they also show a slight over-acceptance.

[12] We present the results collapsed in a binary coding for ease of exposition and to make a clearer distinction between grammatical and ungrammatical. A similar analysis was conducted on the 1-to-6 scale data and the overall picture was the same.

[13] The total percentage of 'I do not know' responses is 0.014%.

2.5.1.2 Statistical Analysis

To further investigate the findings, we conducted linear mixed effects logistic regression analyses of the responses in the R environment (R Core Team, 2016), by using the lme4 package (D Bates, Maechler, Bokler, & Walker, 2015). Generalised mixed effects models were fit to the binomial response data. The data for the two properties under investigation were analyzed separately in each language, thus, we used separate models. Each model included fixed effects of condition (Model1: NCI+SN, NCI+V; Model2: -DOM, +DOM), group (L1Cat-L2Sp, L1Sp-L2Cat,) and their interaction. Fixd effects were sum-coded as -0.5/0.5 and each model included by-participant and by-item random intercepts and slopes for the repeated measures variables. In the case of significant interactions, planned comparisons investigated effects of group within the same condition using the multcomp package (T Hothorn, Bretz, & Westfall, 2008). The summaries of the omnibus models are presented in table 3 and 4.

Table 2.3. Generalized mixed effects models for the NCI property in the two different datasets (RL: L1Cat-L2SP, NCI+SN)

	Catalan Data		Spanish Data	
	Estimate (SE)	*p*	Estimate (SE)	*p*
(Intercept)	1.094 (.28)	< .001	-1.338 (.44)	< .001
Group	0.251 (.25)	.316	-0.181 (.44)	.488
Condition	0.726 (.43)	.092	3.278 (.55)	< .001
Group: Condition	0.334 (.42)	.418	.413 (.46)	.322

Table 2.4. Generalized mixed effects models for the DOM property in the two different datasets (RL: L1Cat-L2SP, -DOM)

	Catalan Data		Spanish Data	
	Estimate (SE)	p	Estimate (SE)	p
(Intercept)	1.815 (.28)	< .001	-1.092 (.44)	< .001
Group	-0.114 (.34)	0.738	-0.216 (.38)	.039
Condition	-1.627 (.34)	< .001	2.877 (.54)	< .001
Group: Condition	0.595 (.39)	0.136	0.022 (.39)	0.954

For the NCI data the effect of condition was significant for the Spanish data only, in the absence of any significant interactions. This confirms that both groups allowed both conditions in Catalan and that both groups significantly preferred the NCI+V condition in Spanish. For the DOM data, there was a significant main effect of condition in both Catalan and Spanish, with a preference for the grammatical condition in each language.

The results show that both groups have target-like grammars in both Catalan and Spanish with respect to the Negative Concord Items. They all allow for optionality in the co-occurrence of the Negative Concord Item (ningú) and Sentential Negation (no) as expected and they do not allow this optionality in Spanish. With regards to the DOM conditions, both groups prefer the grammatical condition in each language +DOM in Spanish and –DOM in Catalan, but both groups also show an unexpected over-acceptance of ungrammatical conditions in both languages.

2.5.2. Self-Paced Reading Tasks

Comprehension accuracy was calculated to ensure that participants were reading the sentences and paying attention to the task. The mean accuracy for the L1Cat-L2Sp group is 93.04% in Spanish and 95.61% in Catalan. The rates of comprehension accuracy for the L1Sp-L2Cat were 92.30% in Spanish and 94.31% in Catalan. This indicates that the participants paid attention to the task.

The analysis focuses on the three regions following the Critical Region to check for any slowing down effects (i.e. spill-over effects). This is done due to the fact that for two of the four conditions, the Critical Region was an empty region (absence of Sentential Negation or absence of the accusative marker). The reaction times (RTs) for each condition and each language were analyzed separately (NCI+SN, NCI-SN, +DOM, -DOM) using linear mixed effects models, using the same coding scheme as for the offline data. We used raw RT as opposed to residual because the critical comparisons are the same across conditions rendering residualization not necessary. The regions of interest were of the same length, both groups

are equally bilingual (scoring at ceiling in proficiency in both languages), each bilingual group is highly literate in both languages and most crucially, there is purposefully no monolingual control comparison from which we might expect a general difference in reaction time. Figure 1 shows the mean RTs (ms) for the three regions of interest and each group in the NCI conditions when the groups are tested in Catalan.

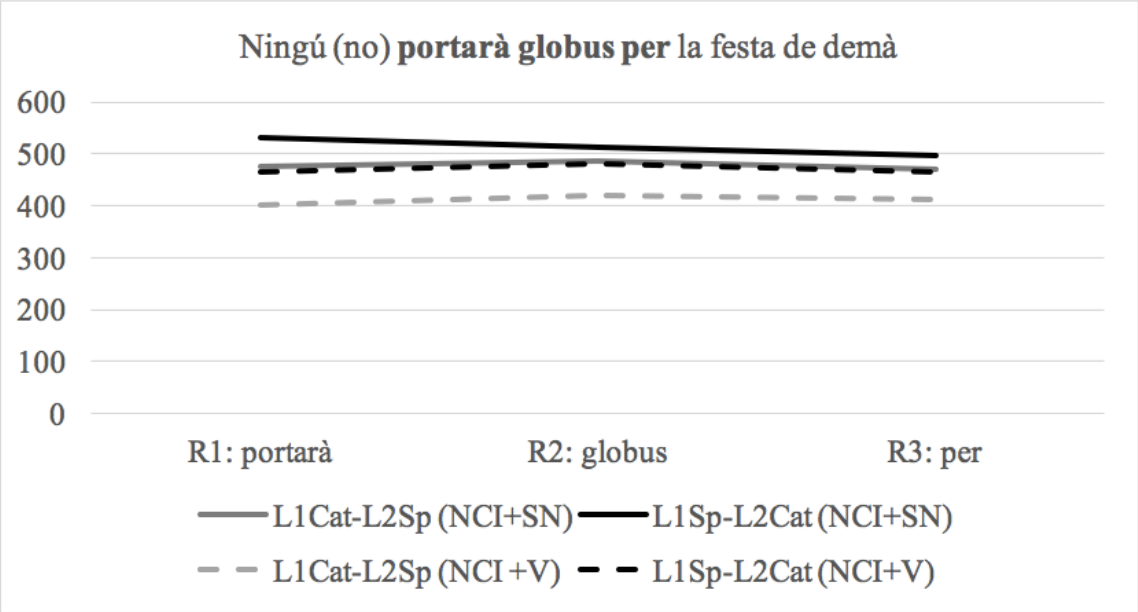

Figure 2.1. Line graph of Reaction Times (RTs) in milliseconds (ms) in the regions of interest in the NCI conditions when tested in.

The three models revealed no significant main effects or interactions (see table 5), which indicates that both the L1Cat-L2Sp and the L1Sp-L2Cat groups allow optionality with respect to the co-occurrence of pre-verbal NCIs and Sentential negation in Catalan.

Table 2.5. Linear models for the NCI property Catalan (RL: L1Cat-L2SP, NCI+SN)

	R1		R2		R3	
	Estimate (SE) t-value	*p*	Estimate (SE) t-value	*p*	Estimate (SE) t-value	*p*
Intercept	452.1 (32.7) 13.809	< .001	463.9 (32.1) 14.459	< .001	394.5 (26.6) 14.822	< .001
Condition	-81.6 (50.4) 1.619	.105	-45.55 (40.7) -1.118	0.263	-85.6 (45.5) -1.882	0.069
Group	77.3 (46.7) 1.654	.09	66.9 (52.06) 1.654	0.198	66.8 (38.1) 1.753	0.079
Condition*Group	-60.6 (42.1) 1.439	.149	-07.6 (31.6) -1.439	0.809	-82.3 (52.5) -1.566	0.117

When they are tested in Spanish in these same conditions, the picture that emerges is different (see figure 2).

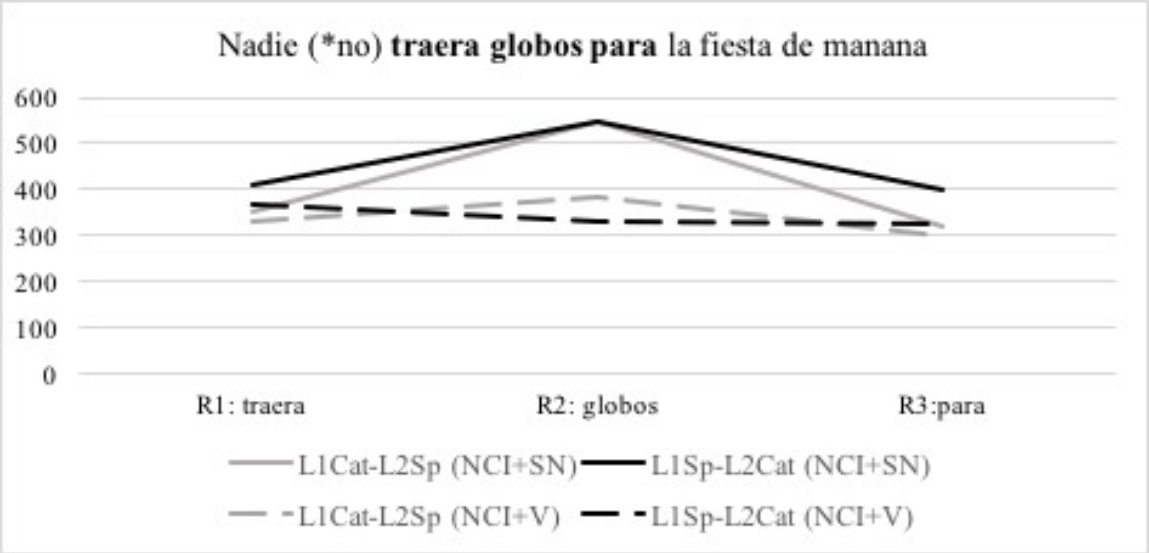

Figure 2.2. Line graph of Reaction Times (RT) in milliseconds (ms) in the regions of interest in the NCI conditions when tested in Spanish.

As seen in table 6, the only significant main effect was the one on condition in R2, showing that both groups are significantly slower in the second region of interest of the NCI+SN (ungrammatical in Spanish) than in the NCI+V (grammatical). The results show that both groups are sensitive to the morphosyntactic violation of pre-verbal NCIs co-occurring with Sentential Negation in Spanish.

Table 2.6. Linear models for the NCI property in Spanish (RL: L1Cat-L2SP, NCI+SN)

	R1		R2		R3	
	Estimate (SE) t-value	*p*	Estimate (SE) t-value	*p*	Estimate (SE) t-value	*p*
Intercept	399.2 (38.6) 10.329	< .001	452.5 (17.3) 26.164	< .001	335.3 (18.5) 18.092	< .001
Condition	1.45 (60.5) .025	.979	-190.6 (19.1) -9.995	< .001	-46.4 (28.2) -1.693	.092
Group	113.69 (77.3) 1.471	.141	-26.1 (34.3) -0.759	.447	51.8 (34.6) 1.496	.134
Condition*Group	50.81 (120.9) .420	.420	-44.1 (36.9) -1.192	.233	-58.9 (49.79) -1.192	.236

Turning to the DOM conditions, figure 3 illustrates the Catalan data.

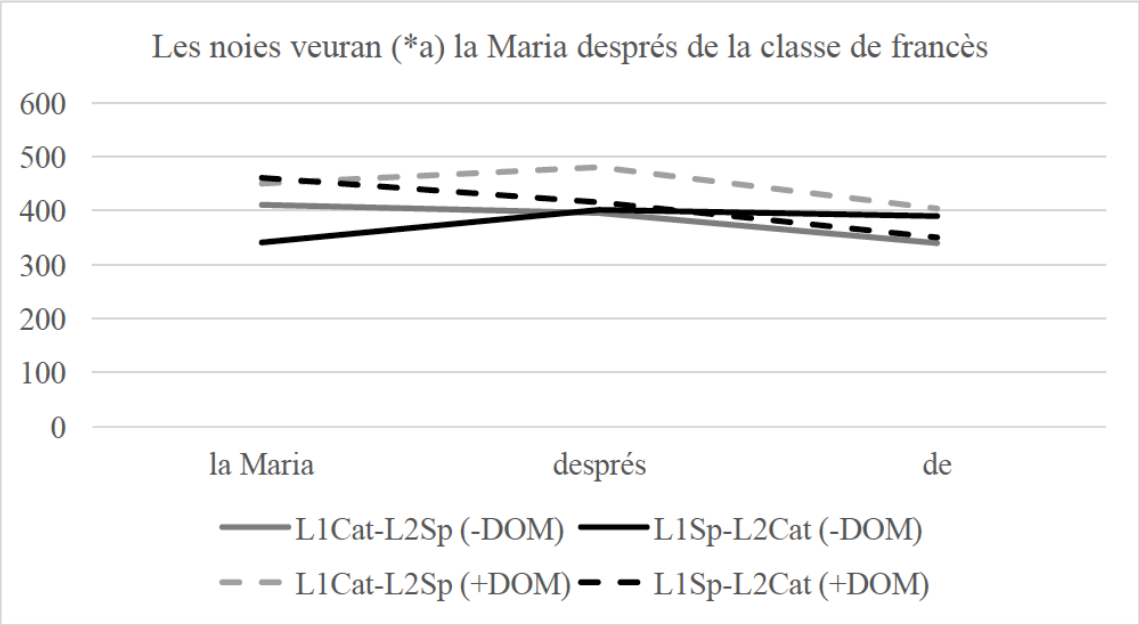

Figure 2.3. Line graph of reaction times (RTs) in milliseconds (ms) in the regions of interest in the DOM conditions when tested in Catalan.

The statistical results in table 7 show that there is a significant interaction of Group*Condition in the third region of interest. The results indicate that the L1Cat-L2Sp group does not show sensitivity to the morphosyntactic violation of the +DOM condition and the L1Sp-L2Cat group shows sensitivity to the –DOM condition, being significantly slower in the first (p = .025) and third region (p < .001). This shows that the L1Cat-L2Sp group has optionality in their grammars because they allow sentences with the accusative marker and without it in Catalan and that the L1Sp-L2Cat disallows the absence of the accusative marker, potentially showing influence from Spanish onto Catalan.

Table 2.7. Linear models for the DOM property in Catalan (RL: L1Cat-L2SP, -DOM)

	R1		R2		R3	
	Estimate (SE) t-value	p	Estimate (SE) t-value	p	Estimate (SE) t-value	p
Intercept	454.2 (29.7) 15.265	< .001	455.1 (27.7) 16.411	< .001	371.4 (22.7) 22.674	< .001
Condition	-19.9 (48.3) -0.415	.678	-15.5 (49.9) -0.310	.756	15.3 (26.33) .581	.561
Group	65.9 (41.4) 1.583	.113	45.4 (29.8) 1.515	.129	1.44 (26.36) .054	.956
Condition*Group	-98.4 (44.1) -2.232	.025	-196.9 (35.8) -5.496	.388	-121.18 (35.5) -3.410	< .001

The following figure shows the Spanish Data in the DOM conditions.

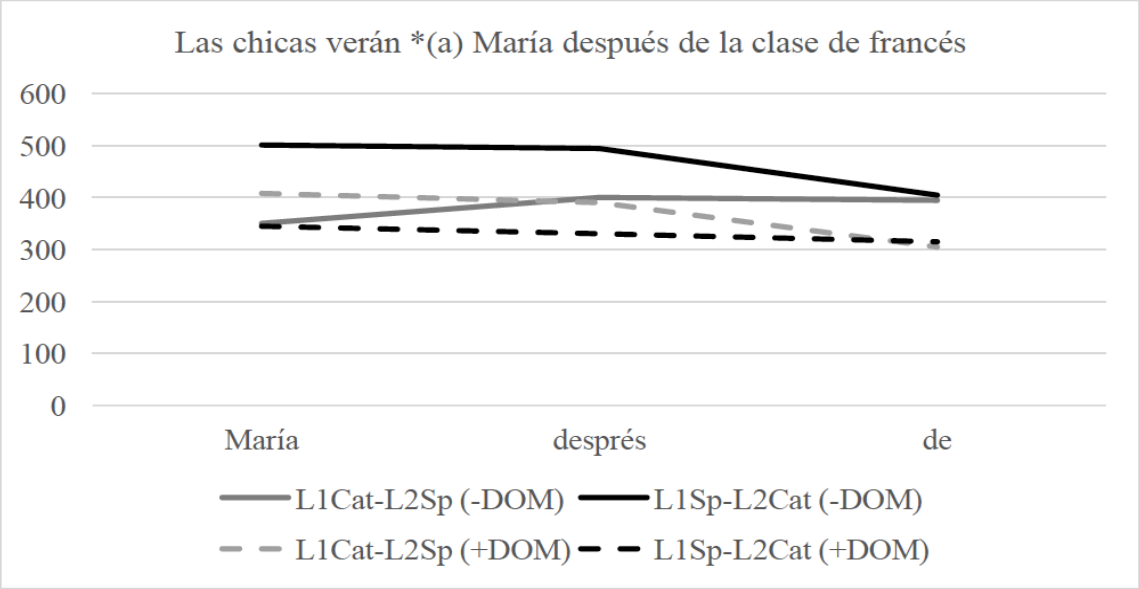

Figure 2.4. Line graph of Reaction Times (RT) in milliseconds (ms) in the regions of interest in the DOM conditions in Spanish.

The statistical models in table 8 show a significant interaction of Group*Condition in Region 1, reflecting that the L1Cat-L2Sp group is significantly slower in the +DOM condition (p < .001) and the L1Sp-L2Cat group is significantly slower in the –DOM condition. In the third region, there is also significant interaction of Group*Condition, the L1Sp-L2Cat group is significantly slower in the –DOM condition. Overall, the results show that the group of L1Sp-L2Cat group have target-like grammar and that the L1Cat-L2Sp group show sensitivity to the expected grammatical condition, thus, their grammar shows influence from Catalan with respect to this phenomenon in Spanish.

Table 2.8. Generalized Linear models for the DOM property in Spanish (RL: L1Cat-L2SP, - DOM).

	R1		R2		R3	
	Estimate (SE) t-value	p	Estimate (SE) t-value	p	Estimate (SE) t=value	p
Intercept	406.7 (43.8) 9.273	< .001	365.9 (21.7) 16.846	< .001	355.3 (18.8) 18.805	< .001
Condition	15.3 (26.3) -0.619	0.535	-101.3 (30.7) -3.297	< .001	-63.4 (31.5) -2.010	.027
Group	44.1 (87.7) .502	0.615	75.3 (42.4) 1.774	0.076	4.89 (35.1) 0.139	0.889
Condition*Group	-232.3 (35.5) -1.365	< .001	-84.5 (58.5) -1.443	0.148	27.5 (56.4) .487	0.625

2.6. Discussion and conclusions

In this section, we bring the results together in summary. As there is a significant amount of data to be considered, we begin with a brief overview of the most interesting results. Starting with the Negative Concord Item (NCI) conditions, as can be seen in Table 9, irrespective of modality (offline versus online) and the language of testing, each group's performances are consistent with having distinct representations for both languages that conform to what is formally described of Spanish and Catalan. As a result, we can safely say that order of acquisition and/or relative dominance in one or the other language brings nothing to bear for this domain of grammar, at least for these sets of bilinguals, a point to which we return below.

Table 2.9. Summary of the results for the NCI conditions, where (✓) refers to expected performance based and (×) does not.

	L1Sp-L2Cat		**L1Cat-L2Sp**	
Spanish	NCI+SN (GJT) ✓	NCI-SN(GJT) ✓	NCI+SN (GJT) ✓	NCI-SN(GJT) ✓
	NCI+SN (SPR) ✓	NCI-SN (SPR) ✓	NCI+SN (SPR) ✓	NCI-SN (SPR) ✓
Catalan	NCI+SN (GJT) ✓	NCI-SN(GJT) ✓	NCI+SN (GJT) ✓	NCI-SN(GJT) ✓
	NCI+SN (SPR) ✓	NCI-SN (SPR) ✓	NCI+SN (SPR) ✓	NCI-SN (SPR) ✓

Turning to the Differential Object Marking (DOM) conditions, the picture is less clear. We have some within group mismatches in performance across modalities as well as inter-group across language and modality-group, as can be appreciated visually in Table 10 below. Our focus is definitively not on any comparisons to monolinguals, but rather on a fairer bilingual-to-bilingual group comparison (e.g. Hopp & Schmid, 2013; Ortega, 2010, 2013; Rothman & Iverson, 2010) where L1 and L2 status is switched in a mirror-image way and proficiency is held constantly high in. That said, we do highlight below where group diverges from expected monolingual norms, as described in the literature, with some insights as to why this might be. Attempting to compare the bilinguals to monolingual control groups would

have been difficult, in part since it would be virtually impossible to find a Catalan monolingual control group and thus it would have been unbalance if we were to offer only a Spanish one. At first glance, however, it is useful to highlight, as we predicted could occur, that CLI can be conditioned by the domain of grammar itself, a point to which we will return in greater detail below.

Table 2.10. Summary of the results for the DOM conditions, where (✓) refers to expected performance based and (✖) does not .

	L1Sp-L2Cat		**L1Cat-L2Sp**	
Spanish	+DOM (GJT) ✓	-DOM (GJT) ✖	+DOM (GJT) ✓	-DOM (GJT) ✖
	+DOM (SPR) ✓	-DOM (SPR) ✓	+DOM (SPR) ✓	-DOM (SPR) ✖
Catalan	+DOM (GJT) ✖	-DOM (GJT) ✓	+DOM (GJT) ✖	-DOM (GJT) ✓
	+DOM (SPR) ✖	-DOM (SPR) ✖	+DOM (SPR) ✖	-DOM (SPR) ✓

Looking at the quadrant on the top-left side of the table shaded in green, that is when L1-Sp-L2-Cat bilinguals are tested in their L1, Spanish, we see that for the –DOM conditions—where the accusative marker *a* is not present although it is grammatically obligatory—the GJT revealed influence from Catalan, their L2. This is not terribly surprising in light of previous literature that has shown DOM to be highly vulnerable in bilingual contexts (e.g. Guijarro-Fuentes & Marinis, 2009; Montrul, Bhatt, & Girju, 2015) even for the context we used—purposefully because dialectal variation that can otherwise obtain for DOM in other contexts does not apply. However, it is not clear at what level this Catalan influence rests—e.g. if such reflects a representational difference in their mental grammars—precisely because in the Self-Paced Reading (SPR) task the same participants do show a clear sensitivity to the very same ungrammatical condition. If it were truly the case that these speakers' grammars did not have the functional architecture of Spanish DOM in their grammar, we would expect that they would be equally insensitive to DOM grammaticality issues in both modalities. The fact that

the processing measure shows sensitivity that is potentially obscured in the offline behavioral measures alone might be because the processing measures are more likely to tap into implicit knowledge (e.g. Jegerski, 2014; Keating & Jegerski, 2015). Therefore, we would not conclude based on a coupling of the two modalities that these L1-Sp-L2-Cat bilinguals have non-monolingual-like representations for DOM, but rather that the offline task shows a more methodological performance-based difficulty. This same pattern, where processing measures indicate better competence than offline behavioral measures, has been shown recently for other types of Spanish bilinguals, namely more traditional HSs in North America (e.g. Jegerski, Keating, & VanPatten, 2016; Villegas, 2014).

Shifting to the bottom-left quadrant of the table shaded in blue, that is when the L1-Sp-L2-Cat bilinguals are tested in Catalan, they show over-acceptance of sentences with +DOM (ungrammatical in Catalan) in the GJT and they do not show sensitivity to the morphosyntactic violation in this condition in the SPR either. Because there is performance conformity across modalities, we take this as especially strong evidence that the underlying reason for both performances is one and the same, that is, representational in nature. The performance seems to suggest that Spanish is influencing their Catalan. In turn, their performance in Catalan as summarized in table 10 is further evidence for what we argued in relation to the representation of this domain in their Spanish grammar. Recall that they appeared to have some issues marking -DOM as ungrammatical despite having no issues accepting +DOM as grammatical and being sensitive to the -DOM violation in RT. We concluded that the processing measure reflected their competence more accurately. Their performance on the Catalan condition thus seems to strengthen this claim precisely because one could only reasonably expect (or explain) evidence of Spanish DOM transfer in Catalan if indeed they had an intact DOM representation from their other grammar. There is also a modality asymmetry in their Catalan performance for the same domain, that is -DOM, however, this seems to be the mirror image of their performance in Spanish. In Catalan, they

perform just fine in the -DOM condition, which entails accepting as grammatical sentences that do not have an overt *a* case marker, in the offline measure only. With the same condition in the online measure, they show a sensitivity (they slow down) where they should not, suggesting that they are sensitive to a grammatical violation that should not obtain in Catalan but does in Spanish. We would like to suggest that the offline measure potentially reflects a "yes" bias, they simply did not reject something provided to them and that the online measure reflects more their grammatical representation, which we take to be influenced from Spanish. To the extent that this is on the right track, it again provides further evidence for intact DOM representations in Spanish.

These results, related back to our research question that probes the relationship that language use and exposure exercises on linguistic competence/performance in both languages of early child bilinguals, suggest that language use and exposure play a role in determining the directionality of cross-linguistic influence.[14] Recall that this set of participants was categorized as having high use and exposure to Spanish even though they live in a Catalan-dominant area. We conclude that contrary to other typical cases of Spanish Heritage Speaker bilingualism, the access to high quality and quantity of input to the minority language of the immediate context (i.e. Spanish) – by means of language use and exposure on top of education— is a key factor to preventing cross-linguistic interference from the majority language of the immediate context (i.e. Catalan).

Turning to the L1-Cat-L2-Sp bilinguals, we focus our attention to the quadrant on the top-right of the table shaded in orange. Particularly notable is the fact that they do not judge the –DOM conditions in Spanish as categorically ungrammatical (GJT), nor do they show

[14] The two languages under investigation are two closely related systems and thus, this might have had an effect on triggering cross-linguistics effects. However, cross-linguistic influence in the DOM we have investigated has also been reported when Spanish is in context with other less related language, such as English, in context of Spanish as a Heritage Language in the US (e.g. Montrul, 2004; Montrul & Bowles, 2009; Montrul & Sánchez Walker, 2013) or Spanish as a non-native language (e.g. Bowles & Montrul, 2008; Farley & McCollam, 2004) in North America (e.g. Montrul, 2004; Montrul & Bowles, 2009; Montrul & Sánchez Walker, 2013).

appropriate sensitivity to the ungrammaticality in this condition. However, in the +DOM conditions, they show target-like performance in the GJT and SPR tasks. Since it is the case that these bilinguals do not reliably reject nor show sensitivity in RT to sentences in Spanish without the accusative *a* marking when the object is [+ animate, +specific], the canonical condition under which DOM is required, yet have no issues accepting sentences that have it in the same context, we might conclude that they indeed have a representation for DOM in their mental Spanish grammars, but, unlike the other group and other sets of Spanish natives described in the literature, DOM seems optional as opposed to obligatory. Such a conclusion might be strengthened by the latent patterns in their performance. That is, in both the -DOM and +DOM they are consistent in their performances across offline and online modalities.

Turning to the final quadrant in the bottom right shaded in yellow, that is, when the L1-Cat-L2-Sp participants are tested in their native Catalan, we see that although they prefer sentences without DOM (grammatical in Catalan) by rating them as more acceptable than sentences with DOM (ungrammatical in Catalan), they do accept +DOM sentences at a non-trivial rate. In the online data, these speakers show no sensitivity in -DOM conditions, as expected, however, they do not show sensitivity to the grammatical violation of +DOM conditions in Catalan. Taken together, this also suggests that their grammars allow for optionality with respect to DOM, which goes in line with Escandell-Vidal's (2009) claim that DOM in Catalan is starting to appear in varieties of Catalan which traditionally do not allow for it. Optionality in their Spanish grammar, thus, can be explained by influence from Catalan on their Spanish precisely because their Catalan shows the same degree of optionality. As it relates to the question of language dominance (LD), again we see that LD affects cross-linguistic influence in these highly proficient bilinguals. At first glance, because there is optionality that would not be expected per se of a monolingual native Catalan grammar (to the extent that there are any) it was not clear that LD, in this case Catalan influence, was unambiguously demonstrated or at least as clearly as it was for the Spanish dominant group.

However, since we have shown that the optionality in Spanish is reflected also in the Catalan of these same speakers it seems reasonable to understand the optionality in Spanish as influence of Catalan as represented in these bilinguals.[15] Thus, we have evidence of LD affecting cross-linguistic influence in both groups.

It is interesting to ponder why out of the two domains of grammar tested, both of which differ across the languages, only one shows cross-linguistic influence, albeit patterning differently, in both target groups. It is possible that the issues with DOM are idiosyncratic to DOM itself. Recall that DOM seems to be challenging in all instances of heritage speaker bilingual acquisition (see e.g., Montrul, Bhatt, & Girju, 2015). Moreover, we should keep in mind that the accusative case marker itself is phonologically reduced and potentially not overly salient. Furthermore, DOM reflects a large degree of variation across Spanish dialects and even individual speakers. Because our bilinguals, however, are all exposed to Peninsular Spanish where DOM is consistent in the core context we isolated (López, 2012) and given that the [+ animate, +specific] is not subject anyway to much variation dialectically or individually, we attempted to control for the general variation within this grammatical domain, which was chosen precisely because it had been shown to be problematic for more typical HSs. Keeping in mind our research questions then and under the hypothesis that less variation would obtain in our context of societal bilingualism as compared to more traditional HS

[15] One reviewer queried whether or not subtle differences, as we have uncovered herein, in bilingual grammars would serve as a potential catalyst for changing the representational structure of monolingual grammars. It is outside of the scope of this paper to make such claims, not the least because it is difficult to find monolinguals of Catalan in particular to test what we would claim. That said, a general discussion on the matter is perhaps warranted. As monolinguals are in contact with bilinguals, especially in situations like Catalonia where bilingualism is the default state— rural enclaves of monolingualism would likely have significant contact with bilinguals, in person or via media. It would, thus, make sense that bilingual innovations could result in changes to monolinguals via various paths. We will highlight one herein. In light of L1 attrition research (see Schmid & Köpke, 2017, for review), we know that native grammars can change over time. We also know from Iverson (2012) and Iverson & Miller (2017) that all domains of grammar—even narrow syntax—can be affected by shifting input over thresholds for L1 change over time. And so, contact with bilinguals over the lifespan can induce innovations—if the threshold is tipped. Changes in production as a result in monolingual grammars will likely affect how the next generation sets the grammatical system, as argued for monolingual L1 acquisition (Lightfood, 1999) and heritage speakers (Bayram, Pascual y Cabo, & Rothman, 2018; Pascual y Cabo & Rothman, 2012), albeit via somewhat distinct provenance. Our results would be compatible with the argumentation in Perpiñán (2018) that specific context of Catalan-Spanish bilingualism is leading to language change and to the creation of a new variety of Catalan that allows for the optionality seen in our participants.

situations, examining a domain such as DOM, as compared to other properties, could then go a long way to inform us about what is vulnerable in bilingualism even when many variables that likely affect HS performance are more favorably proportioned. And so, why all of these factors might contribute to why DOM is a vulnerable property for bilingual variation in general, they do not seem to be overcome as they are for monolinguals even in an environment where all opportunity has been given for our bilinguals to perform like monolinguals. This should of course not be surprising and certainly bespeaks nothing evaluative about our bilinguals herein, why would they or how could they perform exactly like monolinguals, if only because they are simply not monolinguals? However, given the differences across the two groups that grow up under similarly favorable environmental conditions, there does seem to be some evidence to suggest that order of acquisition/language dominance matters for the outcomes of development in this domain. And so, relating more directly all that we have seen across the two domains of grammar to our two research questions, it seems that LD matters for some domains of grammar more than others, even when bilinguals are more or less balanced as related to overall proficiency in the languages and when this is maximally supported by a bilingual environment. If the same pattern holds for future studies of a similar nature, then looking at the adult outcomes of such groups as we have done here might couple together with more traditional HS populations to inform linguistic theory more generally. As Polinsky (2016, 2018) has nicely argued and supported with data recently, certain domains of grammar are invulnerable to bilingual effects even in the minority language of HSs who are severely imbalanced in dominance whereas others are highly sensitive to bilingual effects. Our data then support her general claim (see Tsimpli, 2014 for similar arguments), showing that some properties of grammar are still vulnerable to bilingual effects while others are not even in the opposite case, that is, when there is extremely high proficiency in both languages and the day-to-day environment of the bilingual promotes both languages. Together, such data can tell us what is more and less core related to language in general.

As promised above, it is worth coming back to the case of NCIs and ponder why there is no CLI noted at all, that is, conditioned or not by order of acquisition/dominance, different from the case of DOM. The case of NCIs is interesting by comparison to DOM, since only the former relates to optionality in the "larger" grammar. Catalan permits the Spanish sole, obligatory spell-out (the use of the NCI without Sentential Negation (SN)) but optionally allows for double negation spell-out without the cancelling of semantic negation (as would be the case in Spanish if an NCI co-occurred with SN). And so, there is no direct competition of an obligatory nature between the two grammars, as is the case with DOM where an obligatory use of DOM constitutes an ungrammatical extension of DOM in Catalan. Therefore, it could be the case that this tension "optionality" vs. "obligatory-ness" plays a further conditioning role for CLI. In a sense, the grammars might be less likely to affect one another when what is at stake in not a contradiction in the obligatory construction of a grammatical structure. The subtleties involved, in other words, are actually not so subtle. The case of NCI might stand out across the two languages as more salient precisely because Catalan optionality coincides with a very specific domain of distribution in which it reflects an interpretation that is unavailable in Spanish.

As a closing point of discussion, it is worth considering whether or not our speakers are indeed HSs of a specific sub-type or if it would indeed be best to not apply that label to them. In an effort to not open up Pandora's box on this potential issue, we were neutral in distinguishing traditional HSs from our bilinguals herein and mainly because it hardly matters for our immediate points. We could be neutral because there is no denying the fact that our bilinguals are quite different in non-trivial ways from Spanish HSs studied in North America. But those differences alone do not necessarily mean that they are both not HSs, yet of distinct types (see Putnam, Kupisch, & Pascual y Cabo, 2018 for similar argumentation). Although more traditional HSs do not remain dominant in their HL because their environments essentially preclude this and it is seemingly a given that HSs will show, on a gradient,

differences from expected monolingual baselines (but see Kupisch & Rothman, 2016), a lack of difference in these regards should not be used as a criterion to disqualify someone as a HS. Doing so would only make sense under a deficit model of HS bilingualism whereby the label HS has somehow become synonymous with deficiency par excellence. With many others (e.g., Bayram et al., 2017; Kupisch & Rothman, 2016; Putnam, Kupisch, & Pascual y Cabo, 2018; Putnam & Sánchez, 2013), we definitively reject such a view. Allowing for the present bilingual groups to be considered as a specific subtype of HSs, precisely because they meet all the neutral inclusion criteria of several non-deficit approaches definitions widely adopted in the literature, for example, Rothman (2009). And so, evidence from highly balanced HSs, if the label is appropriate to apply to our L1-Sp-L2-Cat group, could go a long way at counterbalancing the HS as an incomplete acquirer viewpoint. Our L1-Sp-L2-Cat participants grew up in a household where both parents had moved to rural Catalonia and are not native speakers of Catalan, Spanish is their exclusive L1 and the only language spoken in their homes when they were young children and continues to be the family language. Crucially, the majority language of the immediate environment they grow up in is not their home language, but rather (for them) an L2 (Catalan), which they became significantly immersed in only upon going to school. This means that Spanish is their native L1, unlike the L1-Cat-L2-Sp group for whom Spanish is clearly an L2. It is also true that in this environment successful bilingualism and support for such is omnipresent and, thus, the possibility to maintain and further develop Spanish is different than other typical cases of HSs. Spanish has a higher prestige and is more accessible than it is in the USA, however, in this specific part of Catalonia there is no question that Spanish is not the majority language of the society (see Illamola, 2015). The increased opportunity to conserve dominance in Spanish does not disqualify our HSs from being HSs, it merely naturally creates an environment in which we can observe the relative weight of key variables that are different from Spanish HS situations in other environments and could not otherwise be teased apart. And so, why should our population not reflect a sub-type of HS?

We leave this discussion for future work that takes advantage more and more of what comparisons of traditional HSs and bilinguals like ours can show when the minority language, in this case Spanish, is able to be held constant.

Chapter 3: A Systematic review (Study 2)

A Systematic Review of Transfer Studies in Third Language Acquisition [1]

Abstract

The present systematic review examines what factors determine when, how and to what extent previous linguistic experience (from the L1, L2 or both languages) affects the initial stages and beyond of adult L3 acquisition. In doing so, we address what a bird's eye view of the data tells us regarding competing theoretical accounts of L3 morphosyntactic transfer. Data couple together to suggest that some factors are more influential than others. As discussed, the systematic review transcends the field of adult multilingualism precisely because of what it reveals, as a *prima facie* example in behavioral research, in terms of how different types of methodological considerations impact the way data are interpreted to support or not particular claims.

Keywords: Systematic review, L3/Ln acquisition, Transfer selection, Methodological considerations, Typological Proximity.

[1] Puig-Mayenco, E., González Alonso., and Rothman, J. (2018). A Systematic Review of Transfer Studies in Third Language Acquisition. *Second Language Research*. https://doi.org/10.1177/0267658318809147

3.1. Introduction

The study of non-native (i.e., non-primary) language acquisition and processing has long been concerned with the interplay between 'old' and 'new' linguistic knowledge (an issue already discussed in Weinreich, 1953), both in vocabulary and grammar (e.g., Jarvis, 2000; Odlin, 1989; Schwartz and Sprouse, 1996; White, 2003). Non-native language learners often speak more than one language at the onset of acquiring a new one—e.g., immigrants that arrive in Europe or the USA from India or Malaysia are likely to speak several previous languages. Accumulating evidence seems to indicate that third or more language (L3/L*n*) acquisition presents differently from second language acquisition (L2) (see De Angelis, 2007; Falk and Bardel, 2010; González Alonso, Rothman, Berndt, Castro, & Westergaard, 2017). While in second language acquisition, the learner can only rely on her experience with one language, in L3/L*n* acquisition more than one system of linguistic representation is available.

With these observations in mind, it is not surprising that a substantial amount of research in L3/L*n* acquisition has focused on determining which of the previous languages, if any, exerts a larger amount of influence on the initial representations in L3/L*n* interlanguage grammars and thus affects the L3/L*n* learning process. Theoretical proposals attempting to model the role of linguistic transfer in L3/L*n* acquisition invariably contain two underlying assumptions, namely, (i) that one or more variables determine when and how transfer will take place (i.e., it is not random), and (ii) that this combination of variables is indeed weighted, such that all things being equal one variable will take precedence over the others. Thus, the models we will discuss here differ along two main dimensions. The first is what variable(s) they advocate as being ultimately explanatory for linguistic transfer in L3/L*n* acquisition. The second is whether the model is limited in scope to one developmental stage in particular—e.g., initial, intermediate, advanced stages—or if it is meant to account for linguistic transfer at any and all points in the developmental sequence.

This paper offers a systematic review of a sizeable subset of L3 studies, focusing on morphosyntactic transfer. It is important to clarify from the outset, however, that this is not a meta-analysis in the traditional sense, for reasons that pertain to the nature of these studies and, to some extent, to our specific motivations in undertaking this task. A meta-analysis uses calculations based on individual studies' effect sizes—or some other measure of strength—to derive conclusions about the effects of a particular treatment on a specific population, targeted by all included studies (see Boulton & Cobb, 2017; Norris and Ortega, 2000; Plonsky & Oswald, 2012). Unfortunately, a majority of the studies reviewed here do not meet the requirements to conduct a meta-analysis of the type just described: effect sizes are not reported, and they often cannot be directly or indirectly estimated from the information reported in the studies (only 60.9% of the entire pool of studies provides enough information to calculate effect sizes based on, e.g. Boulton & Cobb, 2017; Plonsky & Kim, 2016; Plonsky & Oswald, 2012).

Given our main point anyway—to understand what methodological choices might confer for interpreting data in light of specific models— a systematic review is a more appropriate choice. Collective data weigh in best on debates among competing theories when they come from methodologies that fairly represent as many available theories as possible. As a whole, the group of studies we analyze in this paper have deficiencies in two related departments: they often lack the necessary detail in their description and/or reporting to replicate or re-analyze the data, and they sometimes ignore field-specific methodological considerations which directly affect their interpretation (in light of *all* available theories).

To be clear then from the start, we will employ contingencies precisely because the goal is to reveal if there are associations between method/practice and outcome. This review thus provides a bird's eye view of the field, in an attempt to evaluate how much of what we have ascribed to linguistic variables can also be explained by potential inadvertent methodological choices. Our systematic review comprises 71 studies, where we examine methodological

practices. Furthermore, since linguistic transfer—its source, its extent, its timing—feeds into the very definition of individual L3/L*n* learnability tasks and can also, especially and uniquely in the case of multilingualism, reveal insights into how the mind economizes more generally, a review of this type is non-trivial on several planes.

3.2. Setting the stage

Studying the role of transfer in the acquisition of a third or further language can contribute to our understanding of cognitive economy in ways that studying L1 or L2 acquisition cannot. This is not to say that L3/L*n* acquisition is fundamentally different, as a whole, from L1 or L2 acquisition (see Rothman, 2013, 2015). However, the fact that an L3 learner has varying amounts of previous experience with more than one language makes transfer a multidimensional factor: now the learner's brain has *choice*—however unconscious such is likely to be—for many if not most domains of grammar. Because languages (may) have different and often incompatible representations for the same structure or grammatical function, the selection of L1 over L2 representations (or vice versa) for transfer into the L3 is not a trivial issue. This is so because it might have differentially facilitative results depending on what the target L3/L*n* grammar specifies for each linguistic property—as it might resemble the L1, the L2, or neither. Crucially, however, since there is no way to know *a priori* what the most facilitative choice might be in each case, the brain is forced to make an unconscious 'best guess' as to what will most efficiently assist the creation of a linguistic representation that is able to parse the L3/L*n* input. The question thus becomes the following: what guides this informed guess? Different theories and models of morphosyntactic transfer in L3/L*n* acquisition have addressed this question by considering a substantial number of variables: type of linguistic experience, age of acquisition, similarity between the languages (overall or at the level of specific properties), among others. No model explicitly denies the simultaneous involvement of various factors; the delineation between them, however, rests in what is

ascribed as the primary factor. The list of models we present below is not exhaustive, but contains the proposals that have received the most attention for the past 15 years—and, therefore, the ones that have had a chance at the time of writing this to be systematically assessed through L3-specific empirical work. The *Scalpel Model of third Language acquisition* (Slabakova, 2017) and the *Linguistic Proximity Model* (Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017) are not considered directly precisely because their recency translates to a dearth of studies that incorporate their predictions into the experimental design. To include them precipitously after a year of existence would thus not be fair to these new models. Many details aside, both predict that both languages can influence L3 simultaneously, in other words, they predict some level of hybridity from both sources. We have coded for hybrid transfer, which can then be used indirectly in view of these models.

3.2.1. Models of morphosyntactic transfer in L3/Ln acquisition

In general terms, there are two possibilities with respect to transfer at the onset of L2 acquisition: that it comes from the L1 or that there is no transfer at all—a debate with a long history in SLA studies (e.g., Epstein, Flynn, & Martohardjono, 1996; Odlin, 1989; Schwartz & Sprouse, 1996; Vainikka & Young-Scholten, 1996; see Foley & Flynn, 2013, for updated review). The picture in L3/L*n* acquisition is somewhat more complex in what pertains to potential sources of transfer, since we need to consider four logical possibilities *a priori*: (i) there is no transfer; (ii) transfer comes exclusively from the L1; (iii) transfer comes exclusively from the L2; (iv) transfer may come from either language, or from both at the same time, in whole or in parts. Some of these possibilities—notably (iii) and (iv)—have been articulated into models or hypotheses proposed within the last 15 years, which we will introduce below. No formalized model to date has been put forward in line with possibilities (i) and (ii), although the latter—default L1 transfer—has been indirectly suggested from (at least partially) supportive data from a number of studies.

3.2.1.1. A privileged role of the L1

Some of the work on L3 grammar acquisition seemed to support the idea of a dominant role of the native language (e.g., Hermas, 2010, 2015; Jin, 2009; Na Ranong & Leung, 2009). That is, that the default source of transfer or the only source of possible transfer is the native, first-acquired language. Even in studies which have claimed to support this with empirical data, there is no discernible explanation as to why this should be so. It is possible, for example, that the L1 is privileged for all subsequent language transfer because native L1s tend to remain the dominant language of successive bilinguals (see Lloyd-Smith, Gyllstad, & Kupisch, 2017, for phonology) and, therefore, it occupies somehow a more accessible and economic blueprint for other languages to be learned. Whatever the reason turns out to be, it runs in parallel to the main claim that the L1 trumps all other linguistic knowledge.

With the exception of Hermas' work, most studies highlighting a potential L1 default effect predate the present L3/L*n* model*s* of transfer, meaning that the data in these pre-existing studies (and even Hermas' work) could be equally accounted for by, or is compatible with, the currently available formal models—in consideration today of things not considered at the time. An L1 default in transfer source selection is indeed a strong hypothesis, precisely because it makes very clear and straightforward predictions that are amenable to testing, and thus falsifiable by evidence of transfer from the speakers' L2(s).

3.2.1.2. The L2 Status Factor Hypothesis

The main claim of the L2 Status Factor hypothesis (henceforth L2SF; Bardel and Falk, 2007; Bardel & Sánchez, 2017; Falk & Bardel, 2011), as originally formulated, is that an L2 acquired in adulthood will have a privileged status as a source of morphosyntactic transfer. The L2SF's claim is that the L2 will be active throughout L3/L*n* development and not only at the initial stages. In its most current instantiation, this model is conceptually aligned to Paradis' (2009)

Declarative/Procedural model, which argues that the grammars of native and non-native languages acquired after puberty are sustained by different memory systems. The claim is that, while the L1 grammar is fundamentally procedural, all other grammars acquired in adulthood (plus all lexicons, including that of the L1) are mediated by declarative memory. Under this assumption, the L2SF maintains that an L2 will be more likely to influence the process of L3/L*n* acquisition because, in Bardel and Falk's (2012) terms, the L2 and L3 are cognitively more similar (than the L1 and the L3) in their status as (adult) non-native languages.[2]

Recent instantiations of the model (Bardel & Sánchez, 2017; Falk, Lindqvist, & Bardel, 2015) have begun to address certain subset situations within sequential bilingualism where the two-way distinction between implicit L1 competence and explicit L2 knowledge may not be so clear-cut, thus making it difficult to derive straightforward predictions from the initial premises of the L2SF. These situations include, most notably, the case of L3 learners who have received substantial metalinguistic training in their L1, which, may lead to the presence of L1-specific grammatical knowledge in these learners' declarative memory. Which prior language is then selected as the source of transfer largely depends, according to Bardel and Sánchez (2017), on individual differences in cognitive function such as working memory capacity and attention control, which are crucially involved in the process of evaluating and comparing the L3 input to the relevant representations from previously acquired languages. Under these premises, non-facilitative transfer is not ascribed to a default in transfer source selection, but rather to shortcomings in cognitive capacities that lead to the selection of a non-targetlike representation.

[2] The theoretical underpinnings of the L2SF implicitly seem to confine its scope to the case of L3/L*n* learners who have already acquired an L2 in adulthood (i.e., sequential bilinguals); most other bilingual populations, including simultaneous bilinguals, heritage speakers and child L2 learners, inevitably fall outside of the model's scope (see also Hopp, 2018).

3.2.1.3. The Cumulative Enhancement Model

The Cumulative Enhancement Model (CEM; Berkes and Flynn, 2012; Flynn, Foley, and Vinnitskaya, 2004) proposes that both previously acquired languages are available for transfer, at any point in the process of L3 acquisition. The model is predicated on the principles of non-redundancy and maximal facilitation in successive language acquisition, which entails that transfer from previously acquired languages is only expected to obtain when such facilitates the acquisition of the target L3/L*n* property. In terms of transfer source selection, this translates into two main scenarios: (a) if one of the languages contains the target property and the other one does not (or has a non-target-like value for it), the former will transfer; and (b) if none of the languages may be of help, transfer will not obtain and the target property will be acquired in the same way it is in L1 acquisition. In short, the CEM proposes that transfer is selectively applied in L3/L*n* acquisition at the level of individual linguistic properties, if and only the creation of a target-like linguistic representation in the new grammar is facilitated. The idea of a mechanism sensitive to small, property-specific variation in the target L3/L*n* input first proposed by the original CEM paper is a valuable contribution that has been resurrected in the most recent models (e.g., Slabakova, 2017; Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017).

3.2.1.4. The Typological Primacy Model

The Typological Primacy Model (TPM; Rothman, 2010, 2011, 2015) proposes that, at the very beginning of L3/L*n* acquisition, all grammars of previously acquired languages are available for transfer. Paralleling Schwartz and Sprouse's (1994, 1996) Full Transfer/Full Access model of L2 acquisition, the TPM assumes that one of these grammars is transferred in its entirety, as early in the process as possible—as soon as the linguistic parser has gathered enough information to adjudicate between the available choices.

The TPM argues that the linguistic parser selects the previously acquired language for which the highest degree of typological (structural) proximity[3] is detected, this being, potentially, a proxy for the largest amount of structural crossover between the L3 and the different possible sources (L1 or L2). Rothman (2015) proposes an implicational hierarchy of linguistic cues hypothesized to guide the parser in this task: language specific Lexicon → Phonology → Morphology → Syntax. The parser scans the available L3 input, assessing the degree of structural similarity between the L3 and the previously acquired languages at each of these levels, until a critical threshold of activation is reached for one of the prior languages. The fact that this is an implicational hierarchy means that, in some cases, the lower levels will not be considered, because the threshold will have already been met by a higher level in the hierarchy.

Similarly to the L2SF, the fact that only one of the prior languages is selected for transfer entails that the outcome of transfer will in some cases be non-facilitative. Unlike theories advocating transfer on a when-needed, domain-by-domain basis (e.g., Flynn et al., 2004; Slabakova, 2017; Westergaard et al., 2017), there is no need for the model to posit additional factors in order to explain a particular non-facilitative outcome of transfer, since this possibility follows straightforwardly from the relative amount of mismatch between the transferred and target grammars.

[3] Linguistic typology as a system of classification is based on shared formal (grammatical) features across languages, independently of genetic relationship. What this means, essentially, is that linguistic typology is complementary, but crucially not equivalent, to linguistic genealogy—i.e., the classification of languages into families according to their documented or presumed common origin. For example, both Japanese and Tamil are head-final languages (phrase heads are typically preceded by their complements) and therefore typologically similar with respect to head-directionality, but it seems unlikely that they are even remotely related. That said, genetically related languages tend to have moderately high degrees of overlap in typological terms, when their grammars are compared in whole. And so, by typology the TPM refers to underlying structural similarity (see González Alonso and Rothman, 2017; Rothman, 2011, 2015 for discussion). Throughout the paper, we use the term "typology" in strictly linguistic terms, "typological proximity/similarity" as measured over the whole grammar, and "typological transfer" to be the one predicted by the specific learner-internal mechanisms proposed in the TPM—i.e., not by anecdotal perceptions of overall similarities.

3.3. Rationale and research questions

Our main goal is to explore, describe and critically analyze methodological practices currently followed in studies on morphosyntactic transfer in L3/L*n* acquisition, in an effort to shed better light on what the collective whole of the data reveal. We hope to lay the ground for more robust consensuses, showing that some of the disparities in argumentation and seemingly mutual exclusivity of positions in the field are, at least in part, predicated on the interpretation of data stemming from methodological issues. We seek to uncover, to the extent they exist, potential associations between methodological choices/practices and data outcomes. If on the right track, this will then form the basis to argue for consolidating consistency in future experimental design for the purposes of reliability/replicability and maximal comparability across studies. We are guided by the following leitmotif query:

⇒ What will examining a critical mass of studies reveal specifically for the role previous linguistic experience has for linguistic transfer in successive adult multilingual acquisition?

To answer this question, we follow standard practices in other methodological syntheses/reviews in the field of SLA (e.g., Plonsky & Kim, 2016; Roessingh, 2004), as detailed in the following section.

In conducting this review, we do not mean to ignore the fact that certain theoretical questions demand particular methodological choices, and that the theory one subscribes to is the first and foremost factor in adopting some choices in experimental design. Having said this, however, it is important to recognize when such a conventional truth holds and when it should not. To illustrate this with a variable from our review, testing the domain of grammar in the L1 and L2 to be examined in the L3 to know for sure what each individual has as a potential source of transfer, should be of no consequence to the theoretical debate between

the models. It is a question of what potential future standard practice should be in this emerging field. If a comparison between adhering to this practice or not reveals an insightful, significant trend of differences then we might simply agree as a byproduct of showing this to be conservative in future expectations of L3 studies. Who would deny that the more conservative practice of assessing what is available from an L1 and L2 for transfer is best practice—after all if an L2er does not have a unique L2 representation or has one that is not fully developed they could only transfer what would appear to be the L1 or an L1-influenced one even if coming from the L2 grammar inventory. The question is whether such a practice yields a benefit? Besides being more precise in the obvious ways, is it actually necessary given that it represents time and resources? Beyond opinion, answering questions of this type can only be done in a quantifiable manner by a review like the present one.

3.4. Design of the systematic review

3.4.1. Retrieval of studies

Two main types of studies were included in the review: (a) studies published in peer-reviewed publications (journal articles, book chapters and conference proceedings) and (b) doctoral dissertations with a special emphasis on transfer in L3/L*n* acquisition. The search, exhaustive to the extent possible, was conducted through Google Scholar, Proquest and Language and Linguistic Behavior Abstracts (LLBA). Relevant studies were located using the models' names as keywords, as well as inspecting the citing articles for each model's main publications.

After each citation was manually examined, a second filter was applied: we included only those publications which (a) included original data sets—i.e., we excluded epistemological commentaries and review articles—and (b) met one or more of the following criteria: (i) focused on transfer in L3/L*n* acquisition; (ii) focused on testing specifically the models of L3/L*n* acquisition discussed above; and/or (iii) focused on modelling L3/L*n* acquisition.

In total, 41 independent publications/dissertations were included in the analysis. When one of the independent publications or dissertations contained more than one experiment, each experiment was coded as an individual study. In the final analysis, a total of 71 different studies were examined. The 71 different studies in the dataset were published—or defended—by 48 different researchers between 2004 and 2017 (see Appendix E for studies included in the analysis and further information on them).

3.4.2. Coding procedure

The coding was done independently to what the authors of each study had argued from their interpretation of the results. The reason for this is that a number of the studies pre-dated the suggestion of some of the variables under consideration, and so the authors had not included them in the analysis. Even though their interpretation tended (in most studies) to coincide with our coding, we decided to apply an independent coding scheme to all studies. To do so, we examined the methodological choices and results presented in each study and we consistently coded each study following the same two-step process. In order to probe for potential compatibilities with more than one model at the same time—besides the one(s) to which each study claims to lend support—the first step was to code each experiment using a binary scheme with five macro-variables meant to capture the source (and type) of transfer: (a) *L1 transfer*; (b) *L2 transfer*; (c) *Typological transfer* (as defined in Rothman (2015), see 2.1.4 above and 4.2.1 below); (d) *Hybrid transfer* (simultaneous transfer from both languages); and (e) *Non-facilitative transfer* (See appendix F). Table 1 offers a summary of these macro-variables and the coding value associated to each level. Note that it is possible for each of the 71 studies to, in principle, get a check for several factors.

Table 3.1. Binary Value Assignment to Macro-Variables and Factors in the Study

Macro-variables	Levels
L1 Transfer	Yes (+), No (-)
L2 Transfer	Yes (+), No (-)
Typological transfer	Yes (+), No (-)
Hybrid transfer	Yes (+), No (-)
Non-facilitative transfer	Yes (+), No (-)

Each study was then further coded for five different methodological factors relevant to the field of L3/L*n* acquisition, to determine whether the use of a specific methodology might correlate to the source (and type) of transfer: (a) *Proficiency* of the participants in the L3; (b) *Languages tested* (i.e., whether they were tested only in the L3, or also in one or more of the previously acquired languages); (c) type of methodology (i.e., whether the study examined production or comprehension data); (d) *Mirror-image groups,* whether mirror-image participant groups were examined (e.g., L1 Spanish, L2 English, L3 Catalan vs. L1 English, L2 Spanish, L3 Catalan) and (d) *Language combination* (i.e., whether either or both previous languages were genetically related to the L3, e.g., L1 Spanish, L2 English, L3 Catalan, where Spanish and Catalan are genetically close, versus L1 Japanese, L2 English, L3 Arabic, where none of the languages are related); (See Appendix G). These categories are explained in more detail below. Like the macro-variables, our five methodological factors were coded as binary variables. As noted above, in principle each study could check off several of these variables at a time. Table 2 contains a summary of the factors and a description of variable levels:

Table 3.2. Methodological predictors/factor included in the study.

Methodological factors	Levels
Proficiency	Beginner (+), Post-beginner (-)
Languages tested	L3 only (+), L3 + L2 and/or L1(-)
Methodology	Production (+), Comprehension (-)
Mirror-image groups	Yes (+), No (-)
Language combination	High degree of relatedness (same language family) (+), Little to no overt relatedness (-)

3.4.2.1. Macro-variables

The five macro-variables listed in table 1 are self-explanatory, in that we coded for whether a given study's results are potentially compatible with the constructs of (exclusive) *L1* or *L2 transfer*, *Typological transfer*, *Hybrid transfer* or *Non-facilitative transfer*. As we alluded to above, not all of these distinctions/variables are mutually exclusive. Experimental designs/choices can inadvertently obscure the path to meaningfully testing the models against one another, by confounding predictions or due to real-world limitations concerning availability of very specific subjects with the right language pairings, at precisely the right moments in time along the L3 developmental continuum (González Alonso & Rothman, 2017). As a result, a study may receive a positive value in just one, two, or several of these macro-variables. For example, two of the groups compared in Rothman and Cabrelli Amaro (2010) are particularly relevant: L1 English→ L2 Spanish→ L3 French and L1 English→ L2 Spanish→ L3 Italian. The results suggest that transfer obtained from the L2 into the L3 for both groups (i.e., L2 Spanish into both L3 Italian and L3 French). Since Spanish, a Romance language like French and Italian, was the L2 for both groups of learners, the *L2 transfer* and *Typological transfer* variables were confounded in this case; a positive value was thus assigned to both macro-variables in our analysis. This, however, does not apply when only half of the data within the same experiment/study can be accounted for by a macro-variable. A good example are studies where there is a mirror-image methodology used specifically to test between default status transfer (the L1 or L2) versus a more nuanced situation of transfer where it would depend on some variable other than order of acquisition alone. In Rothman's (2010) study looking at word order restrictions and relative clause attachment preferences, for example, the mirror-image groups were L1 Spanish→ L2 English→ L3 Brazilian Portuguese (BP) and L1 English→ L2 Spanish→ L3 BP learners. *L1* and *L2 transfer* macro-variables were not counted as positive, since Spanish was transferred in both groups—thereby showing L1 or L2 transfer

is not an absolute default and, in this case, selection seems compatible with overall typological/structural proximity.

While three of the macro-variables (*L1* and *L2 transfer* and *Non-facilitative transfer*) are self-explanatory, it is worth highlighting what we mean by the labels *Typological Transfer* and *Hybrid transfer* here. In the first case, and since the macro-variables are meant to capture the main predictors of transfer source selection as defined in each of the models, *Typological transfer* is operationalized as that which is predicted by applying Rothman's (2015) TPM hierarchy to each case. *Hybrid Transfer* refers to those cases where influence from both languages could be observed for the same group, in either of three possible situations: combined influence on the same linguistic property (a true hybrid value); influence on different properties, that is, when in a single experiment with two conditions one is seemingly influenced by language X(L1), and the other by language Y(L2); and, finally, those situations where it was not possible to exclude a hybrid value (tease out the L1 from the L2) because both the L1 and L2 are functionally the same. For example, in an interpretation task it could be the case that participants assign an interpretation from the L1 40% of the time and 60% from the L2 to a condition in the L3. Essentially, this macro-variable operationalizes two different, but related, theoretical positions: that transfer obtains selectively on a property-by-property basis (e.g., Flynn, Foley, & Vinnitskaya, 2004; Slabakova, 2017), and that it may consist of a combined influence from both languages, even within a single linguistic property (Westergaard et al., 2017).

3.4.2.2. Methodological factors

Proficiency in the L3

This factor concerned whether participants were tested at the initial stages of L3/L*n* acquisition, or later in development. Our aim is twofold and grounded in theoretical as well as methodological reasons. First, as discussed, not all of the theories presented above are

intended to model transfer throughout L3/L*n* development: the TPM, in particular, contends that the grammar of one of the learner's previous languages is transferred in whole shortly after first exposure, but has little to say about what the dynamics of cross-linguistic influence will be at various later stages of L3/L*n* acquisition thereafter. One can derive (some) predictions, however, for intermediate and advanced proficiency learnability issues that follow from the TPM's initial stages transfer predictions (González Alonso & Rothman, 2017), making it a viable option to test with more advanced L3 development in limited contexts. The second reason is methodological in nature, and dovetails with the first. Learners make fewer errors as their proficiency increases, which means that, as we move away from the initial stages, it is less and less likely to come across errors, including those that can be attributed to transfer from previously acquired languages. In other words, the concentration of instances of our object of study (linguistic transfer) is inversely proportional to proficiency level, which makes the initial stages a more suitable testing ground. After all, failure to see an influence at an intermediate or advanced levels tells you nothing about whether or not it obtained at a lower proficiency level and has since been "worked out". Since the CEM and the L2SF make predictions that hold equally at any stage of L3/L*n* development, data from novice learners are valid for the purpose of vetting these theories. When considering these two arguments together, it seems reasonable to assume that the stage at which participants were tested may have an impact in the way a dataset can appear to support one model over others. And so, we used two levels in our coding of this factor: *Beginners* and not beginners (i.e., *Post-beginner* learners), which for our purposes capture the necessary distinction.[4]

[4] The range of levels within what we have included under 'post-beginner' is wide, from intermediate (e.g., Santos, 2013) to even near-native learners (M. del P. García Mayo & Slabakova, 2015; Slabakova, García Mayo, & Slabakova, 2015). However, and besides the reasons we have just offered, we limited the levels of this variable to two for ease of comparability: measures of proficiency vary greatly across studies (ranging from self-assessment to standardized tests), and therefore it would have been difficult—if possible at all—to develop an independent taxonomy where the studies could confidently be assigned to different levels.

Languages tested

Determining the source of transfer in L3/L*n* acquisition is not always straightforward. In a property-by-property sense, it is not possible to test all language combinations for the purpose of this question. That is, the tripartite language pairing in juxtaposition to the grammatical property being tested, and in consideration of the research question being asked, matters a great deal. In order for the combination to be an appropriate one—in the sense of being able to address *a priori* the question of transfer source—one must first ensure that the L1 and L2 themselves, in the mind of each participant, have different values for the property tested.

Once it is established that the grammars themselves, in principle, have two different values for the target property, we indeed have a suitable combination to begin; all things being equal, relative influence from one grammar or the other can be teased apart empirically. However, the mere fact that the languages in an L1/L2 combination have, in principle—that is, at least for native monolinguals of the two languages—distinct representations for a given property does not mean that an individual L2 learner herself has (already) acquired two distinct representations. Decades of work in second language acquisition documenting differences in ultimate attainment and lingering effects of L1 transfer, even at so-called near native levels of L2 acquisition, show that such an assumption would be inappropriate (e.g., Abrahamsson & Hyltenstam, 2009; Bylund, Abrahamsson, & Hyltenstam, 2012; Clahsen & Felser, 2006; DeKeyser, 2000; Granena & Long, 2013; Hawkins & Casillas, 2008; Hawkins & Chan, 1997; Johnson & Newport, 1989; Long, 2005; Sorace, 2011; Tsimpli & Dimitrakopoulou, 2007).

Overcoming the potential confounds of not choosing appropriate language combinations, and/or appropriate subjects in terms of L2 attainment for the domain of grammar, is relatively simple. In the first place, one simply must choose a property that has distinct representations in the grammars that constitute the contributing L1 and L2s in the triad. If testing a specific grammatical property is, for independent reasons, more important to the researcher than the combination of languages itself, then selecting the right combination

of languages becomes crucial. Secondly, testing each participant's competence for the specific grammar domain of interest in all three languages, in order to know the actual state of linguistic representations available for L3 transfer, is also crucial. In an attempt to quantify the potential impact of not knowing for sure what is available for transfer in the L2, we classified studies into two types: those where participants were tested in the L3 alone (*L3 only*) and those in which minimally the L2 was also tested, if not both the L1 and L2 were also tested for the same linguistic property (*L3 + L2 or L1/L2*).

Methodology

Research in related areas of language development, such as L2 acquisition and heritage language bilingualism, has frequently discussed mismatches in the outcomes of studies as a function of the type of methodology used, particularly along two axes: online (i.e., real-time) vs. offline measures, and comprehension vs. production tasks (e.g., Bialystok, 1979, 1982; Bowles, 2011; Dussias, 2003, 2004; Ellis, 2005; Godfroid et al., 2015; Jegerski, Keating, & VanPatten, 2016; Villegas, 2014; among many others). Given this record in parallel subfields, it is reasonable to consider that the type of task employed might also be an important factor in L3/L*n* acquisition research, and that we might find some patterns of correlation between studies' methodologies and the general direction of their results. Owing to the dearth of relevant studies that have employed truly online measures (e.g., eye-tracking, event-related potentials) in adult L3 acquisition, there is not enough data to explore potential effects within the online-offline methodological continuum. There is, however, considerable variability as to whether studies analyze production or comprehension data. Therefore, we coded the *Methodology* factor in two levels: *Production* vs. *Comprehension*.

Use of mirror-image groups

One of the many ways to classify the current models of morphosyntactic transfer in L3/L*n* acquisition is by whether or not they contend that the order of acquisition crucially determines

the default, or at least predominant, source of transfer. While the L2SF and L1 default proposals assign a prominent role to the L2(s) and the L1(s), respectively, historically established models such as the CEM and the TPM as well as the two newest models, the Linguistic Proximity Model (LPM; Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017) and the Scalpel Model (Slabakova, 2017) predict the source of transfer on the basis of factors that hold irrespective of whether the selected language is the learner's L1 or her L2. This can lead to overlapping predictions by various theories depending on several factors, for example, the specific property being tested, as described in detail above using the Rothman and Cabrelli Amaro (2010) study as an example where L2 status and typological proximity were confounded.

Since the most powerful dataset is one that is able to consider as many theories as possible within the same experimental design, some authors (e.g., Falk & Bardel, 2010; Rothman, 2010; Rothman & Cabrelli Amaro, 2010) have encouraged the use of a specific method that helps researchers to tease apart predictions. Although getting such groups is not always possible, this involves the use of 'mirror-image' participant groups, for whom the L3 is shared and the L1 and L2 are the same languages but in reversed order of acquisition. For example, in a study examining the acquisition of Catalan as the L3 of Spanish-English learners, the mirror-image groups would be L1 English, L2 Spanish, L3 Catalan, and L1 Spanish, L2 English, L3 Catalan. With this type of design, models such as the L2SF predict, at least in principle, a difference between the groups, since transfer will obtain from different languages. The CEM, for example, would expect both groups to behave similarly, because they predict the source of transfer to be determined by factors that are independent of chronological order of acquisition. This methodological factor had a straightforward binary coding: *Use* or *No use of mirror-image* groups.

Language combination

As we discussed in previous sections, linguistic typology in a "genetic" sense has featured prominently in models of L3/L& morphosyntactic transfer, although it has invariably been alluded to as a (learner-external) proxy for the actual variables considered by these theories, which are cognitive in nature and thus internal to the learner. In other words, the fact that two languages are genetically related—or have a long history of more direct(ly relevant) contact—guarantees some degree of crossover in at least lexis and perhaps, especially in the case of languages belonging to the same family, phonology, syntax, morphology, information structure and beyond. To be clear, we used language family in the subset sense (Germanic, Romance, Slavonic) as opposed to the superset sense (e.g. Indo-European). If, as models such as the TPM or the LPM propose, structural similarity between the L3 and previously acquired languages is an extremely important, if not the most deterministic variable in the selection of a transfer source, genetic relatedness might be a broad-brushstroke pointer to the likely predominant linguistic influence. There is, of course, no actual guarantee that this will be the case, since typology (in both its diachronic and synchronic senses) is merely a learner-external factor that tends to correlate more or less strongly with variables the linguistic parser is indeed able to evaluate. Nevertheless, and in order to vet our theories beyond their most immediate scenarios (i.e., those in which they originated), research on language combinations where genealogical relatedness is present as well as those where it is absent is equally advisable. For this variable, we coded studies depending on whether a genetic relation existed between the L3 and the L1 or the L2 (e.g., our previous case of L1 Spanish, L2 English, L3 Catalan, where the L1 and the L3 are closely related). Studies where neither the L1 nor the L2 were straightforwardly related to the L3 (an extreme case would be, for example, L1 Basque, L2 Spanish, L3 Swahili) were coded as *Not related*. Note that, as explained in our description of the macro-variables above, this methodological factor is *not* operationalized or calculated in the same way as the *Typological transfer* macro-variable.

3.5. Results

3.5.1. Reporting and analysis

In order to better navigate the results of this systematic review, we present them broken down by the macro-variables explained in section 4. Also, note that this section presents the results without evaluative assessment or other type of interpretation—discussion and unpacking of what the results reveal follow in section 6. As we discuss each macro-variable in turn, we provide an overview of how the methodological factors presented in section 4 distribute across the subset of the total studies whose outcome can be ascribed to the macro-variable in focus. Note that the tables summarizing by-methodological factor distributions in 5.2. through 5.6 necessarily reflect only the subset of studies pertinent to each macro-variable, and so percentages should be read with both these subset totals and the grand superset total of 71 studies in mind. This means that the methodological factors should be interpreted *within* as well as *across* the macro-variable distribution. For example, if it happens to be the case that a majority of the studies pointing to the L2 transfer macro-variable are, say, production studies, this does not necessarily mean that production methodologies reliably predict L2 transfer. What it means is that, for these studies available in the literature, such an association exists, implications of which are left open for discussion. In order to see if production itself truly correlates with the outcome of L2 transfer, one would need to consider the distribution of the *Methodology* factor across the superset: it might be that a majority of all available studies employing production methodologies support other macro-variables as well, or better.

In consideration of a battery of Fisher's exact tests—recall that each methodological factor is coded in a binary fashion—we report, for each subsection, whether any significant associations are observed between methodological factors and the specific outcome captured by the macro-variable. The choice of this statistical test over the more common Pearson chi-square was motivated by the fact that some of the cells did not meet the minimum raw count

requirements of a chi-square test. Since we are limited by availability from the literature itself, Fisher's exact test is the more appropriate method to explore the associations in 2x2 contingency tables when some of the cells have lower numbers (e.g., Wong, 2011).

3.5.2. L1 Transfer

Out of the 71 studies considered, 10 studies, 14.1% of the total, show transfer coming exclusively from the L1. Table 3 includes raw counts and percentages relative to the same distributions of each methodological variable over the whole sample of 71 studies.

Table 3.3. Distribution of studies by methodological factor within the L1 Transfer subset (n=10), and p values for Fisher exact tests on the associations between distribution and outcome. Bolded values indicate a significant result (p<.05).

Variable	Level	n in L1T (%)	n in Other (%)	Sig. (*p*)
Proficiency	Beginner (n=30)	3 (10%)	27 (90%)	.51
	Post-beginner (n=41)	7 (17.1%)	34 (82.9%)	
Languages tested	L3 only (n=55)	9 (16.4%)	46 (83.6%)	.43
	L3 (+L2/L1) (n=16)	1 (6.2%)	15 (93.8%)	
Methodology	Comprehension (n=45)	9 (20%)	36 (80%)	.08
	Production (n=26)	1 (3.8%)	25 (96.2%)	
Mirror-Image	No Use (n=47)	10 (21.3%)	37 (78.7%)	**.01**
	Use (n=24)	0 (0%)	24 (100%)	
Combination	Related (n=34)	3 (8.8%)	31 (91.2%)	.19
	Not related (n=37)	7 (18.9%)	30 (81.1%)	

As this is the first such chart, it is worth breaking down how to read it and thus the ones in the next sections. *Proficiency*, binarily coded as *Beginner* or *Post-beginner*, has a distribution of 3 (studies) and 7 (studies), respectively, over the relevant 10 studies for this variable (first two cells in the column "n(umber) in L1T"). For the same methodological factor, the following column ("n in Other") reports the number of studies where *Beginners* or *Post-beginners* are used, respectively, within the remaining 61 studies (out of the 71 superset): 27 beginners and 34 post-beginners. The numbers in these two columns, the quadrant highlighted in grey, will always add up to 71, the total number of studies in the analysis. In both columns, percentages are relative to the total number of studies from the 71 broken down in the "Level" column,

so whatever percentage of the 30 Beginner studies (3 out of 30) or the Post-beginner studies (7 out of 41) these 10 relate to across the whole. Incidentally, the two numbers in the "Level" column will also always equal the total number of studies, or 71. And so, 10% relates to 3 studies showing L1 transfer exclusively out of 30 studies that use beginners, and 17.1% to 7 studies showing L1 transfer out of the 41 where post-beginner learners were examined.

Fisher's exact tests conducted to detect potential associations between the distribution of each factor and the *L1 Transfer* outcome revealed only one significant case: reporting L1 transfer effects is significantly associated to only one methodological factor, the absence of mirror-image groups (10 vs. 0) in these studies' experimental designs (p=.01).

3.5.3. L2 Transfer

Of the total 71 studies, 20 (28.2%) suggest that transfer comes exclusively from the L2. Table 4 below shows how the methodological factors we coded for distribute across this subset of 20 studies.

Table 3.4. Distribution of studies by methodological factor within the L2 Transfer subset (n=20), and p values for Fisher exact tests on the associations between distribution and outcome. Bolded values indicate a significant result (p<.05).

Variable	Level	n in L2 (%)	n in Other (%)	Sig. (*p*)
Proficiency	Beginner (n=30)	8 (26.7%)	22 (73.3%)	.51
	Post-beginner (n=41)	12 (29.3%)	29 (70.7%)	
Languages tested	L3 only (n=55)	17 (30.9%)	38 (69.1%)	.52
	L3 (+L2/L1) (n=16)	3 (18.8%)	13 (81.3%)	
Methodology	Comprehension (n=45)	8 (17.8%)	37 (82.2%)	**.02**
	Production (n=26)	12 (46.2%)	14 (53.8%)	
Mirror-Image	No Use (n=47)	19 (40.4%)	28 (59.6%)	**.01**
	Use (n=24)	1 (4.2%)	23 (95.8%)	
Combination	Related (n=34)	10 (29.4%)	24 (70.6%)	.51
	Not related (n=37)	10 (27%)	27 (73%)	

As is shown in Table 4 above, two methodological factors are significantly associated with an L2 Transfer outcome. The first is *Methodology* (12 vs. 8 studies, p=.02) in the favor of production methodologies. In other words, having chosen a production experiment seems to correlate with observing L2 Transfer effects. The second association, as in the *L1 Transfer*

macro-variable above, is the correlation to *L2 Transfer* when a mirror-image design was not employed (19 vs. 1; $p<.01$).

3.5.4. Typological Transfer

Out of the 71 studies, the results of 43 of them (60.1%) can be ascribed to transfer that is typologically determined (see section 4.2.1 and footnote 2). Table 5 below shows the distribution of the methodological factors across these 43 studies, and the respective statistical results of Fisher's exact tests.

Table 3.5. Distribution of studies by methodological factor within the Typological Transfer subset (n=43), and p values for Fisher exact tests on the associations between distribution and outcome. Bolded values indicate a significant result (p<.05).

Variable	Level	n in TT (%)	n in Other (%)	Sig. (*p*)
Proficiency	Beginner (n=30)	17 (56.7%)	13 (43.3%)	.62
	Post-beginner (n=41)	26 (63.4%)	15 (36.6%)	
Languages tested	L3 only (n=55)	28 (50.9%)	27 (49.1%)	**.01**
	L3 (+L2/L1) (n=16)	15 (93.8%)	1 (6.2%)	
Methodology	Comprehension (n=45)	28 (62.2%)	17 (37.8%)	.80
	Production (n=26)	15 (57.7%)	11 (42.3%)	
Mirror-Image	No Use (n=47)	22 (46.8.3%)	25 (53.2%)	**.01**
	Use (n=24)	21 (87.5%)	3 (12.5%)	
Combination	Related (n=34)	27 (79.4%)	7 (20.6%)	**.01**
	Not related (n=37)	16 (43.2%)	21 (56.8%)	

The distributions of three of the methodological factors coded for are significantly associated to a *Typological Transfer* outcome. The first is related to the *Combination* of languages. 27 of these 43 studies were conducted with combinations where at least one of the previous languages was genetically related to the L3, versus 16 studies where all languages were genetically unrelated ($p<.01$). The second association is with use of a *Mirror-image* methodology. Contrary to the L1 and L2 Transfer macro-variables where *Mirror image* also turned out to correlate, the significant association here is found in the opposite direction; using a mirror imagine methodology was done by more studies in the relevant subset (22 vs. 21, $p=.01$). Finally, a significant association is found between Typological Transfer and the *Languages tested* factor

(p=.01), which, as you will recall, relates to whether a study tested only the L3 or if it indeed also tested knowledge of the target domain in at least the L2 (if not the L2 and L1).

3.5.5. Hybrid transfer

So far, we have examined macro-variables relating to transfer from one linguistic system, be it the L1 or the L2—for reasons of order of acquisition or structural similarity. The macro-variable we have labeled *Hybrid transfer* considers those cases in which a study reported evidence of transfer from both the L1 and the L2 within the same subjects. 17 of the 71 studies (23.9%) found some evidence of transfer from both languages.

Table 3.6. Distribution of studies by methodological factor within the Hybrid Transfer subset (n=17), and p values for Fisher exact tests on the associations between distribution and outcome. Bolded values indicate a significant result (p<.05).

Variable	Level	n in HT (%)	n in Other (%)	Sig. (p)
Proficiency	Beginner (N=30)	7 (23.3%)	23 (75.6%)	.57
	Post-beginner (N=41)	10 (24.4%)	31 (75.6%)	
Languages tested	L3 only (N=55)	16 (29.1%)	39 (70.9%)	.07
	L3 (+L2/L1) (N=16)	1 (6.2%)	15 (93.8%)	
Methodology	Comprehension (N=45)	7 (15.6%)	38 (84.4%)	**.04**
	Production (N=26)	10 (38.5%)	16 (61.5%)	
Mirror-Image	No Use (N=47)	15 (31.9%)	32 (68.1%)	**.03**
	Use (N=24)	2 (8.3%)	22 (91.7%)	
Combination	Related (N=34)	4 (11.8%)	30 (88.2%)	.06
	Not related (N=37)	13 (35.1%)	24 (64.9%)	

The statistical tests reveal that two methodological factors (*Methodology* and *Mirror-image*) are significantly associated with an outcome of *Hybrid transfer*. Considering whether a particular study showing hybrid transfer (n=17) employed a production versus a comprehension type of method seems to matter whereby L3 production correlates to transfer hybridity (10 vs. 7, p = .04). Moreover, of the relevant subset, studies not using a mirror-image methodology are associated with studies that reveal *Hybrid transfer* (15 vs. 2, p. = .03).

3.5.6. Non-facilitative transfer

Recall that this last macro-variable refers to the apparent transfer of a linguistic property into the L3 from a previously acquired language that does not facilitate grammar building towards the target.

Table 3.7. Distribution of studies by methodological factor within the Non-facilitative Transfer subset (n=62), and p values for Fisher exact tests on the associations between distribution and outcome. Bolded values indicate a significant result (p<.05).

Variable	Level	n in NT (%)	n in Other (%)	Sig. (*p*)
Proficiency	Beginner (n=30)	29 (96.7%)	1 (3.3%)	.17
	Post-beginner (n=37)	33 (89.2%)	4 (10.8%)	
Languages tested	L3 only (n=51)	47 (92.1%)	4 (7.9%)	.81
	L3 (+L2/L1) (n=16)	15 (93.8%)	1 (6.2%)	
Methodology	Comprehension (n=42)	39 (92.8%)	3 (7.1%)	.21
	Production (n=25)	23 (92%)	2 (9%)	
Mirror-Image	No Use (n=43)	41 (95.3%)	2 (4.7%)	.21
	Use (n=24)	21 (87.5%)	3 (12.5%)	
Combination	Related (n=33)	30 (90.9%)	3 (9.1%)	1
	Not related (n=34)	32 (94.1%)	2 (5.9%)	

As can be seen in Table 7, the general picture clearly suggests it is possible and indeed quite likely to experience non-facilitative transfer in L3/L*n* acquisition: in fact, 62 out of the 67 studies (92.5%) show evidence of non-facilitative transfer, as opposed to the 5 studies (7.5%) where all prior language influence seems to be facilitative. It is worth mentioning that, within the 71 studies included in the review, 4 of them were coded as not applicable for this variable because these could probe for the possibility of non-facilitative transfer from both languages—i.e., the linguistic property or properties they test could only provide facilitative transfer or simply not obtain at all—and so it is impossible to determine if non-facilitative transfer could obtain for the same learners and the same languages testing different properties. The statistics reported above show that no significant associations were found; that is, irrespective of all potential methodological choices non-facilitative transfer is found equally robustly.

3.6. General discussion

Several trends can be observed in the results, which we endeavor to unpack now. Recall that we did not take at face value support or lack thereof for any particular theory claimed by the authors of included studies. Instead, we coded each study for all the same variables and essentially reduced the models themselves to a particular combination of positive and negative values for those variables, namely, *L1 transfer*, *L2 transfer, Typological transfer*, *Hybrid transfer* and *Non-facilitative transfer*. To start, such an approach attempts to avoid overt and implicit biases on several levels, not the least could be our own implicit biases. In doing so, we were able to capture most neutrally what the data support irrespective of what is claimed in any particular study and to entertain all models for each data set, even if the study itself was limited to a subset of theories considered. Furthermore, since the models' predictions are not always entirely incompatible with each other our approach allowed us to capture when a given data set is compatible with more than one theory. Additionally, other factors related to methodological choices were encoded—e.g., *Proficiency* in the L3, whether all three languages were tested, whether the task examined production or comprehension, among others—to test the hypothesis that datasets in seeming disaccord in terms of what they reveal about multilingual transfer might be better explained as a byproduct of high order interactions. Before unpacking things, it is prudent to point out that the overall snapshot reveals significant variation across the studies and across all relevant areas, that is, differences exist related to the backgrounds of the subjects tested, the languages in the trilingual pairings, the domains of grammar tested and several non-trivial distinctions in type, creation and administration of the testing methodology. As we saw in the previous section, the systematic review shows that some of the methodological factors we coded for were, indeed, significantly associated with the outcomes/claims of the studies.

Why should methodology matter? All methods employed contain some level of implicit biases towards particular outcomes—and this is not necessarily a bad thing, just one we need

to be mindful of. The challenge becomes one of choosing the methods that convey the least or are best fit-for-purpose in line with our research goals. The first step in choosing the best cohort of methodological practices is to consider, upon the achieving of a critical mass of studies in a given field, the (inadvertent) effects of them. If inevitable effects are neutral as they pertain to our research questions, we can acknowledge them and put them aside. If they possibly obscure; however, we can and should consider what alternatives are more neutral and less entangling. We turn to this task now.

As pertains to the type of methodology used, significant associations were found between either production or comprehension-based methodologies and two of the macro-variables: *L2 only transfer* (e.g., Bardel & Falk, 2007; Tavakol & Jabbari, 2014) and *Hybrid transfer* (e.g., Angelovska, 2017; Fallah & Akbar Jabbari, 2016). Research in other populations has typically found a divide between production and comprehension data, as reported for child L1 acquisition (e.g., Hendriks, 2014), child L2 acquisition (e.g., Unsworth, 2007) and adult L2 acquisition (e.g., Gershkoff-Stowe & Hahn, 2013). It is, thus, not entirely surprising that in L3 acquisition this divide is also apparent.

In order to understand language, the mind must in some ways reverse-engineer input received juxtaposed against whatever system is able to decode language (-specific) information. This is not to suggest that production does not require the same (in the opposite order of course); we simply wish to point out that it requires much more, and this can add complexity to the task and thus extraneous noise to the proverbial signal we are trying to disentangle. Comprehension principally requires decoding, whereas production has further and more complex requirements (e.g., selecting words from the mental lexicon, assigning syntactic representations, passing from the mental computational representation to the phonological form for articulation, etc.). It might be the case, then, that production itself, especially at lower levels of proficiency, introduces variables that make the L2 more likely to be accessed for production—above and beyond when other co-occurring factors are at play.

As discussed in Falk and Bardel (2011) and Bardel and Falk (2012), the L2 might be more accessible for production because of its non-native status (potentially represented and stored differently). If on the right track, this could account for the association revealed within the subset of studies that show L2 only transfer—12 of 20 or 60%—but it would leave unexplained the overall results when considering the superset of 71 studies from which 26 were production methodologies (12 of 26 or 46.2%). However, one must also concede that insofar as production is more susceptible to influences beyond grammatical representation, studies showing seemingly default L2-based influence in production might capture processing based influence at a more superficial level than being truly reflective of underlying representations in the emerging L3 system—the latter being what all theories claim to be focusing on.

It makes sense that the surface output effects of production would reflect an L2 bias due to metalinguistic and/or recency effects of having learned an L2 in a similar way as an L3 (both different from an L1). Alternatively, a hybrid effect is also likely especially if production taxes the attentional/processing resource allocation. If the goal is specifically to determine the underlying representation used to parse L3 sentences, we might conclude that comprehension has a privileged status to be used and that it is thus a more appropriate methodology, especially for beginning learners. This is not to suggest that production is unimportant, quite the contrary. We simply intend to suggest it would be more useful for other questions within L3 development and ultimate attainment, for example.

The (lack of) use of mirror-image groups showed significant associations with three of the macro-variables: *L1 transfer*, *L2 transfer* and *Typological transfer*. For the two macro-variables targeting order of acquisition as a determining factor (L1 vs. L2), their associations with the (lack of) use of this design showed that most of these studies do not employ the mirror-image design (e.g., Foote, 2009; Hermas, 2010; Na Ranong & Leung, 2009). The association with the *Typological transfer* macro-variable shows that studies with evidence for this type of transfer tend

to use the design (Giancaspro, Halloran, & Iverson, 2015; Rothman, 2010). The fact that the mirror-image design is not employed in, at least, some of the studies from the former two groups is unfortunate. Recall that this design was explicitly devised and advocated for by authors of opposing theories to tease apart order of acquisition (either L1 or L2) from other potentially explanatory variables for transfer source selection (Falk & Bardel, 2010; García-Mayo & Rothman, 2012; Rothman & Cabrelli Amaro, 2010b). Thus, if one study shows L1 transfer or L2 transfer but has not used a mirror-image design, we cannot rule out the possibility that the source of transfer was based on other factors rather than order of acquisition. We understand it is not always practical to find mirror-image groups. We also realize that if this were a requirement, it would severely reduce the language pairing we would be able to study for obvious practical reasons. Nevertheless, showing L1 or L2 transfer alone and using such to support a L1 or L2 privileged/default model of transfer is vacuous if one cannot rule out other possibilities the mirror-image design affords. In such cases, data are merely compatible with a given theory, not necessarily supportive of it. A reasonable alternative could be to compare L2 and L3 acquisition of the same target language when the L1 is held constant, but this too is not without potential confounds (see Cabrelli Amaro & Rothman, 2010).

With respect to the studies showing *L1 transfer* that are also compatible with other macro-variables, 4 out of 10 studies can just as well explained by *Typological transfer*. Perhaps the 8.5% of remaining studies (6/71) showing *L1 transfer* not otherwise accounted for is low enough to be taken as relative noise in an otherwise clearer signal. However, we cannot escape the fact that other variables might actually account for even this relatively low number overall. Almost none of these studies control for what the systematic review has revealed as important factors, such as using a *Mirror-image* approach and testing the status of the domain of grammar in the L2 to know for sure that a distinct L2 representation was actually available for transfer. Of the 20 studies showing *L2 transfer*, 16 also had a positive value for *Typological transfer*. Thus,

the percentage of studies with unambiguous evidence for *L2 transfer* is reduced to 5.6% of the total (4 of 71 studies).

These results have two clear implications for the study of adult successive multilingualism. The first one is that order of acquisition, as postulated by original formulations of the L2 Status Factor or the group of studies advocating default L1 transfer, can hardly be considered the main factor in the selection of the source of transfer in (the initial stages of) L3/L*n* acquisition. With ever larger bodies of evidence suggesting that transfer can come from an L1 or an L2 depending on other variables, L3/L*n* transfer models incorporating order of acquisition defaults at the top of their hierarchy of factors will inevitably suffer to accommodate all presently available data. The second implication is that using the bi-directional mirror-image design is crucial to reveal the dynamic nature of multilingual transfer.

If a model wants to argue that strict order of acquisition (L1 or L2 as a default) is the most deterministic variable for transfer selection, then, not only does it need to provide a good explanation of what happens when this is not the case, but it also needs to be able to have accurate predictions for when order of acquisition will not be deterministic in transfer selection. The latest papers associated with the L2 Status Factor take this most seriously (Bardel & Sánchez, 2017; Falk et al., 2015). They attempt to explain when and why L1 transfer might occur, arguing that high degrees of L1 metalinguistic knowledge trigger transfer from the L1 and/or individual differences such as working memory capacity conspire to explain unexpected outcomes. However, these are fairly new claims. Promising as they are and despite the fact that they make clear testable predictions, the methodological designs used up to now in the vast majority of studies—virtually all of the 71 reviewed here, including the ones conducted by these authors in previous years—do not allow for testing such claims.

The case for specifically testing knowledge of the grammatical domain under investigation in all three languages of each participant was made above and was pointed out in the analysis to be a key factor correlating to outcomes. Recall that to determine what the

source of transfer is, we need to be confident that an individual has two distinct representations available for transfer (one clearly aligning with the L1 and the other different from the L1, if not exactly like the target L2). Given what we know about L2 acquisition from decades of research (see for reviews, Ortega, 2011; Slabakova, 2016; VanPatten & Williams, 2015), we simply cannot take for granted that all L3 learners have acquired all domains of the L2 and thus actually have multiple sources from which transfer selection can obtain. Yet, when we examine the associations between this methodological factor and the research outcomes, the only one that comes out as significant is its association with the macro-variable of *Typological transfer*. This reveals that a good portion of the studies showing *Typological transfer* have tested the L1 and L2 as well as the L3 of the same speakers with respect to the specific linguistic domain under investigation (e.g., Na Ranong & Leung, 2009; Santos, 2013). Equally, given the nature of the association itself, it reveals that when one knows for sure—because this is objectively tested—that there are two representations available from which transfer can obtain, the outcome almost always aligns with typological proximity (15 out of 16 relevant studies or 93.8%). It is true that most of these experiments, 13 of the 16 in fact, stem from papers from Rothman's lab or former members of it, which might lead some to attribute this association more to preferences of a research group than anything else. However, any bias one might be inclined to attribute should not lead one astray from what is revealed and/or reduce the logical prudence of what is being advocated. The fact remains that these happen to be the only papers that control for L1 and L2 knowledge of the domain under investigation and the data clearly reveal that when this is done the trend is unmistakable. Who would argue, alternatively, that it is not good practice or that there is an implicit bias/confound to ensuring L3 learners have access to distinct L1 and L2 representations before investing in attempts to tease apart the source (L1 or L2) of L3 transfer. We submit that doing so should be a pre-requisite moving forward. Doing so a priori might reduce some of the variation in data we have, eliminating potential false positive of seemingly L1 based transfer.

As should not be overly surprising, *Language Combination* is significantly associated with *Typological Transfer* and, in fact, is the only one to show this. The results of the statistical test suggest that the degree of relatedness between the L1 or L2 and the L3 is a strong predictor for transfer selection. Note that out of the 34 studies that use a linguistic triad with high degree of relatedness, 27 of these studies find evidence for transfer from the language that is genetically closer to the L3. However, this is not to say that the only studies showing structurally-based typological transfer are those that test languages that are overtly, genetically related. In fact, 16 studies that use languages which are not genetically related provide data captured by comparative typological proximity when applying the TPM's implicational hierarchy (see Rothman, 2015). These results make it fair to establish and assume that the degree of similarity between languages, be it obvious or not, is crucial for transfer selection in L3/L*n* acquisition. Thus, it is important for any theory attempting to model the initial stages of L3/L*n* acquisition, and indeed trace its developmental trajectories, to factor in similarity between languages as a strong variable.

The fact that the non-facilitative claim of the CEM is refuted by over 92.5% of available datasets is quite convincing. One might ponder then, if it is time to discard this theory from further consideration moving forward. After all, the systematic review has made it clear that any adequate theory of morphosyntactic transfer in L3/L*n* acquisition must minimally be able to accommodate instances of non-facilitative transfer from previously acquired languages. This renders a strong version of the CEM overwhelmingly unsupported. Models which follow similar principles to the CEM yet allow for the possibility of non-facilitative transfer, such as the Scalpel Model (Slabakova, 2017) and the LPM (Westergaard et al., 2017), are in many ways better suited to pursue the general idea that transfer is not wholesale in the beginning, but rather obtains on a property-by-property basis and indeed could reflect transfer/influence from both languages at the same time.

3.7. Conclusion

Of course, no single variable, not even the one our analysis reveals as being overall the most explanatory—typological proximity—accounts for all the data. Recall that the macro-variables, which relate most closely to claims of the existing models revealed that L1 transfer is compatible with 14.1% of the results, L2 transfer is compatible with 28.2%, Typological transfer with 60.5%, and the CEM is compatible with only 5.9% of the results. And thus, it is fair to conclude that no current theory is proven correct by the analysis herein, even if some are more questioned and/or on a better track than others. This should come as no surprise. Indeed, it would be highly unlikely that any of the models, at least in their present form, would be correct in absolute terms; the field is likely too young for this to have obtained. This is also good news. It means that there is significant room for refinement to present models and space for new ones that build on the insights of its predecessors and the coverage (or lack thereof) they have of the data. The systematic review reveals that transfer/influence at multiple stages in L3 development seems to be more dynamic than any one or any interactional combination of several variables—at least the ones considered so far—could capture. In this sense, the Scalpel Model and the LPM, especially since both take typological proximity to be an important variable, are welcome, very recent additions to this nascent field. However, it is not clear (yet) how either of these approaches predict a priori *when* non-facilitative transfer will obtain (other than assuming that it *can* obtain), nor do they seem to have defined in precise terms the mechanisms that give rise to this. They are especially promising additions because they embody both initial stages and developmental theories in one, therefore, we look forward to newer instantiations that further develop the predictive value and ecological validity of these approaches.

As is true of any review and/or synthesis of behavioral research, the findings emerging from the very exercise of doing a systematic review are relevant well beyond the field of inquiry itself. In fact, the present review can be used as a proxy to remind us of what we all know, yet

due to multifarious reasons cannot always control for in all studies: (a) methodology matters a great deal, and (b) we need to triangulate various types of methodologies as well as variables considered in our analyses to tease apart co-varying factors affecting our conclusions. It takes a cohort of studies to reveal methodological implicational patterns and to use these patterns to hammer home important points. We hope to have shown just how this can effectively be done, for the benefit of scholars interested in questions of transfer in additive multilingual acquisition. We can conclude with the following recommendations to increase the comparative value of studies in this emerging field: (a) L3 studies should employ, where possible, a mirror image design (b) test the specific knowledge of the L3 domain of inquiry in the previously acquired languages, (c) use comprehension or production plus comprehension methods, especially for beginning L3 learners. To the extent that we all gravitate towards common practices and general design in L3 studies, the more meaningful comparisons will be, and the clearer generalizations can be from the superset of L3 data.

Chapter 4: A note on the role of Exposure (Study 3)

Low Proficiency Does Not Mean *Ab Initio*: A Methodological Footnote for Linguistic Transfer Studies[1]

Abstract:

The goal of this brief article is to highlight a specific methodological consideration pertaining to the examination of linguistic transfer in sequential language acquisition: when and how can transfer be meaningfully disentangled from target language acquisition? While this methodological issue is relevant for all transfer studies irrespective of learner type or linguistic domain of inquiry, we will focus on a set of third language acquisition data. We examine the domain of Negative Quantifiers '*nobody/nothing*' and Negative Polarity Items '*anybody/anything*' by Catalan-Spanish early bilinguals learning English as the L3 in adulthood. We offer two group analyses. The first is the superset of low beginner proficiency speakers (all participants taking part in a specially designed English course) and then a subset group (only those who were true *ab initio* L3 learners*;* that is, with no previous study of English). The analyses combine to show that exposure matters beyond proficiency; that is, even when proficiency is held constant at very low levels, low proficiency L3 learners who have had some instruction/exposure to an L3 pattern differently from truly *ab initio* L3-learners. We discuss how this reality complicates isolating L3-transfer proper from effects of L3-development/acquisition and thus, by extension, to all cases of transfer such as adult and child L2.

Key words: L3/Ln acquisition, Morphosyntactic transfer, Exposure, Proficiency

[1] Puig-Mayenco, E., & Rothman, J. (Submitted). Low Proficiency Does Not Mean *Ab Initio*: A Methodological Footnote for Linguistic Transfer Studies.

4.1. Introduction

One of the most enduring questions in non-native language acquisition concerns the role that previous language experience plays in subsequent language acquisition. The majority of the relevant work has studied this by examining L1 transfer/cross-linguistic influence in sequential second language (L2) acquisition in adulthood. Although the construct of transfer proliferates in virtually all theoretical paradigms, studying it has taken center stage in formal (generative) linguistic approaches to L2 acquisition since its inception in the early 1980s (e.g.,White, 1989, 2003 for review). Although the terms cross-linguistic influence (CLI) and transfer are often used interchangeably, many scholars—across theoretical paradigms—find it useful, if not more accurate to maintain a difference between them (see González Alonso & Rothman, 2017; Herdina & Jessner, 2002; Paradis, 2004; Schwartz & Sprouse, 1996). Under such accounts, transfer sits at the level of mental representation, a copy from a previous language into the developing interlanguage grammar itself. Alternatively, CLIs are, as the name suggests, (in-the-moment) influences from other linguistic systems that bleed into performances of the non-native language for processing limitation or other specific reasons.

The above distinction is not merely a terminological one. Being at the level of mental representation, transfer relates directly to the learning task and developmental sequencing in non-native acquisition. That is, if a representation has been transferred from a previous linguistic system then this representation constitutes the point of departure for L*n* acquisition. If the previous language has the same underlying representation, then transfer is facilitative, speeding up the overall acquisition of a given domain relative to child L1. If it is distinct, transfer is non-facilitative and can complicate, severely delay or render impossible the eventual acquisition (reconfiguration of the copied interlanguage representation in favor of the feature specification of the target) of the target grammar property. Whether facilitative or non-facilitative, transfer makes the point of departure specified, distinct from the state of underspecification that child L1 speakers enjoy. This is predicted to play out in predictable

developmental sequence and potentially ultimate attainment differences from child L1, even if the adult sequential bilingual has access to the same underlying linguistic and cognitive mechanisms. Precisely because transfer sits at the level of grammatical representation revealing and understanding how transfer plays out as well as its nature and timing are crucial for modeling the very learning task non-native speakers will undergo. Is it complete or partial? Is it wholesale (complete) at the very initial state/initial stages or can it obtain domain-by-domain throughout interlanguage development?

An indivisible question of importance concerns the timing of and/or conditions under which transfer is best captured, that is, distinct from potential effects of target development/acquisition itself. After all, transfer is the initial interlanguage representation. Given exposure to the target language, development/acquisition takes place. And so, how can we be sure that what any given data reveal, seemingly showing evidence for or against specific theories of transfer, is in fact transfer proper and not already showing signs of a developing representation in the interlanguage? Conventional wisdom suggests that examining learners as close to the initial state of non-native acquisition as possible should help to reduce the noise in the signal of what we seek to capture. This truism has been robustly represented in the initial state hypotheses of L2 acquisition over time such as Full Transfer/Full Access (Schwartz & Sprouse, 1996); Minimal Trees Hypothesis (Vainikka & Young-Scholten, 1996); and the Valueless Features (Eubank, 1994). Although many studies have used later stages learners to comment on these initial state models, the best evidence come from studies that have groups with very limited exposure to the L2. This does not mean that transfer effects cannot linger into later stages of interlanguage development—in fact it can be predictively so if L1 transfer significantly complicates the L2 learning task—but failure to show evidence of transfer at a later stage in no way precludes it from having happened and already being overcome. The previous statement should be relatively uncontroversial in conceptual terms. To date, however, specific data underscoring this warning is not readily available. This brief

article provides data that speak very directly to this possibility. In light of them and because these data come from L3 acquisition, with the caveat that what we suggest has more universal application to non-native language studies more generally, we will discuss the implications they have specifically for the emerging field of formal linguistic approaches to L3 acquisition, its theories and especially methodological practice.

4.2. Adult Third Language (L3) Acquisition and Linguistic Transfer

Over the past decade or so, there has been a sharp increase of research in adult third language (L3) acquisition from a multitude of perspectives. Questions related to L3 acquisition abound and can differ considerably across paradigms. Determining the relative role that previous linguistic experience plays in the unfolding of sequential multilingual acquisition, however, is a common theme across all approaches (e.g., Angelovska & Hahn, 2017; Cenoz, Hufeisen, & Jessner, 2001; De Angelis, 2007; De Angelis & Dewaele, 2011; Rothman, Cabrelli Amaro, & de Bot, 2013; Rothman & Halloran, 2013). Within the nascent field of formal linguistic approaches to L3 acquisition, modeling the source (L1, L2 or both) of transferred representations into the L3 initial interlanguage grammar(s) dominates. González Alonso & Rothman (2017) discuss the manifold importance of such a question. They maintain, for reasons discussed in the introduction section, that: (a) knowing what the initial stages grammars look like—initial L3 interlanguage—is crucial for making informed/principled predictions for L3 developmental sequencing and (b) transfer of mental representations—not mere influence from previous linguistic experience *per se*—is best studied at the L3 initial stages of true beginners when transfer can be meaningfully teased apart from L3 learning/acquisition itself.

Existing models related to L3 morphosyntactic transfer have taken two main positions with respect to the above: multilingual transfer (a) defaults to the L1 or L2 or (b) does not default to either the L1 or L2, the selection depends on various factors hypothesized to

motivate and/or delimit it. A-type models reflect the logical default possibilities—either the L1 (Hermas, 2010, 2015) or the L2 (the L2 Status Factor: Bardel & Falk, 2007, 2012; Falk, Lindqvist, & Bardel, 2015)—has a privileged default status.

B-type models are necessarily more diverse; they must define how transfer unfolds (e.g., in whole or in parts) over time and what motivates transfer selectivity between the two available systems. B-type models can be divided into two main approaches, those that argue for holistic (full-system) transfer at the initial stages and those that argue for transfer obtaining property-by-property throughout development. The Typological Primacy Model (TPM: Rothman, 2010, 2011, 2015) stands out as the only B-type full transfer approach. The TPM maintains that the parser evaluates structural proximity between the target L3 input the learner receives at the initial stages against the L1 and L2. At the earliest possible moment,[2] the parser determines which whole system to transfer upon having had enough linguistic cue validity to make an informed selection (González Alonso & Rothman, 2017; Rothman, 2015).

The other B-type models argue that transfer happens selectively throughout L3 development and is thus piecemeal; that is, it unfolds property-by-property over time conditioned by key factors that themselves differentiate these approaches. The Cumulative Enhancement Model (CEM: Berkes & Flynn, 2012; Flynn, Foley, & Vinnitskaya, 2004) argues that maximal facilitation motivates whether the L1 or L2 transfers; transfer obtains if and only if one provides a bootstrap for a given property in the L3. The Linguistic Proximity Model (LPM: Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017), alternatively, rejects the maximal facilitation notion but maintains that transfer happens domain-by-domain over the course of development and is motivated by the comparative linguistic proximity of the L3 to

[2] Here, "earliest possible moment" refers to the point at which the parser has enough information from the L3 input stream to determine—via an implicit comparison to the L1 and L2—which of the two complete systems is likely to be the best source of transfer. The "earliest possible moment" will vary along a continuum depending on the language triad in question, that is, based on the extent to which the L3 shares structural linguistic similarities at various levels of linguistic cues with both of the previously acquired languages and the extent to which one is likely to stand out over the other to the parser (see Rothman 2015; González Alonso & Rothman, 2017 for detailed discussion).

the other systems. Moreover, the LPM offers the possibility that both the L1 and L2 could have a simultaneously cumulative effect, giving rise to what looks like amalgamated or hybrid transfer. The Scalpel Model (SM: Slabakova, 2017) aligns with the LPM, however, adds a series of potentially ameliorating factors that might obscure the straightforward alignment of linguistic proximity.

In what remains, we provide some novel evidence to adjudicate between the above models, especially concerning whether transfer is complete (full transfer of an L1 or L2) or more likely reflects property-by-property transfer. No one denies the existence of ambiguous evidence across the literature that complicates answering this important question. However, we provide some data from an on-going project that shed important light on this debate, revealing that transfer can indeed appear piecemeal or to reflect hybridity when certain key variables are not controlled. In doing so, we underscore real value of this brief article, which serves as a methodological discussion for transfer research more generally and thus has further reach than L3 studies alone.

4.3. Study

4.3.1. Participants

We will consider data from both a superset (n=60) and subset (n=40) from that superset of L3 learners of English who are highly proficient Catalan-Spanish bilinguals of two types: L1 Catalan-L2 Spanish (N=35, Mean Age= 54.4) and L1 Spanish-L2 Catalan (N=25, Mean Age= 52.1). All participants came from a two-month language course designed and advertised for *beginners* of L3 English. The idea is that we would capture a large proportion of true *ab initio* L3 English learners, and, by designing our own course, we would be able to know and control the exact amount and type of L3 input they received. In addition to the experiment introduced below, each participant completed the *Oxford Quick Placement Test* (all participants scored within the A1 level of the *Common European Framework of Reference for Languages*) and the

Bilingualism Language Profile (BLP: Birdsong, Gertken, & Amengual, 2012)—a questionnaire used to determine relative dominance and linguistic profile in bilinguals—to which we added several questions to ascertain any previous exposure to the L3, English, instruction or otherwise. Such questions were crucial for us to be able to isolate *a posteriori* the *ab initio* beginners from low proficiency beginners who did have previous exposure.

4.3.2. Linguistic Properties

We tested various types of related constructions. This being a brief article and space thus being at a premium, we draw together results from two specific domains to make our points; the interpretation of Negative Quantifiers (NQs) and Negative Polarity Items (NPIs) in two different contexts: (a) in pre-verbal position with the presence of the sentential negative marker and (b) in (non-veridical) conditional contexts. The sentences examined here contained either Negative Quantifiers 'nobody/nothing' or Negative Polarity Items 'anyone/ anything' in subject position of a transitive verb in context (a) as in (1)-(2) and in object position of transitive verbs for context (b) as in (3)-(4):

(1) #Nobody does not drink coffee. (Acceptable only with Double Negation reading)
(2) *Anybody does not drink coffee.
(3) Laura will call us if Peter says nothing.
(4) Laura will call us if Peter says anything
.

The choice of these constructions and these lexical items is interesting for two main reasons: (1) *nobody/nothing* and *anyone/anything* are interpreted differently in these contexts in English; and (2) Spanish and Catalan only have one lexical item to express both meanings, but crucially Catalan and Spanish give rise to different interpretations.

With respect to the English interpretations, sentence (1) can only give rise to a Double Negation Interpretation—effectively canceling semantic negation, or is otherwise ungrammatical. Sentence (2) is simply ungrammatical. In sentence (3), '*nothing*' must have a negative reading and '*anything*' in sentence (4) can only have an existential reading. Spanish and Catalan work differently. When the Negative Concord Item (NCI) occurs in in pre-verbal

position with sentential negation, the Spanish version of the sentence also gives rise to a Double Negation reading as in (5), whereas the Catalan version gives rise to a single negation interpretation reading as in (6).

(5) #Nadie no bebe café. Spanish
Nobody not drinks coffee
'Nobody does not drink coffee.' (DN reading)
(DN reading: 'There is nobody that does not drink coffee')

(6) Ningú no beu cafè Catalan
Nobody not drinks coffee
'Nobody drinks coffee.'
(SN reading: 'There is nobody that drinks coffee')

In a conditional context, Spanish *nada* 'nothing' (7) is interpreted with a negative reading as the English Negative Quantifier would be. Alternatively, Catalan *res* 'nothing' in this same context has the same interpretation as an English NPI, that is, it takes an existential reading (8).[3]

(7) *Laura me llamará si Pedro dice nada. Spanish
Laura will.call.me if Peter says nothing
'Laura will call me if Peter says nothing.'
(Negative reading: 'Laura will call me if Pedro says nothing')

(8) La Laura em trucarà si en Pere diu res. Catalan
Laura will.call.me if Peter says nothing
'Laura will call me if Peter says nothing.'
(Existential reading: 'Laura will call me if Pere says anything at all')

4.3.3. Task

Herein we focus on the results of a Sentence-Picture Matching Interpretation task. The task presents target sentences and a choice between two pictures depicting the possible interpretations. In accord with the above descriptions, only one interpretation should be expected depending on the transfer source (Catalan or Spanish). The larger experiments

[3] The reader is referred to the literature for specific analysis of NQs, NPIs in English and NCIs in Catalan and Spanish, (e.g., Espinal, 2000; Espinal & Tubau, 2016; Haegeman & Zanuttini, 1991; Tubau, 2008; Vallduví, 1994).

comprised were 8 conditions with 4 experimental items, in addition to 32 distractor items. Given space limitations, it suffices that we focus on a subset of conditions (4 of 8) to reveal the empirical basis supporting the methodological point, as presented in Table 1 below. The other conditions we do not report here were the control conditions which work the same in Spanish and Catalan, ((i)Nobody...VERB, (ii)Anybody...VERB, (iii)VERB...nothing and (iv)VERB...anything), yet only 2 of 4 work the same in English (conditions (i) and (ii)). Obviously, these control conditions cannot reveal the transfer source, but given the grammatical versus ungrammatical asymmetry with English they serve as control conditions. All participants performed unsurprisingly, demonstrating a transfer effect.

Participants saw a sentence and two pictures depicting different interpretations. The conditions and example sentences we report on are summarized in the table below:

Table 4.1. Conditions, Example items and Interpretations.

Condition	Example	Picture A	Picture B
Nobody…not[A]	Nobody doesn't drink coffee.	Double Negation	Single Negation
Anybody…not[A]	Anybody doesn't drink coffee.	Double Negation	Single Negation
Conditional…nothing[B]	Mary will call us if Peter drinks nothing.	Existential Interpretation	Negative Interpretation
Conditional…anything[B]	Mary will call us if Peter drinks anything.	Existential Interpretation	Negative Interpretation

[A]For the if speakers interpreted the sentences with DN readings (Picture A), it would be evidence for Spanish transfer; if they interpreted these sentences with SN readings (Picture B), it would be evidence for Catalan transfer.
[B] For this context if speakers interpreted the sentences with negative readings (Picture B), it would be evidence for Spanish transfer; if they interpreted these sentences with existential readings (Picture A), it would be evidence for Catalan transfer.

Depending on the picture chosen for the condition—in accord with the Catalan or Spanish interpretations discussed above—we could determine which previous language was transferred. The following figure provides an example of one of the experimental items, indicating the expected language specific readings.

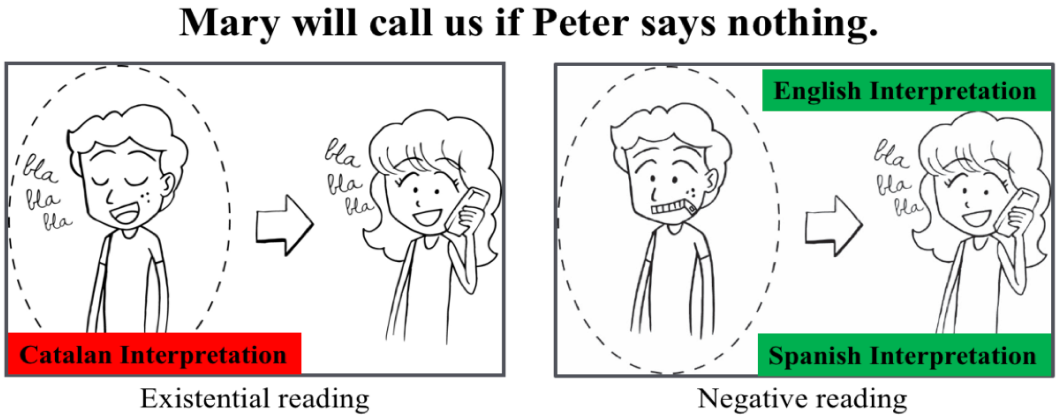

Figure 4.1. Example of the experimental item in the Conditional...nothing condition.

4.3.4. Results: Superset analysis

For the first two conditions (*Nobody*…not, *Anybody*…not), the results were coded as 1 for the Double Negation interpretation and 0 for the Single Negation interpretation readings. For the second two conditions (Conditional…*nothing*, Conditional…*anything*), the coding was 1 for the negative interpretation and 0 for the existential interpretation. See table 2 for raw counts and percentages.

Table 4.2. Raw counts and Percentages (%) of the Double negation interpretations for the first two contexts and negative interpretations for the second two contexts (=Spanish-like interpretations).

	L1Catalan-L2Spanish (35)		L1Spanish-L2Catalan (25)	
	Raw Counts	%	Raw Counts	%
Nobody…NOT	14/140	10.0%	22/100	22.0%
Anybody…NOT	24/140	17.1%	14/100	14.0%
Conditional…nothing	50/140	35.8%	38/100	38.0%
Conditional…anything	14/140	10.0%	16/100	16.0%

To understand the significance of the descriptive results in Table 2, we employed generalized linear mixed effects logistic regression analyses via the lme4 package (Bates, Maechler, Bokler, & Walker, 2015) in the R environment (R Core Team, 2016). The two contexts (pre-verbal position with sentential negation vs. conditionals) were tested in distinct models due to the fact that they captured different interpretations: Nobody/Anybody…NOT conditions capture either Double Negation or Single Negation readings and the Conditional…nothing/anything conditions capture either negative readings or existential

readings. The models tested the effects and interaction of Condition, Group and thus order of acquisition (L1Cat-L2Sp versus L1Sp-L2Cat) and Exposure to English (using months of exposure as a continuous variable, if applicable at the individual level) on the interpretations (coded as 1 and 0). The models include random by-participant by-item interecepts. The summaries of the omnibus models are presented in table 3.

Table 4.3. Generalized mixed effects models for the beginner learners.

Model Nobody/Anybody…NOT			
	Odds ratio	CI: LL, UL	*p*
(Intercept) (Ref: NQ+SN, L1Cat-L2SP)	0.07	0.03, 0.16	<.001
L1-Spanish	2.87	1.13, 7.27	<.001
Condition:NPI+SN	1.99	0.94, 4.18	.069
Exposure	1.01	0.99, 1.01	.531
L1SP*NPI+SN	0.27	0.09, 0.80	<.001
Model: Conditional…nothing/anything			
(Intercept) (Ref: Con…any, L1Cat-L2SP)	0.05	0.02, 0.12	<.001
L1-Spanish	1.95	0.57, 6.60	.281
Condition:Con…nothing	8.30	3.81, 18.04	<.001
Exposure	1.02	1.01,1.05	<.001
L1SP*Con…nothing	0.57	0.19, 1.73	.329

The first model shows that there is a significant main effect for group and a main interaction for group and condition. The L1Sp-L2Cat group gives more Double Negation readings to the Nobody…NOT condition than the L1Cat-L2Sp group ($p < .001$) does. However, they do not differ for the Anybody…NOT condition ($p = .069$). Even though the double negation readings are higher in this condition for the L1 Spanish group, they nevertheless also show transfer from Catalan because they only give Spanish-like interpretations (double negation readings) 17.1% of the time and Catalan-like ones (single negation readings) 82.9%.

When we examine the other model targeting the context with the conditional structures (Conditional…nothing, anything), it shows that there is a main effect for condition ($p < .001$) and a main effect for exposure ($p < .001$). It appears that both learner groups show Catalan-

like interpretations (i.e., existential readings) for the Negative Polarity Item when it is licensed by a conditional structure. Notice the low percentage of negative readings in this condition (L1-Cat: 10%; L1-Sp: 16%). Until now, having considered three of the four conditions under investigation, we have seen that all learners show Catalan transfer, irrespective of L1-L2 order of acquisition. However, when we explore the interpretation of Negative Quantifiers in conditional contexts, the picture is less clear. Irrespective of order of acquisition, both learner groups assign more negative interpretations to the Negative Quantifier than the Negative Polarity Item (L1-Cat: 35.8%; L1-Sp: 38%). Thus, one might be tempted to conclude that for Negative Quantifiers, learners have a mixed initial representation reflecting hybrid transfer (i.e., an amalgamated influence) from both Catalan and Spanish.

Taken together, the data suggest that the models that propose a default status for the L1 or the L2 are on the wrong track, clearly indicating that transfer does not default to an L1 or L2. Furthermore, these data seemingly help to adjudicate between the models that do not suggest a default status, questioning the full transfer stipulation of the TPM in favor of models that predict the possibility of an amalgamated effect from both grammars, such as the LPM. Recall, however, that precisely the one condition showing a potentially amalgamated Catalan/Spanish effect the statistical model showed that exposure comes out as a significant predictor ($p <. 001$) of individual variation. Despite the fact that all learners tested at very low English proficiency, the model reveals that the more exposure to L3 English one had prior to the specifically-designed course, the more negative readings were given to Negative Quantifiers in the conditional context. Clearly, if exposure comes out as a –in this case *the* only—significant predictor it can indicate, in accord with González Alonso and Rothman's warnings for L3 methodologies, probing for transfer beyond *ab initio* learners could have an inadvertent, obscuring effect. If exposure to the L3 beyond initial stages can indeed muddy the waters for determining initial stages transfer representations, even for relatively low L3 level proficiencies, the fact that some of the 60 L3 learners have had previous exposure to

English might very well explain why the *Conditional…nothing* condition stands out as not showing clear transfer effects from one or the other language. Since *ab initio* trajectories reduce the possibility of confounding (L3) transfer effects with issues of (L3) interlanguage development itself, we ran the statistics again removing the low proficiency learners who were not *ab initio* prior to the course, which we present in the next section.

4.3.5 Results: Subset analysis.

Overall, 20 participants –13 from L1Cat-L2Sp and 7 L1Sp-L2Cat—33.3% of the entire sample size were not *ab initio* learners. These participants reported having taken part in short courses of English as a Foreign language (between 12 and 48 months) either in tutored or classroom-settings. Indeed, they were all beginners as shown in their proficiency but some had had slight to significant previous temporal exposure to English.

Excluding these 20 participants, the shape of the data is quite different as we see below. Table 4 already reveals that when true *ab initio* L3 learners are isolated two important changes happen: (a) the percentage of double negation interpretations for the L1Sp-L2Cat group for the *Nobody…NOT* condition drops from 22% to 9.7% and (b) the interpretation of Negative Quantifiers in the *Conditional…nothing* conditions drops from 35.8-38% to approximately 7.95%-12.8% for both groups, aligning these results with those of the Negative Polarity Items.

Table 4.4. Raw counts and Percentages (%) of the Double negation interpretations for the first two contexts and negative interpretations for the second two contexts (=Spanish-like interpretations) for the ab initio learners only.

	L1Cat-L2Sp (22)		L1Sp-L2Cat (18)	
	Raw Counts	%	Raw Counts	%
Nobody…NOT	11/88	12.5%	7/72	9.7%
Anybody…NOT	7/88	7.95%	12/72	14.0%
Conditional…nothing	9/88	10.22%	10/72	13.9%
Conditional…anything	7/88	7.95%	9/72	12.8%

The same statistical models used above[4] were applied on the dataset after excluding the 20 participants, as seen in table 5.

Table 4.5. Generalized mixed effects models for the ab initio learners.

Model Nobody/Anybody…NOT			
	Odds ratio	CI: LL, UL	*p*
(Intercept) (Ref: NQ+SN, L1Cat-L2SP)	0.12	0.05, 0.27	<. 001
L1-SP	0.72	0.24, 2.19	0.572
Condition: Anybody…NOT	0.53	0.19, 1.45	0.220
L1SP*Anybody…NOT	2.85	0.66,12.16	0.157
Model: Conditional…nothing/anything			
(Intercept) (Ref: Con…any, L1Cat-L2SP)	0.06	0.02, 0.16	<. 001
L1Sp	2.02	0.62, 6.57	0.242
Condition: Con…nothing	1.34	0.46, 3.84	0.593
L1SP*Con…nothing	0.74	0.17, 3.16	0.694

As a result, the evidence suggesting hybrid transfer disappears. Both groups now comprised of true *ab initio* learners give existential readings to Negative Quantifiers and Negative Polarity Items in a conditional sentence frame, which suggests that all *ab initio* learners interpret them as influenced from Catalan only, irrespective of whether Catalan is their L1 or L2.

4.4. Discussion and Implications

The above data provide empirical evidence warning that precipitous evaluations of models of initial stages morphosyntactic transfer in L3/L*n* acquisition from data sets beyond *ab initio* L3 learners need to proceed with caution. To our knowledge, this is the first dataset of its kind where, as a byproduct of the larger study design, we are able to retroactively look at the data in two ways to evaluate the tenability of the claim that data collected past the initial stages can make it difficult to distinguish what is transfer from what are effects of, in this case L3,

[4] Logically exposure is removed as a variable because as a matter of inclusion in these models, exposure was kept constant across all individuals stemming from the 2-month course.

developmental acquisition. As is true of the much wider studied case of adult L2 acquisition, showing what we have does not mean that looking at L3 acquisition data across various levels of increasing L3 exposure/proficiency, even for the purpose of cross-linguistic influence, is not something one wants to do. Quite the contrary. Like any other instance of acquisition, one wants to understand the L3 process from initial representations through development and ultimate attainment. The point here is simply one of what can be claimed based on particular data sets. As we saw, not considering the actual exposure of the participants but instead taking beginning proficiency as a proxy for exposure would have led to the conclusion that various models are rejected, that transfer is clearly not complete and more. Although these data do not prove that models that would be rejected without a more nuanced approach are in fact confirmed, they underscore the importance of using the right type of data to make certain claims, especially when rejecting a model in its entirety. And this methodological caveat, the main point of this brief article, is true ubiquitously for all studies of linguistic transfer be them in children or adults and irrespective of the quantity of languages involved. In the present case, the fact that beginning proficiency was shown to reflect some effects of L3 learning already–when this coincided with non-*ab initio* learners–tells us that exposure to the L3 otherwise nullified by using proficiency as a catch-all proxy can inadvertently obscure answers to important, debated questions. If our participants with previous exposure to English present so differently from those who truly never had any exposure, one might question what this means for the vast majority of data in L3 studies that conflate beginning proficiency with true L3 initial stages.

Chapter 5: The initial stages and development (Study 4)

Language dominance modulates the rate of L3 development above and beyond initial state transfer [1]

Abstract

This study examines the extent to which extra-linguistic factors such as language dominance, order of acquisition and the language of instruction are deterministic for transfer selection and subsequent development. We test a group of Catalan-Spanish bilinguals acquiring English as an L3 in a controlled setting in a Picture-Sentence matching task to tap into the interpretation of Negative Quantifiers and Negative Polarity Item. We test them at TIME 1 to establish the baseline for transfer and at TIME 2, 11 months after, to explore what factors, if any, modulate the rate of development. We show, that irrespective of these factors, holistic structural similarity is the most deterministic factor in the case of early bilinguals acquiring a third language (Rothman et al. 2019). More importantly, results of TIME 2 of testing reveal that developmental sequencing after initial stages transfer is dynamic and non-uniform depending on language dominance in the previous acquired languages. This study highlights the fruitful nature of longitudinal design in the emerging field of L3/L*n* acquisition, the principled way variation in the acquisition process takes shape as well as the importance and utility of capturing the baseline of transfer at the initial stages for the creation of developmental theories of L3 acquisition proper.

[1] Puig-Mayenco, E., Rothman, J. & Tubau, S. (Submitted). Language dominance modulates the rate of L3 development above and beyond initial state transfer.

5.1. Introduction

Given multiple available sources for transfer, research in adult successive multilingualism, especially morphosyntax, has focused on determining the linguistic and (extra-)linguistic factors that trigger transfer selection. As cross-linguistic comparisons of second language (L2) acquisition studies reveal, trajectories in acquisition can vary immensely depending on the starting point of the process. For example, the path, performance and ultimate attainment of L2 English varies considerably depending on the L1. Accordingly, some have argued that determining initial representations for a third language (L3) is of key importance for understanding third language (L3) acquisition overall, not least because only at the initial stages of acquisition can one confidently isolate transfer from knowledge that stems from learning itself (Cabrelli Amaro, Iverson, Giancaspro, & Halloran, 2018; González Alonso & Rothman, 2017). For example, if *ab initio* L3 learners compared to L2 *ab initio* learners— both natives of the same L1— demonstrate distinct knowledge in the same non-native target language whereby only the former shows target knowledge after minimal exposure, it would be reasonable to deduce that the L2 of the L3 learner fills the apparent gap. If, however, we tested these same learners for the first time after each had achieved intermediate proficiency in the target language— an L2 for one and L3 for the other— and each had comparable knowledge for property X at that point we would not be able to adjudicate between at least two scenarios. The observed result could have come from transfer in the L3 case and learning of the domain in question for the L2 case or, conversely, learning could have applied in both cases whereby the L2 provided no initial advantage. We would simply have no way to know which is correct, having missed the window of opportunity where such could be meaningfully teased apart. And so, examining true initial stages in L3 acquisition has the distinct advantage of potentially isolating transfer from other mitigating factors. To the extent that a particular study is concerned with transfer source in L3 acquisition as its primary question, it stands to reason that timing in the L3 acquisition continuum is paramount.

There are, however, other advantages that come from placing a particular spotlight on L3 initial stages research. It follows from the above discussion that knowing what initial L3 grammars look like affords the best opportunity to meaningfully predict and map developmental and ultimate attainment learning trajectories. Existent L3/L*n* research shows that L3 initial interlanguage representations can differ significantly from sequential second language (L2) acquisition ones, even when the native (L1) and the target languages (L2 or L3 depending) are held constant (e.g., Rothman & Cabrelli Amaro, 2010). Much like we would not expect the patterns of Spanish and German natives for acquiring subjects in L2 English to be the same, we should not take it for granted that all Spanish or German natives will acquire pronominal subjects, for example, in L3 English in the same way simply because they share the same native language. It is possible that they will or will not differ significantly as a function of what they have acquired as an L2. This is, however, an important empirical question with potentially significant knock-on effects, implications of which highlight how L3 acquisition is distinct from L2 acquisition. In turn, it highlights how the study of L3 acquisition, especially the initial transfer from which the learning task (partially) derives, offers unique insights into the mind/language interface at multiple levels. And so, while examining initial L3 interlanguage grammars is particularly useful for determining transfer source, it is also important for setting the stage for tracking and explicating patterns in L3 development over time.

In light of the above, one might expect there to be a critical mass of studies following on from initial stages data collection; that is, developmental studies that follow learners iteratively over time after their L3 initial representations are established. However, exceedingly few studies have combined L3 initial stages data with later developmental data (or any type of longitudinal design from whatever point of L3 proficiency data was first collected). Relevant published work is cross-sectional, for example, Cabrelli Amaro, Amaro and Rothman's (2015) paper examines raising over dative experiencers in L3 Brazilian Portuguese bringing together

various proficiency levels with the same methodological protocols. We endeavor herein to fill the longitudinal L3 gap, examining a group of Catalan-Spanish bilinguals who, in the first instance of data collection, are *ab initio* learners of English. We follow a subset of this group—those that continued learning the L3— testing them 11 months later. We focus on the interpretation of Negative Quantifiers and Negative Polarity Items because the distribution and interpretation of them in Catalan and Spanish differ and distribute uniquely as well in the target L3 (see section 2.2). We test variables that have been suggested to be important (order of acquisition and language dominance) and some that have yet to be proposed but that could have an effect on transfer selection (e.g. language of instruction) and subsequent development. We capitalize on the relatively unique situation that Catalan-Spanish bilingualism affords. Collecting data in rural Catalonia, we were able to collect data from two order of acquisition groups: Catalan L1→ to child L2 Spanish and Spanish L1→ to child L2 Catalan. Because the environment is so rich with access to and opportunity to use both languages, order of acquisition does not exclusively predict dominance in adulthood (some L1 Catalan tested on the Spanish-dominant side of the scale and vice-versa). As we will explain in detail below, we were thus able to isolate order of acquisition and dominance as separate variables without sacrificing on proficiency in the previous languages—because every individual is highly proficient in each. To our knowledge, this study is the first to use a longitudinal design to (a) establish a baseline for transfer at the true initial stages with *ab initio* learners, and (b) to examine the developmental trajectories of these same learners inclusive of the potential factors modulating them. The uniqueness of the method and learner groups combined come together to permit a greater understanding of the variables that impact initial L3 interlanguage and developmental, similarly and differentially.

5.2. Background

5.2.1. L3 acquisition: the initial stages and impact on development

As discussed above, the goal of this paper is to go beyond the typical study of adult L3 morphosyntactic transfer. We do so by first examining the initial stages interlanguage system and using this—comparing learners against themselves with time in between testing—as the baseline for their development over time. As a result, the present study touches on transfer at the initial stages, which inevitably relates to the models of transfer in the literature, even if testing them *per se* is not the primary focus. Nevertheless, the data from the first time of testing will enable us to comment on these models before getting to our primary focus goal of examining the dynamic nature of L3 development and the deterministic variables that shape it. And so, in this section we cursorily sketch out the current landscape of L3 transfer models. Because there is a dearth of studies, much less independent developmental theories for L3/L*n* morphosyntax, we will examine these transfer models with an eye at understanding their overt and/or latent predictions and implications as they pertain to the L3 learning task. Details aside, these models can essentially be subdivided into two main blocks: models (or positions) that advocate a primacy default transfer effect from a single source the L1 or the L2 and the models that claim transfer can come from either language, differentiating themselves with respect to how they envisage the variables that conspire for transfer selection (the L1 or the L2; in its entirety or on a property-by-property basis).

There are logically two potential default transfer positions: the L1 or the L2 having a primary default status. Only one, however, has been formalized under a specific model: the L2 Status Factor (L2SF: Bardel & Falk 2007; Bardel & Falk 2012; Bardel & Sánchez 2017; Falk & Bardel 2011). As the name suggests, the L2SF maintains that, all things being equal, the L2 is the privileged default source of transfer. By "all things being equal" we make reference to more recent instantiations of the L2SF, which include proposals for how and why

the L1 might override the L2 default transfer status under specific conditions. For example, Falk, Lindqvist & Bardel (2015) argue that for L3 speakers who are highly trained metalinguistically in their L1, such knowledge could, when relevant (e.g., when typological similarity between the L1 and the L3 is high), result in the by-passing of the otherwise claimed L2 default. Bardel and Sánchez (2017) further argue that transfer selection can be ameliorated, away from the L2 default, on the basis of other competing individual differences such as working memory capacity and attention allocation resources. Under the strongest version of the L2SF whereby L2 representations constitute the initial ones for the L3, tracing the developmental trajectories for L3 is straightforward. The learning task will be the same as it is for native L1 speakers of the L3 speakers' L2 because the source of transfer (L1 in one case, L2 in the other) will be the same. Of course, idiosyncratic issues related to L3 acquisition might conspire to make the learning trajectory unravel somewhat differently, but as far as the formal learning task is concerned— what would need, on the basis of transfer, to be overcome— is one and the same. Although there is no formalized L1 transfer model—coined by a name as such— a few scholars have suggested there is indeed a privileged status for the L1 (e.g., Hermas 2010; Hermas 2015; Na Ranong & Leung 2009). Under the strong version of such a view, transfer and the learning task stemming from it is analogous to what is claimed by the L2SF, except in reverse on the basis of what would come as a default from the L1.

The proposals that claim a non-default status in transfer selection differ as regards what factors they claim motivate the selection of one of the other potential sources as well as whether such selection is wholesale or happens iteratively, that is, property-by-property. The Typological Primacy Model (TPM: Rothman 2011; Rothman 2010; Rothman 2013; Rothman 2015) claims full transfer of a single system (the entirety of the system–in the sense of Schwartz and Sprouse's (1994, 1996). It claims that, as soon as the parser is exposed to a critical mass of L3 input—unconsciously juxtaposing the L3 to the L1 and L2—, full transfer of the apparent typologically closer language to the L3 obtains. It thus constitutes the initial L3

interlanguage system. Since the TPM focuses on the very initial representations of the L3, what happens after along L3 development itself is in many ways outside its scope. However, this does not entail that the TPM makes no knock-on predictions for development or that specific patterns of development cannot provide evidence to affirm or falsify its claims. After all, if transfer is complete and based on typological similarity as defined in Rothman (2015) development should be delimited— the developmental sequence should unfold— in accord with whatever language is predicted to transfer in juxtaposition to what the formal learning task is. In other words, one should be able to set out predictively: (a) what should be more or less difficult based on transfer from (b) what in the target L3 should be facilitated by transfer, plus (c) what can be reconfigured on the basis of continued exposure to the L3 minus (d) what is complicated by the initial transfer itself (e.g. when a superset value is transferred to the target L3 subset value).

The Linguistic Proximity Model (Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017) also proposes that transfer is not defaulted to either the L1 or the L2. Distinctly from the TPM, however, the LPM argues that transfer does not occur in its entirety from one of the two languages initially (or ever), but rather happens on a property-by-property basis at any time relevant— when the property is ripe for acquisition itself— during the course of development. The LPM argues, conversely, that linguistic proximity of a specific property between the L3 and the L1 or the L2 is what motivates the selection of transfer iteratively over time. The LPM would thus be compatible with evidence of iterative transfer effects over time— thus highly suitable to be tested in a longitudinal format— especially so if these can be meaningfully disentangled from developmental learning effects themselves. It might also predict a quicker learning task than other models would because it offers a more conservative type of transfer. Property-by-property transfer might give rise to less non-facilitative transfer overall than a model that appeals to default transfer or wholistic transfer based on typological (structural proximity).

We will keep the above theories in mind as we look at the data in subsequent sections, especially the data from the first time of testing and their knock-on effects. That said, the focus of this paper is not to test these models *per se*, but rather to seek to understand and uncover the variables that—the same or distinct ones—impact on subsequent development. To this end, we will test specific variables that have been shown to have limited predictive and explanatory adequacy for initial transfer such as order of acquisition (L1 versus L2 status) and relative dominance when this can be teased apart Puig-Mayenco, Miller & Rothman (2018) to understand if these factors take on new relevance for development and potential distinctions in recovery from non-facilitative transfer over time (see Cabrelli and Iverson, 2018).

5.2.2. Negative Quantifiers, Negative Polarity Items and Negative Concord Items: Their distribution and interpretation

Related to negation, there are two types of languages. Those that do not allow *a priori* the co-occurrence of two negative elements with a Single Negation reading (such as Dutch, Norwegian, Standard English and Swedish) are often referred to as Double Negation (DN) languages (Zeijlstra 2004) Languages that allow *a priori* the co-occurrence of two negative elements with a Single Negation reading (such as Czech, Greek, Japanese and Spanish) are referred to as Negative Concord (NC) languages (Giannakidou, 2000).

Standard English falls into the category of DN languages, whereas both Catalan and Spanish fall into the category of NC languages. Crucially for our study, however, this is not simply a two-way distinction in that the subset of languages labelled NC languages can be subdivided themselves into Strict versus Non-strict, and Catalan has been classified as being in between these two as we will describe below.

5.2.2.1. English: Negative Quantifiers and Negative Polarity Items

English is a DN language. This means that the co-occurrence of two negative elements in the same sentence gives rise to double negative readings, as can be appreciated in (1),[2] in which the English Negative Quantifier *nothing* co-occurs with the overt sentential negative operator *not*; thus, the negative semantic meaning of the sentence is cancelled.

(1) #Laura did not say nothing (=It is not the case that Laura did not say anything).

When the sentence does not contain an overt negative operator, the Negative Quantifier is grammatical and expresses a Single Negation reading, as in (2):

(2) Laura said nothing (=It is not the case that Laura said something).

Negative Polarity Items show the opposite pattern from that of the distribution of Negative Quantifiers. The Negative Polarity Items need to be licensed by an overt negative operator to (a) be grammatical and (b) to express a Single Negation meaning (see 3—4).

(3) Lily did not eat anything.
(4) *Lily ate anything.

As it pertains to their licensing in the preverbal position, Negative Quantifiers cannot be licensed by external negation and be grammatical (5); when they do, the sentence only becomes acceptable under a double negation reading.

(5) Nobody is drinking coffee.
(6) #Nobody is not drinking coffee.
(=It is not the case that there is a person who does not drink coffee).

Negative Polarity Items cannot occur in the preverbal position with or without sentential negation (see 7-8).

(7) *Anybody is drinking coffee.
(8) *Anybody is not drinking coffee.

[2] The reader is referred to Puskás (2012) for a more detailed discussion of the conditions that give rise to Double Negation readings.

(=It is not the case that there is a person who does not drink coffee).

As discussed by Giannakidou (1998, 2011, amongst others), Negative Polarity Items can also be licensed by other types of operators, namely non-veridical operators (such as questions and conditionals). When such an operator licenses one of these lexical items, the Negative Polarity Item receives an existential reading (9). It is interesting that Negative Quantifiers can also occur in such a context, but they are necessarily assigned a negative reading (10).

(9) Call me if Lily eats anything!
(=Call me in the event that Lily eats something).
(10) Call me if Lily eats nothing!
(=Call me in the event that Lily does not eat anything).

5.2.2.2. Catalan and Spanish

Catalan and Spanish are NC languages; this means that these languages allow for the co-occurrence of two negative elements without triggering a Double Negation reading, at least when the Negative Concord Item is in the post-verbal position (consider 11 and 12):

(11) a. L'Àngel no va dir res. Catalan
b. Ángel no dijo nada. Spanish
Ángel neg said n-thing
'Àngel did not say anything'

(12) a. *L'Àngel va dir res. Catalan
b. *Ángel dijo nada. Spanish
Àngel said n-thing
'Àngel said nothing'

All Negative Concord languages behave similarly with regard to the behaviour of Negative Concord Items in the post-verbal position, as exemplified above. However, they do differ in terms of their behavior in preverbal position. Some languages, such as Czech, Romanian or Arabic, require these elements to co-occur with an overt negative operator in the same domain; these languages are classified as Strict Negative Concord languages. At the opposite end of the spectrum, we have languages such as Spanish and Italian that do not allow for the co-occurrence of an overt negative operator with a preverbal Negative Concord Item if a

Single Negation reading is intended (see the difference between 13 and 14). Languages, like Spanish, with this type of behavior are called Non-strict NC languages.

(13) Nadie está bebiendo café. Spanish
Nobody is drinking coffee.
'Nobody is drinking coffee.'

(14) #Nadie no está bebiendo café. Spanish
Nobody not is drinking coffee.
'Nobody is not drinking coffee.'
(It is not the case that there is a person who does not drink coffee).

Catalan's behaviour sits somewhere in between both ends of the spectrum in that the appearance of a negative operator with preverbal Negative Concord Items is optional, and, crucially, its co-occurrence does not usually give rise to double negation readings; see (15):

(15) Ningú (no) està bevent cafè. Catalan
Nobody (not) is drinking coffee.
'Nobody is drinking coffee.'

A further difference with regard to the interpretation of these lexical items in Catalan and Spanish is their occurrence with non-veridical operators such as questions or conditionals. Catalan Negative Concord Items can be licensed by these operators and, when they are, they have an existential reading (Espinal, 2000; Vallduví, 1994) as can be seen in (16a). Spanish, unlike Catalan, does not allow for these lexical items to be licensed by these operators, as seen in (16b).

(16) a. Truca'm si la Dolors diu res! Catalan
b. *¡Llámame si Dolores dice nada! Spanish
Call me if Dolors says n-thing!
"Call me if Dolors says anything!"

Overall, Catalan and Spanish show micro-variation with regard to the licensing of their Negative Concord Items along two dimensions: (i) preverbal Negative Concord Items with sentential negation in the sentence have Single Negation readings in Catalan and Double Negation ones in Spanish, and (ii) Negative Concord Items in contexts such as conditionals are acceptable and have existential readings in Catalan, and are ungrammatical and interpreted

with negative readings in Spanish. We will capitalize on these subtle, yet robust differences between Spanish and Catalan (the L1s and L2s of our groups) to tease apart which of the previous languages, if any, are transferred into the beginning stages of L3 interlanguage. We will further examine how recovery after initial transfer unfolds in a second testing time, seeing if recovery from transfer is conditioned by additional factors than the mere learning task (i.e. does it matter if the transferred value is an L1 or L2, what role does dominance play, etc.).

5.3. Study

5.3.1. Research questions and predictions

The aims of this study are twofold. The first is to explore the initial stage mental representation of L3 English by Catalan/Spanish bilinguals. The second is to explore the factors that model developmental trajectories in L3 acquisition. In order to accomplish this, we entertain three interrelated research questions presented below:

- ⇒ R1. What variables determine transfer selection in L3 acquisition?
- ⇒ R2. What are the variables that modulate L3 development from the point of initial transfer?
- ⇒ R3. Are these variables conditioning development similarly or differently to what conditions transfer selection in the first place? If so, why?

Whereas there are very few studies examining L3 morphosyntactic development itself, the past decade and a half has produced a healthy critical mass of studies that has examined transfer source (see e.g., Puig-Mayenco, González Alonso & Rothman 2018; Rothman, González Alonso & Puig-Mayenco 2019, for systematic reviews) As a result, our predicted answer to R1 reflects our understanding of the direction in which research overall points whereas our predictions for R2 and R3 are more speculative and exploratory. A plurality of available L3 studies show that transfer can come from either the L1 or the L2—the selection

depending on other variables (see Puig-Mayenco, González Alonso, & Rothman, 2018, for a review). Thus, we predict transfer will not be defaulted to either the L1 or the L2, and that it will depend on other factors such as underlying typological similarity and/or other factors such as language dominance and a potential priming effect of which language— the L1 or the L2— was used during L3 instruction. While few studies have focused on L3 development trajectories, these few studies give some nice insights. (Cabrelli Amaro et al. (2018) and Cabrelli Amaro 2017) has shown that overcoming transfer from the L2 is easier than doing so from the L1. Based on their results, we predict that overcoming non-facilitation will be easier for the learners that (a) transferred the L2 initially and (b) from the less dominant language. We also hypothesize that the variables that condition initial transfer and developmental sequencing will only partially overlap, not the least because of the inherently distinct natures of the two constructs. For example, where typological considerations, albeit to a different extent, might be a relevant variable for transfer and development, language dominance is not predicted to matter for initial transfer itself (e.g., Puig-Mayenco, Miller & Rothman, 2018) it is likely to matter considerably for development, as we will test in our study.

5.3.2. Methodology

5.3.2.1. The L3 Input and context

The majority of research in L3 acquisition has used low proficiency as the inclusion criteria to investigate morphosyntactic transfer in L3 acquisition (see Puig-Mayenco et al. 2018; Rothman et al. 2019 for systematic reviews). Having a low level of proficiency as measured via standardized tests, however, is not necessarily equal to being at the initial stages of acquisition. For reasons discussed in the introduction, if one main question regards capturing the representations of the initial L3 interlanguage then it is imperative we can disentangle transfer from effects of acquisition (see proviso from empirical evidence in Rothman et al. 2019).

Recall that determining initial stages transfer as the baseline for how individuals develop overtime is a primary goal. And so, we avoided potentially confounding transfer effects from learning effects by designing a two-month course for true *ab initio* learners of English that was created and delivered specifically for this study. This allowed us to (a) ensure that our learners had not been exposed to formal instruction in English previously, and (b) to control for several factors that cannot be controlled when examining learners in other contexts of instruction.

Having designed and delivered the course ourselves also made testing *ab initio* learners feasible, not the least because of where we undertook the course and the subjects we targeted. Although English is a ubiquitous second language in Europe, it is not the case that it is truly omni-present in every corner. Doing our study in Northeast rural Catalonia, English is not a language commonly spoken by all and was not a typical language of instruction in previous generations (differently from the present day landscape for children and adolescents in school). And so, we focused on individuals above 50— because they would not have had the option of English in schooling—and only the subset for which English was never otherwise taken up. Administering and devising the course allowed for control of input exposure in crucial ways. Firstly, we could ensure that the learners were familiar with the lexical items to which they would be exposed in the testing phase. We controlled for the frequency of exposure to all the items received. For the participants to be able to perform our tasks and have reliable results, they needed to be familiar with three different sentence frames. As one should expect, we did not provide any explicit instruction regarding the domain/object of inquiry: the distribution of Negative Polarity Items (NPI) and Negative Quantifiers (NQ) in English. However, from the first sessions of the two-month course they were exposed orally and in writing to the below sentence frames devoid of the crucial NPIs and NQs using as many cognates in the three languages as possible so that they would be familiar with the

structures we would later use in testing. Instruction was aided with visual cues so that learners would be familiar with the lexical items and these three sentence frames:

a) Subject+Verb+Object: The girl is drinking coffee.

b) Subject+ NOT+Verb+Object: The girl is not drinking coffee.

c) Conditional: Mary will call me if Peter drinks coffee.

Another important point in the course was to trigger the mapping of NQs 'nothing, nobody' and NPIs 'anything, anybody' without introducing potential biases or noise that would make tapping into the transferred representation more difficult. After all, they would need to know the lexical items themselves for any meaningful testing of how they are represented in the L3, whether reflecting transfer or not. To accomplish this, we presented the Negative Quantifiers and Negative Polarity Items in two contexts that met the three following requirements:

a) The contexts would not be targeted in the experiment,

b) the contexts were grammatical in the three languages, and

c) there were no differences amongst the three languages.

These two contexts were answers to Wh-questions for the Negative Quantifiers as in (17ab), and objects of single negated clauses for Negative Polarity Items as in (18ab):

(17) a. What is Mary eating? Nothing.
b. Who is Mary speaking with? Nobody.
(18) a. Mary is not eating anything.
b. Mary is not speaking with anyone.

Throughout the course, the instructor tried to use as much English as possible to communicate with the learners. However, due to the fact that they were *ab initio* learners some L1/L2 use was unavoidable. We manipulated this in that some of the learners received instructions in Catalan and others in Spanish. The language other than English that was used in the class was decided prior— as there were multiple sections to keep each cohort

manageable with a cap of 16 students per class. Spanish or Catalan use was counter-balanced by group (6 groups; 3 used Catalan and 3 Spanish as other language when needed) so that we could later factor this into the analysis.

5.3.2.2. Factors under consideration

In our analysis for the initial stages data, we mainly discuss three factors (variables in the statistical modelling) that might be deterministic for transfer selection in L3/L*n* acquisition:

1. Order of acquisition of the L1 and L2. We employed mirror-image methodology in that we targeted participants who had been exposed to Catalan at home and Spanish when entering the schooling system (L1-Cat-L2-Sp), and participants who had only been exposed to Spanish at home, who were children of people from southern Spain who had moved to the area in which the data collection took place thus beginning to learn Catalan at school (L1-Sp-L2-Cat).
2. Language dominance. As Slabakova (2017) suggests, amongst many other variables, language dominance might be a factor conditioning the selection of L3 transfer. The role that language dominance plays is inconclusive due to the lack of studies testing it (see Fallah, Jabbari & Fazilatfar 2016; Fallah & Jabbari 2018; Puig-Mayenco, Miller & Rothman 2018). A main limitation of all these studies is the fact that language dominance is treated as a categorical variable, entailing that one is dominant in one or the other language. Such an approach can be extremely informative for some questions, however, it might be underestimating nuances implicit to the dynamic nature of what it means to be dominant in one or another language (see Silva-Corvalán & Treffers-Daller 2015). Therefore, in this study, we treat language dominance as a variable along a continuum. To this end, we used the Bilingualism Language Profile (Birdsong et al., 2012) that allowed us to have such a continuum, giving us a score

from -218 to +218. In our coding system, a score ranging from -218 to 0 implied that the participant was Spanish dominant and a score ranging from 0 to +218 implied that the participant was Catalan dominant. Of course, such a continuum also captures the fact that one participant might be more balanced than another; this can be observed with a score that sits around 0.

3. Other-Language Used in Instruction. As discussed above, we used the L1/L2 use in the classroom to the extent that this was possible (instructions and order of translation when necessary). We decided to factor this into the analysis, as the controlled nature of our context of instruction and testing allowed us to do so, and because it would not be unreasonable to think that this could have an effect on at least task performance. This was also coded binarily: Catalan-used in instruction versus Spanish instruction, meaning that those in the Catalan-used group always received basic instructions in Catalan; those in the Spanish-used group experienced the complete opposite.

5.3.2.2. Participants

Participants were residents of and tested in Osona (Spain). As alluded to prior, they were divided into two groups that differed in the order of acquisition of Catalan and Spanish. The first group consisted of L1 speakers of Catalan who were child L2 learners of Spanish, while the opposite was the case for the second group. The inclusion criteria for the study were the following:

i. Speakers of Catalan and Spanish who were born and raised in Osona,
ii. They were *ab initio* learners of English (no previous exposure to English)
iii. Had completed the task in the three languages, showing distinct representations with regard to the two experimental conditions under consideration in Catalan and Spanish (Catalan and Spanish tested after the L3 and in a counterbalanced manner).
iv. They had 80% accuracy in the distractors of the experimental task in the L3 experiment (ensuring they could perform the task itself).

Overall, of the 73 participants who agreed to attend the testing sessions, 33 (45.21% of the entire sample) had to be excluded for one (or more) of the reasons listed above. These 33 participants were distributed across the four inclusion criteria as described above, and a participant could be excluded for more than one of the four reasons. A large portion of the participants (n=19) were excluded due to fact that they were not true *ab initio* learners, but rather low proficiency learners with 12- 48 months of previous instruction in English. Of the 40 participants who were finally included in the analysis, 18 continued to take English lessons in either a tutored or classroom setting. These participants were tested again 11 months after the first testing session to explore for developmental trajectories in L3 acquisition. The following table contains the information about the participants who were included in the final analysis:

Table 5.1. Information about the participants.

Details	L1Cat-L2Sp (N=22)	L1Sp-L2Cat (N=18)
Age	51.4 (7.5)	50.1 (4.11)
Sex	M=5; F=17	M=7, F=11
L3 Proficiency[3]	5.4 (1.8) out of 60	5.2 (1.2) out of 60
Language Dominance	81.7 (85.6)	-8.16 (103.6)
N in the Cat-Ins group	10/22	9/18
N in the Sp-Ins group:	12/22	9/18
N of participant tested longitudinally	12/22	6/18

5.3.2.2. Task: Sentence-Picture Matching Task

The experimental task consisted of a Sentence-Picture Matching Task (SPM) to tap into how the L3 learners interpreted Negative Quantifiers and Negative Polarity Items in eight different conditions that can be grouped in four different contexts, as can be seen in table 4. The first two contexts (*Nobody/Anyone…VERB*; *VERB…nothing/anything*) were two control contexts

[3] Even though the participants were all ab initio, we still decided to control for their proficiency in English after the two-month course. They took part in the Oxford Quick Placement Test. The participants were instructed to stop when they felt they did not understand something.

where no variation was expected. The second two contexts (*Nobody/Anybody…NOT* and *Conditional…nothing/anything*) were the two contexts of interest where variation would be expected depending on transfer source.

Table 5.2. Contexts, Conditions, Example items and Interpretations.

Context	Condition	Example	Picture A*	Picture B
1	*Nobody…V*	Nobody drinks coffee.	Double	Single
Control	*Anybody…V*	Anybody drinks coffee.	Negation	Negation
2	*V…nothing*	Mary drinks nothing.	Double	Single
Control	*V…anybody*	Mary drinks anything.	Negation	Negation
3	*Nobody…not*	Nobody doesn't drink coffee.	Double	Single
Exper.	*Anybody…not*	Anybody doesn't drink coffee.	Negation	Negation
4	*Con…nothing*	Mary will call us if Peter drinks nothing.	Existential	Negative
Exper.	*Con…anything*	Mary will call us if Peter drinks anything.	Interpretation	Interpretation

Each condition had four experimental items. In addition to the experimental conditions, we added 32 fillers consisting of sentences with the same structures, but without either Negative Quantifiers or Negative Polarity Items. The sentences were all presented in a random order and the pictures were also presented pseudo-randomly on either the left- or the right-hand side of the screen. Each test sentence with a set of two pictures appeared individually on the screen (see Figure 1 for a screenshot of an experimental item).

Mary will call us if John drinks nothing.

Figure 5.1. Screenshot of an experimental item.

5.4. Results and discussion

5.4.1. Data analysis

The same statistical analysis was conducted on the two data sets (TIME 1 and 2), the first one corresponding to initial stages testing and the second after 11 months of development. Responses were coded as 1 and 0, corresponding to interpretations as fleshed below. Recall there were 8 conditions grouped into four contexts. For the two control contexts (*Nobody/Anybody...VERB; VERB...nothing/anything),* 1 was given for the negative interpretation of either the Negative Quantifier or Negative Polarity Item. For the first critical context (*Nobody/Anybody*…*NOT*), 1 was given for double negation readings (Spanish-like) and 0 for the Single Negation reading (Catalan-like). For the second critical context (Conditional… nothing/anything), 1 was given for responses capturing a negative reading (Spanish-like) and 0 for the responses capturing an existential reading (Catalan-like). The analysis was conducted in the R environment (R Core Team, 2016) by using the lme4 package (Bates, Maechler, Bolker, & Walker, 2013). Generalised mixed-effects models were fit to the binomial response data. Each model included fixed effects (specified for each model below) and by-participant random intercepts. In the case of significant interactions, planned comparisons investigated the effects of group within the same condition using the multcomp package (Torsten Hothorn, Bretz, & Westfall, 2008).

5.4.2. TIME 1 analysis: A look at what is transferred

In order to address the first research question to see what variables determine transfer selection at the initial stages of L3/L*n* acquisition, we examined the interpretations given for the Negative Quantifiers and Negative Polarity Items'. Table 3 and Figure 2 show the raw

counts and percentages for all the different contexts and conditions presented separately depending on whether the L1 was Catalan or Spanish.[4]

Table 5.3. Raw counts and percentages (%) of the interpretations of each condition for the learners in TIME 1 of testing.

		L1-Cat (n=22)		L1-SP (n=18)	
Context	CONDITION	Raw count	Percentage	Raw count	Percentage
1[a]	Anyone…VERB[5]	82/88	93.18	68/72	97.22
Control	Nobody…VERB	81/88	93.06	70/72	94.44
2[b]	VERB…anything	47/88	53.41	52/72	72.22
Control	VERB…nothing	49/88	55.68	51/72	70.83
3[c]	Anyone…NOT	11/88	12.5	7/72	9.72
Exper.	Nobody…NOT	7/88	7.95	10/72	13.88
4[d]	CON...anything	7/88	7.95	10/72	13.88
Exper.	CON...nothing	9/88	10.22	10/72	13.88

Counts and percentages of: [a] negative interpretations; [b] negative interpretations; [c] DN interpretations; [d] negative readings.

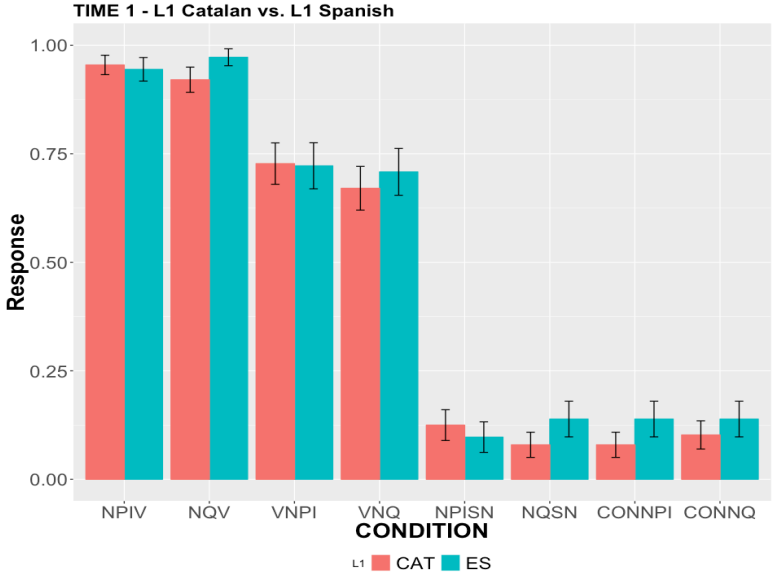

Figure 5.2. Bar-graph of percentages of the interpretations of each condition for the learners in TIME 1 of testing.

[4] As was mentioned earlier, the participants also did the tasks in Catalan and Spanish to establish whether they had two distinct representations available for transfer. The Catalan and Spanish results can be found on Appendix J.

[5] English allows 'Anybody V'/'V anybody' under a free-choice reading but disallows it with a single negation reading. However, when you deal with transfer from languages where no distinction between 'Nobody' and 'Anybody' exists as is the case for our learners, the prediction is that 'Anybody V' will have the same reading as 'Nobody V', as you are only dealing with negation and not with free-choice. Additionally, due to the nature of our context the ab initio learners would have not been exposed to any instance of a Negative Polarity Item with a free-choice reading.

The generalised linear mixed-effects logistic regression analyses tested the effects and interactions of Condition, Order of Acquisition, Language Dominance and Other-Language Used in Instruction (Catalan or Spanish) on the interpretations (coded as 1 and 0). A first pass analysis showed that "Order of Acquisition" was not a significant predictor in any of the contexts, and so it was excluded from the final analysis. All models include random by-participant intercepts. The full models can be seen in Appendix K. We summarize the results of each model below:

⇒ Model 1 (Context 1): No significant results
⇒ Model 2 (Context 2): Main effect of Dominance Score ($p < .05$)
Interaction Condition*DomScore ($p. < 001$)
⇒ Model 3 (Context 3): No significant predictors
⇒ Model 4 (Context 4): No significant predictors

Since "Order of acquisition" was not found to be a significant predictor in any context there is no evidence in support of a default role of the L1 or the L2. It would be precipitous to argue that these findings are counter evidence to the L2SF. The L2SF, as originally postulated, does not make specific predictions for speakers who have acquired the L1 and L2 during puberty not the least because the apparent L2 default effect is linked to a difference in grammatical storage within memory system that is argued to obtain after puberty (Bardel & Falk, 2012; Paradis, 2004). Thus, the predictions that the L2SF would make for the case of child L2 learners are unclear (but see Bardel & Sánchez 2017 for some insights). These data, however, seem to indicate that any default effect that otherwise might obtain does not pertain to child bilinguals who learn an additional language in adulthood.

In the light of recent suggestions by Slabakova (2017) and Fallah et al. (2015), we explored the role of language dominance. Our context allowed us to do so because all of our participants were highly proficient in Catalan and Spanish, but differed in their respective amount and domains of use of the languages in their daily lives. Because of the opportunity for using and supporting both languages in this bilingual context, 1st language and language dominance do not strictly go hand in hand at the individual level—there were some native

speakers in each group that tended to show dominance on a scale in the other language. This provided us with a fairly unique opportunity to isolate language dominance from other factors such as order of acquisition and societal language. Recall that our study design allowed us to explore any potential effect that the Other-Language Used in Instruction had on transfer selection in L3/L*n* acquisition: would use of Spanish or Catalan (strictly controlled) in the learning of English bring anything to bear? We now turn to the analysis of these two variables.

Recall that, in the two control contexts (*Nobody/Anybody…VERB; VERB…nothing /anything*), no variation was expected because both Catalan and Spanish behave similarly. As *Nobody/Anybody…VERB* is grammatical, it was predicted that the participants would interpret sentences with negative meanings and no difference would be seen between the Negative Quantifier and the Negative Polarity Item. In the *VERB…nothing /anything* context, even though the sentences are ungrammatical in both languages, we hypothesized that the participants would rescue the sentences and interpret them with a negative reading due to the inherent negative meaning of the Negative Concord Items. All learners had ceiling percentages of negative readings in context 1. With regard to the second context, contrary to our initial predictions, participants did not interpret the sentences with negative readings consistently. The model showed that there was a main effect of language dominance ($p < .05$) and a significant interaction of language dominance with condition ($p < 001$). The results indicated that the more dominant a learner was in Catalan, the more likely he or she was to give existential readings for the Negative Quantifiers and Negative Polarity Items. On closer examination of their responses in the Catalan and Spanish versions of the tasks, we saw that the same effect was seen in the Catalan data.[6] The speakers who were more dominant in Catalan gave the Catalan Negative Concord Item ('*res*') more existential readings than did the speakers who were more dominant in Spanish. For the Spanish data, there was no effect, in

[6] The model on the Catalan data also showed a significant main effect and an interaction between Condition and Language Dominance.

that all the participants interpreted the Negative Concord Item ('*nada*') as having a negative meaning. Why would this be so? These sentences are ungrammatical in both Catalan and Spanish; thus, it might be the case that the participants were rescuing the existential interpretation of Catalan Negative Concord Items allowed in other contexts and over-extending it to repair the ungrammatical sentences in this context. Such a process would not be seen in Spanish due to the fact that Spanish does not generally allow for existential readings of Negative Concord Items in other contexts. Irrespective of what the reason for these unexpected interpretations is, what is interesting for our 1st research question is that the Catalan-interpretations were transferred into L3 English.

With regard to the two critical contexts that allow us to differentiate between the source of the transfer (*Nobody/Anybody…NOT*; *Conditional…nothing/anything*), we noted that the entire pool of participants had quite consistent interpretations in the two different contexts. In the Nobody/Anybody…NOT context, the participants interpreted the sentences as Single Negation readings (as is expected from transfer from Catalan), they only showed double negative readings for these sentences less than 15% of the time. Recall that, in this context, Spanish would have had a facilitative effect for the Negative Quantifier because both Spanish and English give rise to double negation readings in this context, whereas Catalan does not. The statistical model showed no significant main effect or interaction for any of the factors under consideration. This shows that, irrespective of language dominance and the Other-Language Used in Instruction, Catalan was transferred across the board.

Turning now to the *Conditional…nothing/anything* context, we note that the participants also had uniform interpretations for the Negative Quantifiers and Negative Polarity Items in the conditional context. They assigned existential interpretations to both most of the time and there were no significant main effects or interactions. In this case, transfer from Catalan was an instance of non-facilitation for the Negative Quantifier and an instance of facilitation for the Negative Polarity Item, given the actual target mappings in English.

The other factor explored in our study was the language used in the classroom apart from the L3 (that is, Other-Language Used in Instruction). The fact that the teachers might have to provide some L1/L2 assistance in an *ab initio* classroom setting is not controversial, particularly when the L3 is not the language of the society. The potential influence that the L1/L2 use in the L3 classroom might have on transfer selection is yet to be suggested and tested. This was not shown to be a significant predictor.

The fact that both groups of L3 learners behaved similarly with regard to all the conditions suggests that (a) there is no privileged, default transfer system for early bilinguals acquiring an additional language in adulthood and (b) none of the additional factors under consideration were deterministic for transfer selection. The data seem to be compatible with the predictions made by the Typological Primacy Model (TPM) insofar as we see transfer from a single source and that source is, according to its hierarchy (Rothman, 2015) the source the parser should have chosen. And so, why would the parser choose Catalan and not Spanish? The linguistic triad consisted of speakers of two closely related languages acquiring a third, non-genetically related one. Research on speakers of two closely related languages acquiring a third non-genetically similar language is scarce but shows rather nicely that the hierarchy can be applied in this context (Stadt, Hulk & Sleeman 2016, 2018). Puig-Mayenco and Marsden (2018) apply the TPM hierarchy to this same language triad, arguing that since the lexicon of each is no more similar than the other to English it is necessary to move to the next level in the TPM's hierarchy. It is at this level, phonotactics/phonology, that they argue Catalan is the winner given various prosodic features such as its stress timed status, vowel reduction and the like. The data are also potentially compatible with the LPM insofar as there is a clear use of underlying linguistic structure that is motivating transfer. The LPM, however, might have anticipated some degree of influence from both languages, which seems absent in these data.

One could also argue that the dataset is also compatible with a recent proposal by Jabbari, Achard-Bayle, and Ablali (2018), which claims that the language used in the society would be transferred. Our design did not allow us to tease apart the predictions of the TPM and the predictions of this proposal. All of our participant lived in a Catalan-dominant area in which Catalan was the main language used in daily interactions in the society (see Illamola 2015, for a sociolinguistic analysis of the area in which our data were collected). A question arising from this proposal is why the societal language should be a determining factor for transfer selection. If we take this to be a proxy for language use, activation and entrenchment of the system in the speakers' mental representation, we should also expect to see an effect of language dominance in our study. This, however, was not revealed to be a significant predictor at the initial stages. To the extent that societal language is an influence, its effects are potentially attenuated in societal bilingual contexts such as the present one.

5.4.3. TIME 1 versus TIME 2 analysis: A look at developmental trajectories

Having now established a baseline of transfer in TIME 1 of testing, we can now meaningfully address research question 2 and 3 (repeated below), the most novel and interesting part of this study.

R2. What are the variables that modulate L3 development from the point of initial transfer?
R3. Are these variables conditioning development similarly or differently to what conditions transfer selection in the first place? If so, why?

Of the 40 participants in TIME 1, 18 of them continued to learn English, uninterrupted, in a classroom setting. We tested them 11 months later with the same materials— presented in a distinct pseudo-randomized order— to see whether they had started to acquire the inherent

properties of the Negative Quantifiers and Negative Polarity Items in L3 English. The raw results and percentages are shown in table 4 and Figure 3 below:

Table 5.4. Raw counts and percentages (%) of the interpretations of each condition for the learners in TIME 1 and TIME 2 of testing.

		TIME 1		TIME 2	
Context	CONDITION	Raw count	Percentage	Raw count	Percentage
1[a]	Anyone…VERB	69/72	95.83	70/72	97.22
Control	Nobody…VERB	67/72	93.06	67/72	93.06
2[b]	VERB_anything	47/72	65.27	66/72	91.67
Control	VERB…nothing	49/72	68.05	67/72	93.06
3[c]	Anyone…NOT	7/72	9.72	25/72	34.72
Exper.	Nobody…NOT	7/72	9.72	26/72	36.11
4[d]	Conditional...anything	8/72	11.11	39/72	54.17
Exper.	Conditional...nothing	12/72	16.67	61/72	84.72

Counts and percentages of: [a]negative interpretations; [b] negative interpretations; [c] DN interpretations; [d] negative readings.

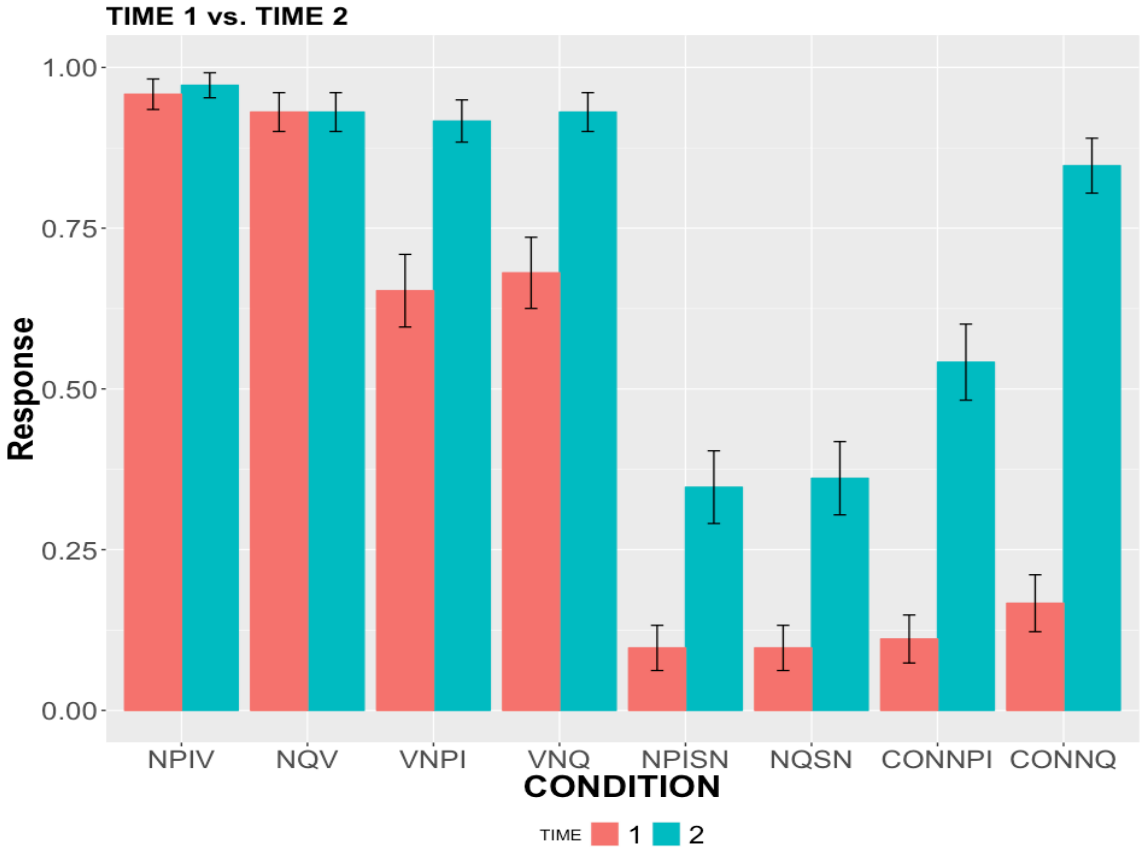

Figure 5.3. Bar-graph of percentages of the interpretations of each condition for the learners in TIME 1 and TIME 2 of testing.

Introducing TIME as a variable into the same analysis one performed in the initial stages study, we compared responses in the four contexts in TIME 1 and in TIME 2 of testing which

will indicate if they are now giving more or less English-like interpretations. Firstly, we present the summaries of the omnibus models for the two control contexts (*Nobody/Anybody...VERB; VERB...nothing/anything*) in the table below.

Table 5.5. Generalised mixed-effects models for the ab initio learners.

Model: Nobody/Anybody…VERB			
	OR	CI: LL, UL	*p*
Intercept (Ref: VERB...anything, TIME 1)	22.65	6.87; 74.34	<. 001
Condition	2.65	.23; 30.19	= .43
Dominance Score	1.01	.99;1.01	= .91
TIME	1.67	.23;12.09	= .61
Condition*Dominance Score	0.98	.96; 1.01	= .06
Condition*TIME	0.16	.01;3.84	= .26
Dominance Score*TIME	1.01	.99;1.02	= .41
Condition*Dominance Score*TIME	1.02	.98;1.02	= .71
Model: VERB…nobody/anybody			
	OR	CI: LL, UL	*p*
Intercept (Ref: VERB...anything, TIME 1)	1.95	1.77; 3.27	<. 001
Condition	1.16	.55; 2.43	= .693
Dominance Score	.99	.99; 1.01	= .608
TIME	7.35	2.23; 24.23	<. 001
Condition*Dominance Score	.99	.99;1.01	= .857
Condition*TIME	2.83	.27;29.61	= .383
Dominance Score*TIME	.99	.98; 1.01	=.462
Condition*Dominance Score*TIME	.99	.97; 1.01	= .317

As was expected, the model targeting the *Nobody/Anybody...VERB* context did not show any significant predictors, and this was no different than in TIME 1. Given the previous languages, this is not a clear context to look for transfer— it was a control condition— because all three languages work the same. And so, we would not expect any change as the target was already attained and no evidence from English as they progress should counter this early facilitation. For *VERB…nothing/anything* context TIME proved significant. Participants were 7.35 times more likely to interpret both the Negative Quantifiers and the Negative Polarity Items as having negative readings in TIME 2. Recall that, at TIME 1, some of the learners showed unexpected existential readings in this context, and that this was captured in the model by

their degree of dominance in Catalan. In TIME 2, the effect of language dominance was no longer evident, and the learners had target-like interpretations in this context.

The summaries of the omnibus models for the two experimental critical contexts (*Nobody/Anybody…NOT; Conditional…nothing/anything*) are presented in the table 6.

Table 5.6. Generalised mixed-effects models for the ab initio learners.

Model: Nobody/Anybody…NOT			
	OR	CI: LL, UL	*p*
Intercept (Ref: NPI...SN; TIME 1)	.05	.01; .19	<. 001
Condition	1.99	.43; 9.32	.382
Dominance Score	1.01	.99; 1.02	.051
TIME	11.71	2.86; 47.73	<. 001
Condition*Dominance Score	.99	.97; 1.01	.141
Condition*TIME	.59	.11; 3.31	.549
Dominance Score*TIME	.98	.97; .99	<. 001
Condition*Dominance Score*TIME	1.01	.98; 1.01	.559
Model: Conditional…nobody/anybody			
	OR	CI: LL, UL	*P*
Intercept (Ref: Con...NPI; TIME 1)	.13	.06; .27	<. 001
Condition	1.58	.59; 4.26	= .358
Dominance Score	.99	.99; 1.01	= .431
TIME	16.21	5.98; 43.86	<. 001
Condition*Dominance Score	0.99	.98; 1.01	= .353
Condition*TIME	4.97	.86; 28.61	= .072
Dominance Score*TIME	.98	.97; .99	<. 05
Condition*Dominance Score*TIME	1.01	.98; 1.01	= .614

The results of the model targeting the first critical context (*Nobody/Anybody…NOT*) showed that there was a significant main effect of TIME, indicating that the learners were 11.71 times more likely to have double negation readings of the Negative Quantifiers and the Negative Polarity Items at TIME 2, and a significant interaction of TIME and LANGUAGE DOMINANCE. This effect is shown in Figure 4 below.

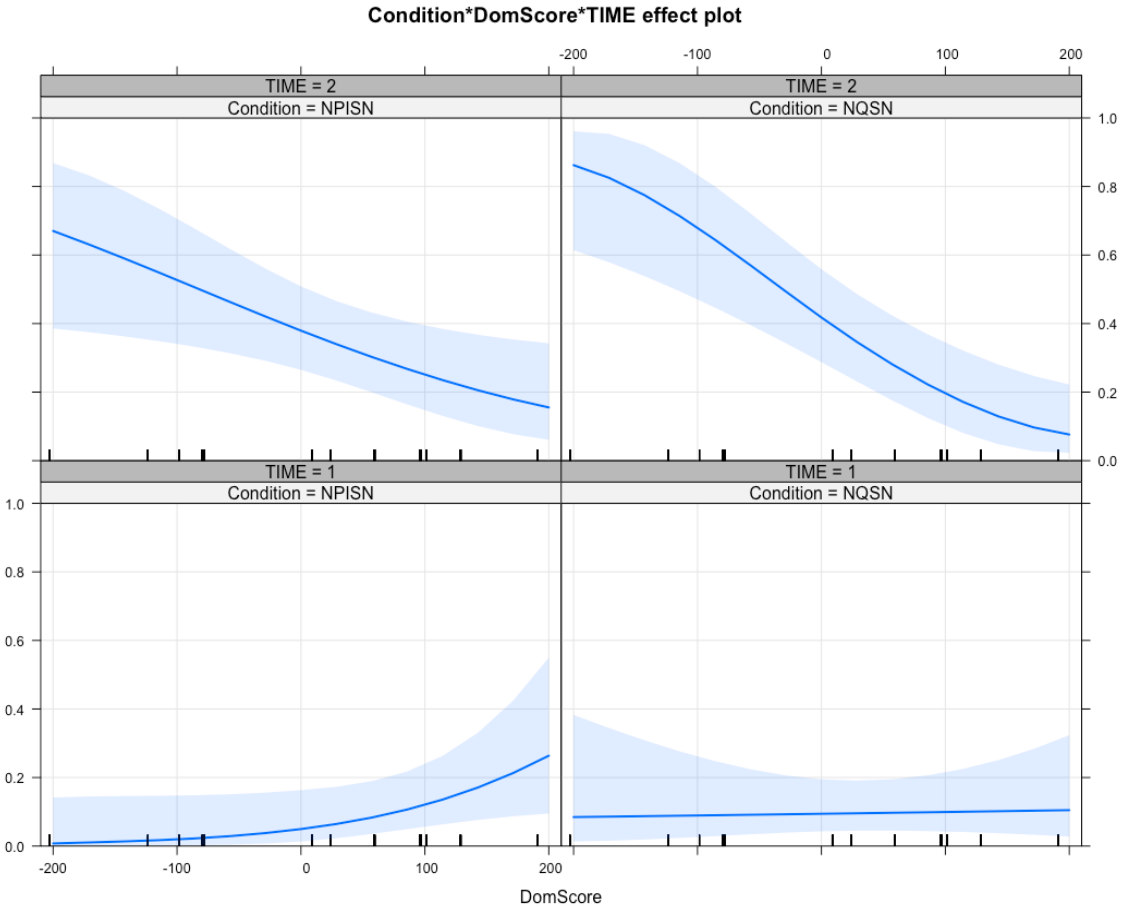

Figure 5.4. Plot of Interaction of Condition*Dominance Score* Time for the Nothing/Anything...NOT conditions.

On the x-axis, we have the score for language dominance (-200 = absolute Spanish dominance; +200 = absolute Catalan dominance, in between scores reflect relativity) and the predicted response of double negation interpretations on the y-axis (1 = Double negation reading, 0= Single Negation reading). We observe that the more dominant someone is in Spanish, the more double negation readings obtained in TIME 2. There was also a main effect of TIME and a significant interaction of TIME with language dominance in the *Conditional…nothing/anything* context. The effect is plotted in the figure 5 below.

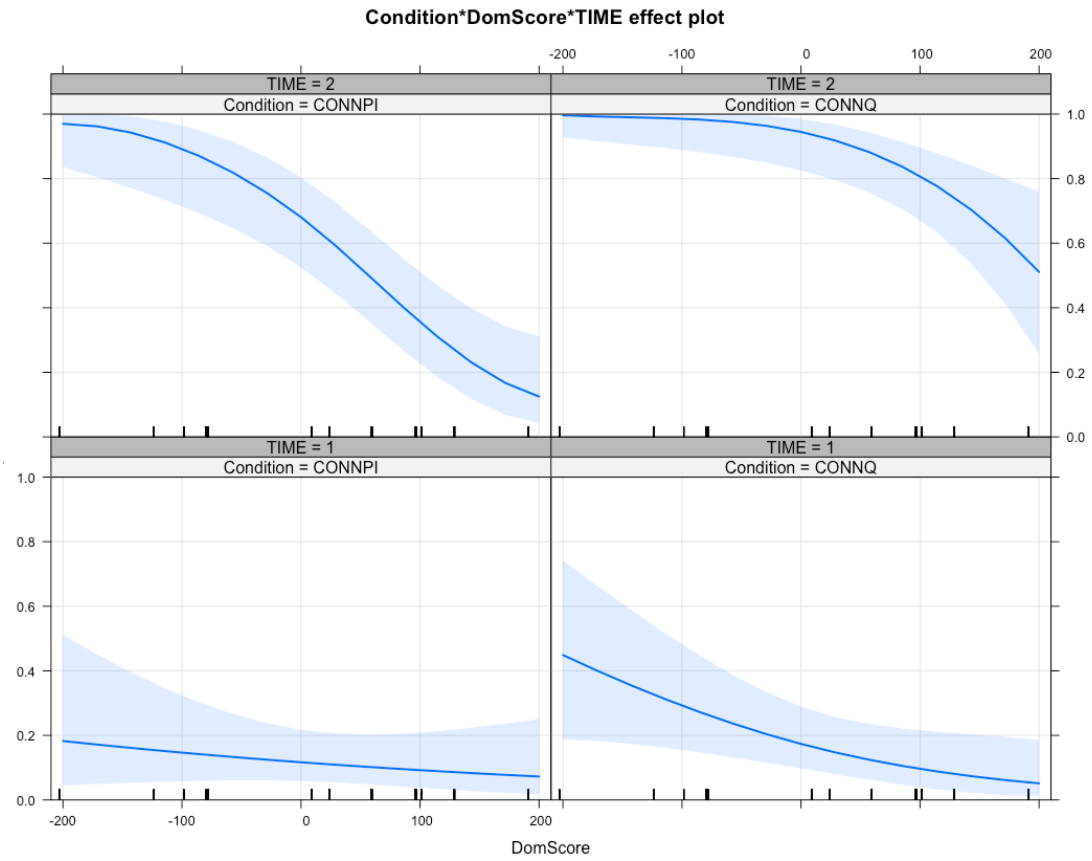

Figure 5.5. Plot of Interaction of Condition*Dominance Score* Time for the Conditional...NQ/NPI conditions.

As above, we have the score for language dominance on the x-axis and the y-axis contains the predicted response for negative interpretations (1 = Negative reading, 0 = Existential reading). What we can conclude from the effect is that the learners were uniformly assigning negative readings to both the Negative Quantifiers and the Negative Polarity Items in the conditional context at TIME 2 of testing. The effect, however, was modulated by their language dominance score: the more dominant they were in Catalan, the fewer negative interpretations they had for the conditions. For the condition with the Negative Quantifier, this implies that those who were more dominant in Spanish already had target-like interpretations. That is, they had overcome non-facilitation earlier than their counterparts. Even though we saw in TIME 1 that dominance did not modulate Catalan transfer effects early on, it seems that recovery from initial stages transfer— in this case overcoming existential interpretations of the Negative Quantifier—is more costly (more difficult) with increased dominance.

This is reminiscent of what Cabrelli Amaro et al. (2018) show in their work on differential trajectories for recovery from Spanish transferred Differential Object Marking (DOM) in L3 Brazilian Portuguese: a non-facilitative transfer since BP does not have DOM. Following up, Cabrelli Amaro and Iverson (in prep.) offer a formal hypothesis to cover the data and attempt to generalize the effect: the *Cumulative Input Threshold Hypothesis (CITH).* On their account, recovery from transfer is proportional to the amount of input one has had in the language that was transferred. They show that adult L2ers recover faster than Heritage Spanish speaker than L1 natives learning L3 BP, a pattern they liken to the relative amount of input each group has had with Spanish or the cumulative threshold effect. Recovery from transfer is not always the same, the more entrenched it is in the source language the more input needed to abandon the form for the L3 target. This promising hypothesis might very well cover our data as well, but we think there might be one amendment needed to how they frame the generalization. Since native language (L1) and dominance typically go hand-in-hand, one could reasonably conclude that there is something akin to an L1 effect for development as regards retreating from initial transfer. What Cabrelli and Iverson discuss certainly seems to fit this mould, even the difference between L1 Spanish and native bilingual HSs of Spanish is captured as the former group will surely have less input in Spanish and, indeed, tends to be less dominant in Spanish on a continuum (see Polinsky 2018 for discussion). However, dominance does not always conform to the typical L1 monolingual > HSs > adult L2 learners directionality. In our case, we can tease apart dominance in a more nuanced way. We can do so precisely because our context is one where there is a potential for balanced bilingualism. Additionally, there is a spectrum of dominance where, like HSs, L1 does not necessarily default to the dominant language but even when it does not (because for some individuals it does) each individual is always exceedingly highly proficient in the other language (unlike the case of HSs). And so, while we agree with the general tenets of *CITH* we suggest that the underlying cause for the differences in development over time might have more to do with

dominance *par excellence* than a cumulative (qualitative) threshold to be overcome. This can only be examined where the two do not necessarily coincide. In principle this could be tested in the future in contexts like the Catalan-Spanish learning L3 X scenarios since in such cases, and for millions of speakers who grow up in bilingual societies, relative dominance in one or the other language does not necessarily mean more or less entrenchment in one or the other language.

The answer to R2 has been amply discussed: of the array of variables we have tested for only dominance seems to stand out. The fact that it does and what this underlies, variation in development due to previous linguistic experience is compatible with insights brought to the fore by two recent proposals, the Linguistic Proximity Model (Westergaard, et al. 2017) and the Scalpel Model (Slabakova, 2017). Both of these approaches highlight the dynamic nature that variables such as dominance (and yet other factors) add to the learning task in additive multilingualism and, crucially, difference that obtain between various types of bilinguals and language pairings learning the same L3. Recall that R3 asked whether the variables that condition initial transfer are the same or different to those that condition multilingual development. Our data are clear: whereas there was no difference in how initial stages transfer obtained, there are clear and predictable differences in development based on dominance. Above, we discussed a promising explanation that might underlie this in the form of *CITH* (Cabrelli & Iverson, in prep): recovering from non-facilitative transfer might be differentially more or less costly depending, at least, on the type of bilingual one given the differential experiences with language that tend to be true of distinct types and groups. Future research will show if this is on the right track and, indeed, what other variables might conspire to explain more of the variation in L3/Ln development and ultimate attainment.

5.5. Conclusions

Our study has shown that extra-linguistic factors such as language dominance, order of acquisition and the language of instruction were not deterministic for transfer selection in L3/L*n* acquisition. We showed, that irrespective of these factors, holistic structural similarity is the most deterministic factor in the case of early bilinguals acquiring a third language (Rothman et al. 2019). More importantly, the longitudinal nature our design shifted the focus towards development— the first of its kind— revealing that developmental sequencing after initial stages transfer is dynamic and non-uniform depending on language dominance in the previous acquired languages. We have to acknowledge that by doing the longitudinal design, the number of participants at the second time of testing was considerably lower. This is due to the high rate of attrition between both testing times. This is, indeed, a major limitation of this particular study which has to be taken into account when looking at the generalizability of the results. This study, however, highlights the fruitful nature of longitudinal design in the emerging field of L3/L*n* acquisition, the principled way variation in the acquisition process takes shape as well as the importance and utility of capturing the baseline of transfer at the initial stages for the creation of developmental theories of L3 acquisition proper.

Chapter 6: Conclusions and future directions

6.1. General Discussion

So far, we have addressed a series of smaller-in-scope research questions pertaining to the individual studies presented in the articles that comprise the body of the dissertation. It is now time to return to the overarching questions proposed in the General Introduction to see how the data from all the studies combined can inform answers to them. Recall the first question asked:

1. What can the study of multilingualism tell us about the cognitive processes underlying the initial stages and beyond of any instance of nonnative acquisition?

There has been a significant amount of research examining how early acquisition unfolds differently in bilingualism as compared to typical monolingual acquisition (see Meisel, 2011; Nicoladis, 2018; Serratrice, 2013, for reviews). Much of this research has focused on examining developmental trajectories in early childhood with a specific emphasis on how intra- and extralinguistic factors affect the development of one or both languages. Studies looking at bilinguals in adulthood have largely focused on adult second language acquisition in crucially different contexts to those that examine early bilingualism, namely, different age of onset, types of learning, etc. (see Rothman & Slabakova, 2017; White, 2018; Wulff & Ellis, 2018; Yilmaz & Schmid, 2018 for updated reviews from various paradigmatic approaches). In article 1 (study 1), we examined if language dominance had an influence on the grammar of early bilinguals tested in adulthood. The results showed that language use and exposure

exercises an important influence on the linguistic competence/performance in both languages of early child bilinguals when tested in a mature ultimate state of knowledge in adulthood.

However, we also showed that dominance alone did not explain all the results. Recall that we tested two domains of grammar and that there was an asymmetry between them. Whereas there was clear cross-linguistic effects for Differential Object Marking (DOM), we did not see such effects for Negative Concord Items. Indeed, we discussed different potential explanations, for example, the fact that Differential Object Marking presents quite a bit of variation with respect to different Spanish dialects (e.g., López, 2012) or the fact that it has been reported to be a particularly vulnerable domain in language contact (see e.g., Montrul, Bhatt, & Girju, 2015). Our results are in line with Polinsky (2016, 2018) and Tsimpli (2014) who argue that some domains are more vulnerable than others in bilingualism for various reasons, in our case potentially cross-linguistic effects that are compounded by the lack of phonological salience of DOM marking in Spanish (*a*) and the lack of semantic import it provides (it serves only as an accusative case marker conditioned by animacy). Our dataset underscores an important methodological point that irrespective of one's interest (purely linguistic or purely extralinguistic) one needs to look at the interaction between linguistic-internal and extralinguistic factors to be able to understand how the languages in the mind of non-monolinguals interact with each other and how this can affect the composition of their mental grammars and/or how they use them in interaction.

In light of the findings in study 1, the results in study 4 also offer some insights into the roles language dominance, exposure and use might have in nonnative language acquisition. This study aimed at (a) establishing a baseline for transfer at the true initial stages crucially with *ab initio* learners and (b) examining the developmental trajectories of these same learners. The results indicate that extralinguistic factors such as language dominance, order of acquisition and the language of instruction are not deterministic for initial stages transfer selection in L3/L*n* acquisition. In line with previous work with a similar population (Puig-

Mayenco and Marsden, 2018; Gorgone, 2018), the data show that irrespective of these factors, holistic structural similarity came out to be the most deterministic factor in the case of early bilinguals acquiring a third language (Rothman et al., 2019). This also relates to the findings in study 2 where the systematic review revealed that holistic structural similarity (i.e., typological transfer as was coded in the study) could explain a good portion of the available datasets. Thus, if we assume that extralinguistic factors such as the order of acquisition or language dominance do not play an important role for transfer selection at the very beginning of acquisition, a logical question to ask was whether these would have a differential effect in subsequent development. The longitudinal portion of study 4 addresses this very point. Recall, we examined whether several factors would be able to account for some of the variability in development. The results revealed that developmental sequencing after initial stages transfer is indeed nonuniform. At later stages of L3 acquisition language dominance in the previously acquired languages plays a deterministic role.

And so, what does all this mean for the study of nonnative acquisition? We have shown in different sections of this dissertation that for us to be able to explore the dynamic factors of multilingualism we cannot ignore the different weights that external factors to language will have and crucially that the same factors can have different weights at distinct points in development. Examining more complex cases of multilingualism (L4, L5 or even L6) will afford us the opportunity to isolate factors that in other instances of acquisition are not possible to isolate. We now turn to the second overarching question.

2. What do methodological practices in the field of L3/L*n* acquisition tell us about the variability found in the literature?

It should come as no surprise that methodologies themselves across studies (can) introduce variability across the literature. Considering that the field of L3/L*n* acquisition is fairly young

and that we now have a good number of studies attempting to answer the same questions, we are in a good position to take a bird's eye view and reflect on what we, as a field, are doing. As pointed out in study 2, theoretical questions should delimit methodological choices and not vice versa. Depending on what we want to answer, different practices will be better suited than others. In study 2, we analyzed the different methodological practices and the possible consequences these had for the reliability of the results. We first explored the compatibility of available studies with the different variables that have been claimed as deterministic in the L3 models. Recall that L1 transfer only is compatible with 14.1% of the results, L2 transfer is compatible with 28.2%, Typological transfer with 60.5% and maximal-facilitation is compatible with only 5.9% of the results. Indeed, some variables captured more data in general than others. While no single variable accounts for all the data, this might be due to the fact that not all data are appropriately sourced than they are suggestive of one or another model being wrong.

We also examined whether there were some significant associations between specific methodological practices and outcomes. This was, indeed, the case. We saw that the lack of use of mirror-image methodologies was significantly associated with affirmative evidence for a potentially default L1 or L2 transfer effect (of the relative small subsets of relevant data), this can potentially explain the fact that most studies showing transfer either coming from the L1 or the L2 are also compatible with typological transfer. Had these studies employed a mirror-image design, we would be able to tease apart these factors. In addition, we also saw that hybridity in transfer selection is significantly associated with the use of production data. As we argued in study 2, this is also to be expected, especially if we consider that production is complex and thus susceptible to in-the-moment effects that are not truly indicative of the underlying linguistic system. Grüter (2006) suggests that initial state data coming from production are not ideal to answer questions pertaining to transfer selection in L2 acquisition.

We wish to extend the same point in this dissertation for L3 acquisition studies (see also González Alonso & Rothman, 2017; Rothman et al. 2019).

All in all, the review allowed us to establish what the "ideal" L3 study to examine morphosyntactic transfer in L3 acquisition should consider. We concluded that to increase comparability across studies in the field and to be able to test as many theories as possible with reliable results, an L3 study should: (a) employ, where possible, a mirror-image design or some other control (using L2 learners in comparison to L3 learners who share the same L1 and the L2/ L3 is the same target language could be a good choice depending on certain factors) (b) test the specific knowledge of the L3 domains of inquiry in the previously acquired languages so one knows exactly what is available for transfer, (c) use comprehension or production plus comprehension methods, especially for beginning L3 learners and (d) test participants at the true initial stages to get a base-line for their own development or for being able to disentangle transfer for other developmental factors. Such recommendations allowed us to carefully design the methodology that we used in what is study 3 and study 4.

The insights we could glean already from the systematic review and summarized in (a)-(d) just above are echoed in the datasets of the studies of this dissertation. Study 3 is perhaps the best example of this. It highlights the importance of testing the participants at the actual initial stages at the very onset of L3 acquisition so that one can isolate any potential noise coming from L3 learning/acquisition effects. The results showed that controlling for exposure in the L3 is not only important but essential for the study of transfer and crucially, that low proficiency itself is not a suitable proxy for *ab initio* learning. Recall from the systematic review that only 30 out of 71 studies (42.3%) use learners who have "low" proficiency in the L3. This is not to say that all these learners have equally low exposure as in some studies learners have been exposed to the L3 for more than 12 years. The studies that use actual *ab initio* learners are even fewer. The fact that the learners with low proficiency but significant exposure to L3 in study 3 showed an effect of L3 learning despite their low proficiency requires us as a field

to take a pause and reflect on what this might mean beyond the confines of our study. Minimally, this warns us that we might be inadvertently injecting noise into the equation and spending time unnecessarily trying to make sense of the noise. When it comes to isolating initial stages transfer, these data hammer home the point that we must be able to make sure that we are capturing the initial interlanguage representations and not subsequent ones down the line. This methodological caveat holds true for the study of transfer in any instance of acquisition be that in children or adults and irrespective of the number of languages involved (L2, L3 or L*n*).

A last methodological point we made in the dissertation was the importance of using longitudinal designs in the study of L3 development. Whereas we acknowledge that these designs are more difficult to produce, the advantages are manifold. As we saw in study 4, these designs allow us to capture the baseline for transfer at the initial stages and explore subsequent development where we can have maximal control: witnessing what happens overtime in the very same individual learners. Of course, cross-sectional studies are extremely important as well and can offer good insights of similar scope as Cabrelli Amaro et al. (2018) and Cabrelli and Iverson (in preparation) do. Interestingly, these two distinct methods seem to be converging in the same direction, which is promising indeed.

Throughout the dissertation, we have tried to reveal the consequences methodological choices can have for the interpretation of results. Considering that the field of L3 morphosyntactic transfer has matured beyond an exploratory, theory-building phase, it is worth adopting a consistent methodology that allows us to test, falsify and develop theories of morphosyntactic transfer (Rothman, et al. 2019). We have aimed at showing how we can do so and what the ideal practices might be to have the most reliable results. As opposed to the initial stages, there is a dearth of studies looking at development in L3 acquisition and thus, different methodologies and suggestions are welcome to understand how we want to proceed with the examination of what happens throughout development and for the sake of

understanding L3 development in its own right, not merely for what it can reveal about cross-linguistic influence. Let us now move onto the final overarching question, repeated below in (3).

3. How can the study of multilingualism help us understand the nature of certain linguistic domains?

Within the generativist tradition, the formalization of language has relied heavily on the judgments and intuitions of native speakers. During the past decade there has been a progressive shift towards using experimental designs with large cohorts of native speakers to test the hypotheses made by theoreticians. Even though the focus of this dissertation was not to inform theoretical descriptions of the domains of grammar used *per se*, the interaction between our research questions and the methodologies we have used provides some insights that we would be wise to capitalize on. Recall from the introduction that we discussed a general debate that surrounds the nature of Negative Concord Items. These lexical items have been argued to be quantifiers, polarity items and/or indefinites. As we also highlighted, none of the proposals could account for the distribution of these items in all the world's languages. The results in this dissertation can give insights into two points that have been discussed: (a) the existence of two dialects in Catalan to account for the variation found with respect to the co-occurrence of the Negative Concord Item and sentential negation (Zeijlstra, 2004) and (b) the possibility that there are two homophonous Negative Concord Items, one behaving like a Negative Quantifier and the other one behaving like a polarity item (Herburger, 2001).

Relating to (a), Zeijlstra (2004) argues that the apparent variation described in Catalan—preverbal NCI can optionally co-occur with overt negation without cancelling sentential (semantic) negation—obtains from two varieties of Catalan that have opposing, yet non-optional rules. He claims that in one variety of Catalan, working like Spanish and English, preverbal NCI cannot co-exist with overt negative markers and in the other, like Romanian,

they always do. The confusion then rests in the collapsing of these two distinct dialects into one, for example, judgements on average seem to be optional when a given group consists potentially of speakers from both hypothesized varieties. Crucially, if this is on the right track no single individual will show variation in this domain, they should either always opt for the Romanian type or Spanish type but never an intermediary as some have argued Catalan to actually be. As we saw in study 1, however, both groups of early bilinguals showed acceptance and processing of preverbal Negative Concord Items both with and without sentential negation, with very little standard deviation noted in the responses. Equally, in Study 4 we saw that they had transferred Catalan into L3 English, showing that all participants irrespective of the order of acquisition and language dominance had very low percentages of double negation readings, which goes in line with the theoretical descriptions of Catalan capturing that the apparent optionality Zeijlstra claims is epi-phenomenal (e.g. Espinal 2000). Indeed, the combined results show that there is not a divide between participants, making it questionable to maintain that there are two distinct dialects of Catalan whose averaging by random sampling in a given group of speakers makes it seem otherwise (see Déprez et al. 2015 for similar argumentation). In Study 1 we saw that individual participants treated relevant sentences equally, allowing for optionality with respect to the appearance of the sentential negative marker in accord with the preverbal Negative Concord Item. And so, our results go against the proposal in Zeijlstra (2004). Having looked at these lexical items in the context of bilingualism and multilingualism has allowed us to postulate that these two dialects of Catalan do not exist, but rather that there has to be something inherent in these lexical items and structures that allows for such optionality.

Another insight we can offer relates to the description of Catalan Negative Concord Items, which need to capture the fact their inherent nature is different to Spanish Negative Concord Items. Herburger (2001) for Spanish and recent work by Espinal and Tubau (2016) for Catalan have suggested that it might be the case that there are competing homophonous

lexical items that give rise to the asymmetry described and seen in our results. Recall that in study 4 we had a control condition where we had not predicted to see any differences with respect to their interpretation of English Negative Quantifiers. We asked learners to interpret sentences where the Negative Quantifier appeared post-verbally in a declarative sentence without an overt negative operator. Whereas this is grammatical in English, it is ungrammatical in both Catalan and Spanish. Assuming that Catalan and Spanish Negative Concord Items were inherently negative, we predicted that they should show negative interpretations in English irrespective of the language transferred. This turned out not to be the case. We saw that they only interpreted these sentences negatively around 50% of the time. They gave these items some unexpected existential readings. Interestingly, this effect was modulated by language dominance. The more dominant in Catalan they were the more existential readings they allowed. To understand what was going on, we examined the Catalan and Spanish data for this same condition for the same participants. We saw that whereas all the participants had ceiling negative interpretations for Spanish Negative Concord Items, their Catalan data patterned as their English data did. They were interpreting 50% of the time Catalan Negative Concord Items in this context as having existential interpretation. Again, this was also modulated by language dominance. The more dominant in Catalan they were, the more existential readings they assigned to these lexical items in Catalan.

Thus, what does this tell us about the debate on the nature of Negative Concord Items? Assuming that they are 'inherently negative' has two potential outcomes. We can either align Negative Concord Items with Negative Quantifiers, rather than Negative Polarity Items (e.g., Haegeman, 1991; Haegeman & Zanuttini, 1991); or assume that Negative Concord Items carry a [uNeg] feature that needs to be checked by an [iNeg] operator. Our results have shown that they cannot be Negative Quantifiers because if they were inherent Negative Quantifiers they should never get the existential readings that we have shown they sometimes get. This goes in line with accounts that argue that Negative Concord Items are Negative Polarity Items

(e.g., Laka, 1990; Bosque, 1980). Following Zeijlstra analysis, our results have shown that when a post-verbal [uNeg] element lacks an overt [iNeg] licensor, the derivation of the sentence fails to be interpreted as negative consistently. Contra to Zeijlstra's (2004) predictions, our results also shown that there is a high percentage of existential readings in Catalan. Zeijlstra's would simply predict the derivation to crash due to the presence of the unchecked feature. This, however, is not what happens in our data. Considering that the ungrammatical sentences get negative readings 50 % of the time and existential ones 50% of the time, this mean that (a) the speakers repair the sentences to be negative somehow and that (b) the [uNeg] feature cannot be inherent to NCIs in Catalan as argued in Espinal and Tubau (2016) due to the fact that they can get existential readings.

A question that follows from (a) is what mechanisms use these speakers to repair these sentences? Zeijlstra (2004) assumes that pre-verbal Negative Concord Items in Spanish can trigger the presence of a Last Resort null operator specified as [iNeg] that can check the relevant [uNeg] feature on the Negative Concord Item so that it can appear in pre-verbal position without an overt negative operator. Zeijlstra, however, precludes the possibility of this Last Resort null operator to license post-verbal Negative Concord Items. If we take this Last Resort null operator to be more accessible than Zeijlstra claims, then it might be the case that our speakers are extending the use of this operator to Negative Concord Items in post-verbal position. This argumentation goes in line with Etxeberria et al. (2018) who show that Basque-Spanish speakers are rescuing Basque ungrammatical sentences with Negative Polarity Items using Zeijlstra's Last Resort Operator. And so, if this analysis is on the right track our results coupled together with those of Etxeberria et al. (2018) show that this repair strategy is more generally available than what Zeijlstra proposes.

All in all, this shows that for participants who are Spanish-dominant there seem to be two coexisting sets of homophonous Negative Concord Items in Catalan: one that behaves more like a Negative Polarity Item and one that behaves like a Negative Quantifier. This is

seen in the fact that they all have target-like existential interpretations in a conditional sentence, but only those who are Catalan-dominant seem to be have an non-inherent negative reading (allow existential readings optionally) when they rescue the ungrammatical condition in the control context. This argumentation fits nicely with Herburger's claim that there might be an on-going linguistic change and that Catalan might fall at an earlier stage within the Jespersen's Cycle (1917) for which its Negative Concord Items are more polar than those of Spanish. A similar position has also been taken by Déprez et al. (2015) and Espinal and Tubau (2016). Bilingualism (and language dominance) might be triggering linguistic change and speeding up the synchronic change of Catalan within Jespersen's Cycle of negation. It might be that in some years from now Catalan Negative Concord Items will behave like the ones from Spanish where they will be more core negative elements as opposed to polarity items. This argumentation for which bilingualism might be the lead of linguistic change in situations of language contact at the proportion of Catalan and Spanish in Catalonia has recently been advocated for by Perpiñán (2018) in this very situation where she shows potentially similar effects in domain of object expression.

6.2. Future directions

After having discussed the main findings of the four relevant studies of this dissertation, there is something that seems clearer to me than when I started this journey. The reality of testing and understanding bilingualism and multilingualism is messier and more dynamic than we typically assume, or hope, it should be. There are many avenues of research that I would want to pursue now, there are many more open questions that I would like to have an answer to. However, there are two main points that I hope will guide my near future research agenda: (a) Is it really the case that transfer is wholesale? and (b) What other factors come into play for developmental theories of L3 acquisition? The goal of both questions is to help inch the field responsibly towards a truly comprehensive theory of multilingual grammatical development.

In study 3 and 4, we saw that there was transfer from Catalan into L3 English for both Negative Polarity Items and Negative Quantifiers. A question that remains is whether transfer happens wholesale or on a property-by-property basis, a question we simply cannot answer on the basis of examining a single domain. We would need evidence from more properties in this language pairing to draw a definitive conclusion. There are three studies looking at L3 English by Catalan–Spanish bilinguals. These three studies show transfer from Catalan to English (Llisterri and Poch-Olivé, 1987: phonology; Puig-Mayenco & Marsden: Negative Polarity Item; and Gorgone: 2018: the Definiteness Effect). Taken together, the evidence seems to lead in the direction that transfer is likely to be wholistic, at least all available evidence is consistent with this view. And because Typology as defined by the TPM seems to make the right prediction, it is reasonable to say the evidence base of L3 English by Catalan–Spanish bilingual studies supports the general tenets of the TPM. Although recent work by Cabrelli Amaro, Pichan, Rothman and Serratrice (2018) has started to compare across distinct modules of the grammar (phonology vs syntax), much more work across different properties and different domains of grammar is needed. We also saw in the second part of study 4 that language dominance modulated the rate of overcoming nonfacilitation in L3 acquisition. However, what is not yet clear is why this should be the case or how robust this finding will stand up to further investigation. More studies carefully designed to test this and many other variables are welcome to understand fully the course of L3 development.

6.3. A closing point

The brief discussion of the overarching questions that guided this dissertation is meant to bring together the four studies that constitute the dissertation. If there is one point that can be taken as truth, it is that there is much more to be understood about the complexities entailed in the study of morphosyntax and multilingualism. No current theory has the power to explain everything and much more research is still needed to understand a bit better what

factors contribute to the beginning and subsequent development in L3 morphosyntax acquisition. I believe that the field is now ready to move to comprehensive modeling from the initial stages through developmental sequencing and ultimate attainment. We need carefully designed cross-sectional and longitudinal studies that can isolate and combine different variables to understand the different weightings (and the potential temporal shifting of such weightings) each has for L3 acquisition. With this, I do not mean to say that we need to stop looking at transfer *per se*, but that the field has produced a critical mass of knowledge where it is safe to project more widely.

Future work will address many of the open questions that we are leaving behind. Hopefully, with more promising answers and new avenues for further research. I hope to have shown how the different pieces of this dissertation have contributed to the bigger picture of additive multilingual acquisition. I also hope to have shown that we are now a step closer to understanding how multilingualism operates within human cognition.

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Appendices

Appendix A: Summary of study 1 properties

The following table summarizes how the two domains under investigation operate in Catalan and Spanish.

Table A.A.1. Summary of the two properties under investigation

	Catalan	**Spanish**
Negative Concord Items		
Ningú/Nadie...NO	Grammatical	Ungrammatical
Ningú/Nadie...VERB	Grammatical	Grammatical
Differential Object Marking		
With...DOM	Ungrammatical	Grammatical
Without...DOM	Grammatical	Ungrammatical

Appendix B: Leap-Q Questionnaire

Language Experience and Proficiency Questionnaire (LEAP-Q)

Last Name		First Name		Today's Date	
Age		Date of Birth		Male ☐	Female ☐

(1) Please list all the languages you know **in order of dominance**:

1	**2**	**3**	**4**	**5**

(2) Please list all the languages you know **in order of acquisition** (your native language first):

1	**2**	**3**	**4**	**5**

(3) Please list what percentage of the time you are *currently* and *on average* exposed to each language.
(*Your percentages should add up to 100%*):

List language here:					
List percentage here:					

(4) When choosing to read a text available in all your languages, in what percentage of cases would you choose to read it in each of your languages? Assume that the original was written in another language, which is unknown to you.
(Your percentages should add up to 100%):

List language here					
List percentage here:					

(5) When choosing a language to speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language? Please report percent of total time.
(*Your percentages should add up to 100%*):

List language here					
List percentage here:					

(6) Please name the cultures with which you identify. On a scale from zero to ten, please rate the extent to which you identify with each culture. (Examples of possible cultures include US-American, Chinese, Jewish-Orthodox, etc):

List cultures here					
	(click here for scale)	(click here for scale)	(click here for scale)	(click here for scale)	(click here for scale)

(7) How many years of formal education do you have? _____ _____
Please check your highest education level (or the approximate US equivalent to a degree obtained in another country):

☐ Less than High School ☐ Some College ☐ Masters
☐ High School ☐ College ☐ Ph.D./M.D./J.D.
☐ Professional Training ☐ Some Graduate School ☐ Other:

(8) Date of immigration to the USA, if applicable ___ _____
If you have ever immigrated to another country, please provide name of country and date of immigration here.
_____ _____

(9) Have you ever had a vision problem ☐, hearing impairment ☐, language disability ☐, or learning disability ☐ ? (Check all applicable). If yes, please explain (including any corrections):
_____ _____

Language:

This is my (please select from pull-down menu) language.

All questions below refer to your knowledge of .

(1) Age when you…:

began acquiring :	*became fluent* in :	*began reading* in :	*became fluent reading* in :

(2) Please list the number of years and months you spent in each language environment:

	Years	Months
A country where is spoken		
A family where is spoken		
A school and/or working environment where is spoken		

(3) On a scale from zero to ten, please select your *level of* ***proficiency*** in speaking, understanding, and reading from the scroll-down menus:

Speaking	(click here for scale)	Understanding spoken language	(click here for scale)	Reading	(click here for scale)

(4) On a scale from zero to ten, please select how much the following factors contributed to you learning :

Interacting with friends	(click here for pull-down scale)	Language tapes/self instruction	(click here for pull-down scale)
Interacting with family	(click here for pull-down scale)	Watching TV	(click here for pull-down scale)
Reading	(click here for pull-down scale)	Listening to the radio	(click here for pull-down scale)

(5) Please rate to what extent you are currently exposed to in the following contexts:

Interacting with friends	(click here for pull-down scale)	Listening to radio/music	(click here for pull-down scale)
Interacting with family	(click here for pull-down scale)	Reading	(click here for pull-down scale)
Watching TV	(click here for pull-down scale)	Language-lab/self-instruction	(click here for pull-down scale)

(6) In your perception, how much of a foreign accent do you have in ?

(click here for pull-down scale)

(7) Please rate how frequently others identify you as a non-native speaker based on your accent in :

(click here for pull-down scale)

Language:

This is my (please select from pull-down menu) language.

All questions below refer to your knowledge of .

(1) Age when you…:

began acquiring :	*became fluent* in :	*began reading* in :	*became fluent reading* in :

(2) Please list the number of years and months you spent in each language environment:

	Years	Months
A country where is spoken		
A family where is spoken		
A school and/or working environment where is spoken		

(3) On a scale from zero to ten please select your *level of* ***proficiency*** in speaking, understanding, and reading from the scroll-down menus:

Speaking	(click here for scale)	Understanding spoken language	(click here for scale)	Reading	(click here for scale)

(4) On a scale from zero to ten, please select how much the following factors contributed to you learning :

Interacting with friends	(click here for pull-down scale)	Language tapes/self instruction	(click here for pull-down scale)
Interacting with family	(click here for pull-down scale)	Watching TV	(click here for pull-down scale)
Reading	(click here for pull-down scale)	Listening to the radio	(click here for pull-down scale)

(5) Please rate to what extent you are currently exposed to in the following contexts:

Interacting with friends	(click here for pull-down scale)	Listening to radio/music	(click here for pull-down scale)
Interacting with family	(click here for pull-down scale)	Reading	(click here for pull-down scale)
Watching TV	(click here for pull-down scale)	Language-lab/self-instruction	(click here for pull-down scale)

(6) In your perception, how much of a foreign accent do you have in ?

(click here for pull-down scale)

(7) Please rate how frequently others identify you as a non-native speaker based on your accent in :

(click here for pull-down scale)

Appendix C: Stimuli for Study 1 (GJT)

Catalan version

PRACTIVE ITEMS

T1	Aquestes són les frases
T2	La Maria és de Mallorca
T3	La Maria son de Mallorca
T4	Qui va dir que la Maria era de Mallorca?
T5	Hi havia la Sara a la festa?
T6	Vas beure un got d'aigua a la festa?

+ DOM

DOM1	La Maria veurà la Sandra després de la festa
DOM2	La Maria escoltarà la Clara aquest vespre
DOM3	La Sandra trucarà la Marta demà al matí
DOM4	La Sara buscarà la Maria abans de classe
DOM5	La Carla coneixerà la Sandra a la festa
DOM6	La Maria veurà la Sara al mercat
DOM7	La Sandra escoltarà la Sara a classe
DOM8	La Maria trucarà la Marta d'aquí 10 minuts

-DOM

DOM9	La Maria veurà a la Sandra després de la festa
DOM10	La Carla va conèixer a la Laura ahir
DOM11	La Maria va veure a la Paula al mercat
DOM12	La Sara va trucar a la Maria a les onze
DOM13	La Carla buscarà a la Marta a la festa
DOM14	La Sara escoltarà a la Sara a la presentació
DOM15	La Mònica coneixerà a la Laura a la festa
DOM16	La Sandra buscarà a la Marta per revisar l'examen

NCI + NO

NCI1	Ningú no comprarà pomes a la botiga
NCI2	Ningú no llegirà aquest llibre
NCI3	Ningú no dirà el que pensa a la Maria
NCI4	Ningú no comprarà peres a la botiga
NCI5	Ningú no llegirà en veu alta en anglès
NCI6	Ningú no va beure una cervesa l'altre dia
NCI7	Ningú no volia les pomes de l'hort
NCI8	Ningú no escriurà el treball en anglès

NCI + VERB

NCI9	Ningú portarà regals a la festa
NCI10	Ningú llegirà el llibre de la Rodoreda
NCI11	Ningú vol menjar pollastre cru
NCI12	Ningú cantarà en anglès davant de tothom
NCI13	Ningú farà els deures abans d'anar a la platja
NCI14	Ningú parla japonès perfectament a la classe
NCI15	Ningú escriurà la carta per la Sandra
NCI16	Ningú arribarà a les 7 de la tarda

GRAMMATICAL DISTRACTORS

DISG1	La Sandra comprarà cebes a la botiga
DISG2	La Maria anirà al parc amb en Joan
DISG3	La Sara estudia japonès als vespres
DISG4	Demà arribarà el paquet que esperes
DISG5	Vas comprar res per la festa?
DISG6	Vas dir res a la Maria?
DISG7	Avisa'm si arriba ningú abans d'hora
DISG8	Avisa'm si hi ha ningú a la sala

UNGRAMMATICAL DISTRACTORS

DISU1	La Maria escriuran tres cartes per la professora
DISU2	Ningú voldran anar a la platja demàs passat
DISU3	La Maria i en Pere no farà els deures d'anglès
DISU4	La Carla i en Joan no parla en anglès a classe
DISU5	La Silvia donarà el llibre a ningú
DISU6	La Marta anireu al parc amb el gos
DISU7	L'Aina portarà uns pantalons blaves
DISU8	La Carla portava tres brusa groga

Spanish version

PRACTICE

T1	Estas son las frases
T2	María es de Sevilla
T3	Carmen y María es de Sevilla
T4	¿Quién dijo que María era de Sevilla?
T5	¿Hablasteis con Sara en la fiesta?
T6	Había muchas bebidas en la fiesta

+DOM

DOM2	Carmen escuchó Marta ayer por la noche
DOM3	Sara buscará Carmen después de clase
DOM4	Carla conoció Carmen en la fiesta
DOM5	María vio Carmen en el mercado
DOM6	Sara escuchó Carmen en clase
DOM7	María llamará Sara después de cenar
DOM8	Carmen conoció María en una fiesta

-DOM

DOM9	Carmen verá a Sara después de la fiesta
DOM10	María escuchó a Carmen ayer por la mañana
DOM11	Carla buscará a Juana en el supermercado
DOM12	Carmen conoció a Carla en la fiesta
DOM13	María vio a Sara en el supermercado
DOM14	Carla escuchó a Juana en la presentación
DOM15	Carmen llamará a Sara durante la fiesta
DOM16	Carmen conoció a Pepita en la tienda de ropa

NCI + NO

NCI1	Nadie no compro manzanas en la tienda
NCI2	Nadie no leerá este libro
NCI3	Nadie no dijo la verdad a María
NCI4	Nadie no compró palomitas para la película
NCI5	Nadie no se bebió una cerveza en el bar
NCI6	Nadie no vino antes de comer
NCI7	Nadie no quiso que comprásemos las entradas
NCI8	Nadie no dormirá en la tienda de campaña

NCI + VERB

NCI9 Nadie traerá regalos a la fiesta
NCI10 Nadie leerá el libro de Cervantes
NCI11 Nadie quiere comer pescado para cenar
NCI12 Nadie quiere aprender esperanto en la escuela
NCI13 Nadie va a terminar el libro antes de clase
NCI14 Nadie compró una rosa para María
NCI15 Nadie escribió una carta para el director
NCI16 Nadie habló con la profesora de portugués

GRAMMATICAL DISTRACTORS

DISG1 Carmen comprará higos en la tienda
DISG2 María ira al parque con Juan
DISG3 Sara estudia árabe por las noches
DISG4 Mañana llegaré el paquete que todos esperamos
DISG5 ¿Vas a comprar algo para María?
DISG6 ¿Hablasteis del tema con Carmen?
DISG7 Dime algo si llega María antes de cenar
DISG8 Juana llegará a las ocho

UNGRAMMATICAL DISTRACTORS

DISU1 María escribirán tres poemas en clase
DISU2 Pedro quieren ir a la playa mañana
DISU3 Carmen y Carlos no va a hacer mucho el domingo
DISU4 Sara y Marta no habla en portugués en clase
DISU5 Silvia dará nada a Juan
DISU6 Marta irán a dar un paseo
DISU7 María se compró un coche roja
DISU8 María y Juan tiene dos perro pequeño

Appendix D: Stimuli for Study 1 (SPR)

Catalan Version

PRACTICE

T1	Les frases es presentaran així
T2	Així les pots llegir d'aquesta manera
T3	És una frase de prova
T4	Ara començarà l'exercici
T5	La Maria i les seves amigues aniran a una festa
T6	Hi haurà molta gent a la festa
T7	La Maria i les seves amigues estudiaran francès
T8	La Sandra després de la festa es diu Sandra

+ DOM

DOM1	La Maria veurà la Sandra després de la festa
DOM2	La Maria sentirà la Sandra després de la festa
DOM3	La Marta buscarà la Sandra després de la festa
DOM4	La Marta coneixerà la Sandra després de la festa
DOM5	La Sara veurà la Sandra després de la festa
DOM6	La Sara sentirà la Sandra després de la festa
DOM7	La Clara buscarà la Sandra després de la festa
DOM8	La Clara coneixerà la Sandra després de la festa

DOM

DOM9	La Maria veurà a la Sandra després de la festa
DOM10	La Maria sentirà a la Sandra després de la festa
DOM11	La Marta buscarà a la Sandra després de la festa
DOM12	La Marta coneixerà a la Sandra després de la festa
DOM13	La Sara veurà a la Sandra després de la festa
DOM14	La Sara sentirà a la Sandra després de la festa
DOM15	La Clara buscarà a la Sandra després de la festa
DOM16	La Clara coneixerà a la Sandra després de la festa

NCI + NO

NCI1	Ningú no comprarà pomes a la botiga
NCI2	Ningú no comprarà peres a la botiga
NCI3	Ningú no comprarà prunes a la botiga
NCI4	Ningú no comprarà figues a la botiga
NCI5	Ningú no comprarà cebes a la botiga

NCI6	Ningú no comprarà melons a la botiga
NCI7	Ningú no comprarà cigrons a la botiga
NCI8	Ningú no comprarà enciam a la botiga

NCI + VERB

NCI9	Ningú portarà regals a la festa
NCI10	Ningú portarà amics a la festa
NCI11	Ningú portarà beure a la festa
NCI12	Ningú portarà flors a la festa
NCI13	Ningú portarà menjar a la festa
NCI14	Ningú portarà música a la festa
NCI15	Ningú portarà glaçons a la festa
NCI16	Ningú portarà globus a la festa

GRAMMATICAL DISTRACTOR

DISG1	La Sandra comprarà cebes a la botiga
DISG2	La Maria comprarà melons a la botiga
DISG3	La Marta comprarà peres a la botiga
DISG4	La Maria comprarà cigrons a la botiga
DISG5	La Sara llegirà un llibre després de la festa
DISG6	La Carla llegirà un llibre després de la festa
DISG7	La Marta llegirà un llibre després de la festa
DISG8	La Sara llegirà un llibre després de la festa

UNGRAMMATICAL DISTRACTOR

DISU1	La Sara comprarà a pomes a la botiga
DISU2	La Marta comprarà a peres a la botiga
DISU3	La Sara comprarà a melons a la botiga
DISU4	La Clara comprarà a cigrons a la botiga
DISU5	La Sara llegirà a un llibre després de la festa
DISU6	La Marta llegirà a un llibre després de la festa
DISU7	La Sara llegirà a un llibre després de la festa
DISU8	La Carla llegirà a un llibre després de la festa

Spanish Version

PRACTICE

T1	Las frases se presentaran así
T2	¿Las puedes leer de esta manera?
T3	Esto es una frase nueva
T4	Ahora comenzará el ejercicio
T5	María y sus amigas irán a una fiesta
T6	Habrá mucha gente en la fiesta
T7	María y sus amigas estudian portugués
T8	La profesora de portugués se llama Carmen

+DOM

DOM1	María verá Carmen después de la fiesta
DOM2	María escuchará Carmen después de la fiesta
DOM3	Marta buscará María después de la fiesta
DOM4	Marta conocerá Sandra después de la fiesta
DOM5	Sara verá Carmen después de la fiesta
DOM6	Clara escuchará Carmen después de la fiesta
DOM7	Marta buscará Sandra después de la fiesta
DOM8	Carmen conocerá María después de la fiesta

- DOM

DOM9	María verá a Carmen después de la fiesta
DOM10	María escuchará a Marta después de la fiesta
DOM11	Clara buscará a Carmen después de la fiesta
DOM12	María conocerá a Sandra después de la fiesta
DOM13	Marta buscará a Clara después de la fiesta
DOM14	Sara verá a Carmen después de la fiesta
DOM15	Sara escuchará a Carmen después de la fiesta
DOM16	Carmen conocerá a Paula después de la fiesta

NCI+NO

NCI1	Nadie no comerá uvas en la cocina
NCI2	Nadie no comerá peras en la cocina
NCI3	Nadie no comerá ciruelas en la cocina
NCI4	Nadie no comerá higos en la cocina
NCI5	Nadie no traerá globos a la fiesta
NCI6	Nadie no traerá regalos a la fiesta

NCI7	Nadie no traerá flores a la fiesta
NCI8	Nadie no traerá bebida a la fiesta

NCI+VERB

NCI9	**Nadie traerá libros a la fiesta**
NCI10	Nadie traerá amigos a la fiesta
NCI11	Nadie traerá flores a la fiesta
NCI12	Nadie traerá música a la fiesta
NCI13	Nadie comerá carne en la cocina
NCI14	Nadie comerá coco en la cocina
NCI15	**Nadie comerá melón en la cocina**
NCI16	**Nadie comerá fresas en la cocina**

GRAMMATICAL DISTRACTOR

DISG1	Sandra comprará flores en la tienda
DISG2	María comprará melones en la tienda
DISG3	**Carmen comprará peras en la tienda**
DISG4	Sara comprará fresas en la tienda
DISG5	**Sara buscará libros en el súper**
DISG6	**Carla buscará melones en el súper**
DISG7	**Carmen buscará hojas en la clase**
DISG8	Juana buscará libros en la clase

UNGRAMMATICAL DISTRACTOR

DISU1	Sara comprará a manzanas en la tienda
DISU2	**Marta comprará a peras en la tienda**
DISU3	**Sara comprará a melones en la tienda**
DISU4	Clara comprará a fresas en la tienda
DISU5	**María buscará a libros en el súper**
DISU6	**Marta buscará a melones en el súper**
DISU7	Sara buscará a hojas en la clase
DISU8	Carmen buscará a libros en la clase

Appendix E: Studies included

#	Publication	Languages involved (*=L3)
1	Angelovska (2017)	English*, German, Russian
2	Angelovska (2017)	English*, German, Russian
3	Bardel & Falk (2007)	Swedish*, Dutch, English, German, Hungarian
4	Bayona (2009)	Spanish*, English, French
5	Ben Abbes (2017)	French*, English, Turkish, Spanish
6	Ben Abbes (2017)	French*, English, Turkish, Spanish
7	Ben Abbes (2017)	French*, English, Turkish, Spanish
8	Berends, Schaeffer, & Sleeman (2017)	Dutch*, English, French
9	Berkes & Flynn (2012)	English*,German, Hungarian
10	Bohnacker (2006)	Swedish*, German, English
11	Borg (2013)	Spanish*, French, English
12	Borg (2013)	Spanish*, French, English
13	Bruhn de Garavito & Perpiñán (2014)	Spanish*, French, English
14	Bruhn de Garavito & Perpiñán (2014)	Spanish*, French, English
15	Cabrelli Amaro (2013)	Brazilian Portuguese*, Spanish, English
16	Cabrelli Amaro, Amaro, & Rothman, (2015)	Brazilian Portuguese*, Spanish, English
17	Cabrelli Amaro, Amaro, & Rothman (2015)	Brazilian Portuguese*, Spanish, English
18	Chin (2009)	Spanish*, Chinese, English
19	Falk & Bardel (2011)	German*, French, English
20	Falk (2017)	German*, Spanish, Italian, French, Swedish
21	Falk, Lindqvist, & Bardel (2015)	German*, Swedish, Dutch, English, Greek, Hungarian, Russian, Arabic, Catalan, French, Italian, Mandarin, Portuguese, Spanish, Latin, Old Church Slavonic, Swedish Sign Language
22	Fallah & Jabbari (2018)	English*, Mazandarani, Persian
23	Fallah & Jabbari (2018)	English*, Mazandarani, Persian
24	Fallah, Jabbari, & Fazilatfar (2016)	English*, Mazandarani, Persian
25	Fallah, Jabbari, & Fazilatfar (2016)	English*, Mazandarani, Persian
26	Fallah, Jabbari, & Fazilatfar (2016)	English*, Mazandarani, Persian
27	Fessi (2014)	Spanish*, Arabic, French
28	Fessi (2014)	Spanish*, Arabic, French
29	Fessi (2014)	Spanish*, Arabic, French
30	Flynn, et al. (2004)	English*, Kazakh, Russian
31	Foote (2009)	Spanish*, French* or Italian*, English, Spanish, French or Italian,

32	García Mayo & Slabakova (2015)	English*, Basque, Spanish
33	Giancaspro, Halloran, & Iverson (2015)	Brazilian Portuguese*, Spanish, English
34	Hermas (2010)	English*, Arabic, French
35	Hermas (2010)	English*, Arabic, French
36	Hermas (2015)	English*, Arabic, French
37	Hermas (2015)	English*, Arabic, French
38	Imaz Aguirre & García Mayo (2017)	English*, Basque, Spanish
39	Imaz Aguirre & Garcia Mayo (2017)	English*, Basque, Spanish
40	Ionin, Grolla, Santos, & Montrul (2015)	Brazilian Portuguese*, Spanish, English
41	Iverson (2009)	Brazilian Portuguese*, Spanish, English
42	Iverson (2009)	Brazilian Portuguese*, Spanish, English
43	Jaensch (2012)	German*, English, Spanish, Japanese
44	Jaensch (2012)	German*, English, Spanish, Japanese
45	Jaensch (2012)	German*, English, Spanish, Japanese
46	Jin (2009)	Norwegian*, English, Chinese
47	Kulundary & Gabriele (2012)	English*, Russian, Tuvan
48	Leung (2005)	French*, Cantonese, English
49	Leung (2008)	French*, Cantonese, English
50	Lindqvist & Falk (2014)	Swedish*, English, French, Latin, Turkish, Greek
51	Mollaie, Jabbari, & Rezaie (2016)	French*, English, Persian
52	Mollaie, Jabbari, & Rezaie (2016)	French*, English, Persian
53	Montrul, Dias, & Santos (2011)	Brazilian Portuguese*, Spanish, English
54	Montrul, Dias, & Santos (2011)	Brazilian Portuguese*, Spanish, English
55	Na Ranong & Leung (2009)	Thai*, English, Chinese
56	Park (2016)	Korean*, Mandarin, Chinese, Japanese, Tamil, Malay, Thai, German, Indonesian, Cantonese
57	Puig-Mayenco, Miller, & Rothman (2018)	English*, Catalan, Spanish
58	Rothman & Cabrelli Amaro (2010)	French* or Italian*, Spanish, English
59	Rothman & Cabrelli Amaro (2010)	Brazilian Portuguese*, Spanish, English
60	Rothman (2010)	Brazilian Portuguese*, Spanish, English
61	Rothman (2010)	Brazilian Portuguese*, Spanish, English
62	Rothman (2011)	Brazilian Portuguese*, Spanish, English

63	Rothman (2011)	Brazilian Portuguese*, Spanish, English
64	Sánchez & Bardel (2017)	English*, Catalan, Spanish
65	Santos (2013)	Brazilian Portuguese*, Spanish, English
66	Santos (2013)	Brazilian Portuguese*, Spanish, English
67	Santos (2013)	Brazilian Portuguese*, Spanish. English
68	Slabakova & García Mayo (2015)	English*, Basque, Spanish
69	Tavakol & Jabbari (2014)	German*, Italian, English, Persian
70	Tsang (2009)	Cantonese*, Tagalog, English
71	Westergaard, et al. (2017)	English*, Norwegian, Russian

Appendix F: Coding for the macro-variables

#	L1 transfer	L2 transfer	Typological transfer	Hybrid transfer	Non-facilitative transfer
1	-	-	-	+	+
2	-	-	-	+	+
3	-	+	+	-	+
4	-	+	+	-	n/a
5	-	-	+	-	+
6	-	-	+	-	+
7	-	-	+	-	+
8	-	+	+	-	+
9	-	-	-	+	-
10	-	+	+	-	+
11	-	-	+	-	-
12	-	-	+	-	-
13	-	-	-	+	+
14	-	-	+	-	+
15	-	-	+	-	+
16	-	-	+	-	+
17	-	-	+	-	+
18	-	+	+	-	+
19	-	+	-	-	+
20	-	+	-	-	+
21	-	-	-	+	+
22	-	-	-	+	+
23	-	-	-	+	+
24	-	-	-	+	+
25	-	-	-	+	+
26	-	-	-	+	+
27	-	+	+	-	n/a
28	-	+	+	-	n/a
29	-	+	+	-	n/a
30	-	+	+	-	-
31	+	-	+	-	+
32	-	-	+	-	+
33	-	-	+	-	+
34	+	-	-	-	+
35	+	-	-	-	+
36	+	-	-	-	+
37	+	-	-	-	+
38	-	-	-	+	+
39	-	-	-	+	+
40	-	-	+	-	+

41	-	-	+	-	+
42	-	-	+	-	+
43	-	+	+	-	+
44	-	+	+	-	+
45	-	+	+	-	+
46	+	-	-	-	+
47	-	-	-	+	+
48	-	+	+	-	+
49	-	+	+	-	+
50	-	+	-	-	+
51	+	-	-	-	+
52	+	-	-	-	+
53	-	-	+	-	+
54	-	-	+	-	+
55	+	-	+	-	+
56	+	-	+	-	+
57	-	-	+	-	+
58	-	+	+	-	+
59	-	+	+	-	+
60	-	-	+	-	+
61	-	-	+	-	+
62	-	-	+	-	+
63	-	-	+	-	+
64	-	+	-	-	+
65	-	-	-	+	-
66	-	-	+	-	+
67	-	-	+	-	+
68	-	-	+	-	+
69	-	-	-	+	+
70	-	-	-	+	+
71	-	-	-	+	+

Appendix G: Coding for the methodological variables

#	Proficiency	Language Appetested	Methodology	Mirror-Image groups	Language combination
1	-	+	+	-	-
2	-	+	+	-	-
3	-	+	+	-	-
4	-	+	-	-	+
5	-	+	+	-	-
6	-	+	-	-	-
7	-	+	+	-	-
8	-	+	-	-	+
9	-	+	+	-	-
10	+	+	+	-	-
11	-	+	-	+	+
12	-	+	-	+	+
13	+	+	+	+	+
14	+	+	-	+	+
15	+	-	-	+	+
16	+	-	-	+	+
17	-	-	-	+	+
18	-	-	-	-	-
19	-	+	-	+	+
20	+	+	+	-	+
21	+	+	+	-	+
22	+	+	+	-	-
23	+	+	-	-	-
24	+	+	+	-	-
25	+	+	-	-	-
26	+	+	-	-	-
27	-	+	-	-	-
28	-	+	+	-	-
29	-	+	-	-	-
30	+	+	+	-	-
31	-	+	-	-	+
32	-	+	-	+	-
33	+	-	-	+	+
34	+	+	-	-	-
35	+	+	-	-	-
36	-	+	-	-	-
37	-	+	-	-	-
38	-	+	-	-	-
39	-	+	-	-	-
40	-	+	-	+	+

41	+	-	-	+	+
42	+	-	+	+	+
43	-	+	+	-	+
44	-	+	+	-	+
45	-	+	+	-	+
46	+	+	-	-	+
47	-	+	-	-	-
48	+	+	+	-	-
49	+	+	+	-	-
50	+	+	+	-	-
51	-	+	-	-	-
52	-	+	-	-	-
53	-	+	+	+	+
54	-	+	-	+	+
55	-	-	-	-	+
56	-	+	+	-	-
57	+	+	-	+	-
58	+	-	-	-	+
59	+	-	-	-	+
60	+	-	-	+	+
61	+	-	-	+	+
62	+	-	-	+	+
63	+	-	-	+	+
64	-	+	+	-	+
65	-	-	-	+	+
66	-	+	-	+	+
67	-	-	+	+	+
68	-	+	-	+	-
69	+	+	+	-	-
70	-	+	-	-	-
71	-	+	-	-	-

Appendix H: Linguistic domain investigated in each study

#	Publication	Linguistic domain investigated
1	Angelovska (2017)	Verb-second
2	Angelovska (2017)	Verb-second
3	Bardel & Falk (2007)	Verb-second/Negation
4	Bayona (2009)	Middle and Impersonal passive constructions
5	Ben Abbes (2017)	Gender, Number Concord, Articles
6	Ben Abbes (2017)	Gender, Number Concord, Articles
7	Ben Abbes (2017)	Gender, Number Concord, Articles
8	Berends, Schaeffer, & Sleeman (2017)	Quantitative Pronoun Constructions
9	Berkes & Flynn (2012)	Relative clauses
10	Bohnacker (2006)	Verb-second
11	Borg (2013)	Future probability
12	Borg (2013)	Future probability
13	Bruhn de Garavito & Perpiñán (2014)	Subject pronouns and clitics
14	Bruhn de Garavito & Perpiñán (2014)	Subject pronouns and clitics
15	Cabrelli Amaro (2013)	Subject raising
16	Cabrelli Amaro, Amaro, & Rothman, (2015)	Subject raising
17	Cabrelli Amaro, Amaro, Rothman (2015)	Subject raising
18	Chin (2009)	Aspectual semantic contrasts
19	Falk & Bardel (2011)	Object pronouns
20	Falk (2017)	Null-subject parameter
21	Falk, Lindqvist, & Bardel (2015)	Adjective placement
22	Fallah & Jabbari (2018)	Attributive adjectives
23	Fallah & Jabbari (2018)	Attributive adjectives
24	Fallah, Jabbari, & Fazilatfar (2016)	English possessives
25	Fallah, Jabbari, & Fazilatfar (2016)	English possessives
26	Fallah, Jabbari, & Fazilatfar (2016)	English possessives
27	Fessi (2014)	Aspectual contrasts
28	Fessi (2014)	Aspectual contrasts
29	Fessi (2014)	Aspectual contrasts
30	Flynn, et al. (2004)	Relative clauses
31	Foote (2009)	Aspectual contrasts
32	García Mayo & Slabakova (2015)	Object drop
33	Giancaspro, Halloran, & Iverson (2015)	Differential Object Marking
34	Hermas (2010)	Verb movement
35	Hermas (2010)	Verb movement
36	Hermas (2015)	Relative clauses
37	Hermas (2015)	Relative clauses
38	Imaz Aguirre & García Mayo (2017)	Double Object constructions
39	Imaz Aguirre & Garcia Mayo (2017)	Double Object constructions
40	Ionin, Grolla, Santos, & Montrul (2015)	NPs in generic and existential contexts
41	Iverson (2009)	Noun-drop
42	Iverson (2009)	Noun-drop
43	Jaensch (2012)	Gender assignment

44	Jaensch (2012)	Gender concord
45	Jaensch (2012)	Definite/Indefinite contrasts
46	Jin (2009)	Null/Overt objects
47	Kulundary & Gabriele (2012)	Relative clauses
48	Leung (2005)	Determiner Phrase
49	Leung (2008)	Tense and agreement
50	Lindqvist & Falk (2014)	Function words
51	Mollaie, Jabbari, & Rezaie (2016)	Wh-questions
52	Mollaie, Jabbari, & Rezaie (2016)	Wh-questions
53	Montrul, Dias, & Santos (2011)	Clitics and Object expression
54	Montrul, Dias, & Santos (2011)	Clitics and Object expression
55	Na Ranong & Leung (2009)	Null objects
56	Park (2016)	Argument realization
57	Puig-Mayenco, Miller, & Rothman (2018)	Negative Quantifiers
58	Rothman & Cabrelli Amaro (2010)	Null Subjects
59	Rothman &Cabrelli Amaro (2010)	Null Subjects
60	Rothman (2010)	Relative clause attachment
61	Rothman (2010)	Relative clause attachment
62	Rothman (2011)	Adjectival interpretation
63	Rothman (2011)	Adjectival interpretation
64	Sánchez & Bardel (2017)	Verb placement
65	Santos (2013)	Dative alternation
66	Santos (2013)	Dative alternation
67	Santos (2013)	Dative alternation
68	Slabakova & García Mayo (2015)	Topic, Focus and left-dislocation
69	Tavakol & Jabbari (2014)	Subject/Object pronouns
70	Tsang (2009)	Reflexives
71	Westergaard, et al. (2017)	Verb-second/Subject-Auxiliary Inversion

Appendix I: Stimuli for Study 3 & 4 (Picture-Sentence Matching Task)

Experimental items

Negative Quantifier + Verb:

1. Nobody brings an apple.
2. Nobody sings a song.
3. Nobody buys a book.
4. Nobody eats an apple.

Negative Polarity Item + Verb:

5. Anybody plays football.
6. Anybody writes a letter.
7. Anybody drinks coffee.
8. Anybody eats an ice-cream.

Verb + Negative Quantifier:

9. Mary is bringing nothing.
10. Mary is eating nothing.
11. Mary is saying nothing.
12. Mary is buying nothing.

Verb + Negative Polarity Item:

13. Mary is singing anything.
14. Mary is drinking anything.
15. Mary is cutting anything.
16. Mary is writing anything.

Negative Quantifier + Sentential Negation:

1. Nobody doesn't bring an apple.
2. Nobody doesn't sing a song.
3. Nobody doesn't buy a book.
4. Nobody doesn't eat an apple.

Negative Polarity Item + Sentential Negation:

5. Anybody doesn't play football.
6. Anybody doesn't write a letter.
7. Anybody doesn't drink coffee.
8. Anybody doesn't eat an apple.

Conditional… Negative Quantifier:

9. Mary will call us if Peter says nothing.
10. Mary will call us if John eats nothing.

11. Mary will call us if Peter buys nothing.
12. Mary will call us if John drinks nothing.

Conditional… Negative Polarity Item:

13. Mary will call us if Peter brings anything.
14. Mary will call us if John sings anything.
15. Mary will call us if Peter writes anything.
16. Mary will call us if John cuts anything.

Distractors

1. Mary is wearing sunglasses.
2. John is wearing sunglasses
3. John and Peter are wearing a white t-shirt.
4. John and Peter are wearing a black t-shirt.
5. Mary and Peter are eating an ice-cream.
6. Mary and Peter are eating a hot dog
7. The children don't bring an apple.
8. The children don't sing a song.
9. The children don't buy a book.
10. The children don't eat ice-cream-
11. The children don't eat pineapple
12. The children don't drink coffee
13. The children bring an apple.
14. The children sing a song.
15. The children buy a book.
16. The children write a letter.
17. The children drink coffee.
18. The children eat ice-cream
19. Mary and Peter aren't eating an ice-cream.
20. Mary and Peter aren't drinking coffee.
21. Peter and John aren't wearing a black T-shirt.
22. John and Mary aren't drinking coffee.
23. John and Peter aren't eating a banana.
24. John and Peter aren't wearing a white T-shirt.
25. Mary will call us if Peter eats an ice-cream.
26. Mary will call us if John drinks coffee.
27. Mary will call us if Peter buys a book.
28. Mary will call us if John eats a banana.
29. Mary will call us if John buys a pineapple.
30. Mary will call us if John brings an apple.
31. Mary will call us if John wears a white t-shirt.
32. Mary will call us if John eats an apple.

Appendix J: Catalan and Spanish results (Study 4)

Table A.E.1. Raw counts and percentages (%) of the interpretations of each condition for the learners in the CATALAN task.

		L1-Cat (n=22)		L1-SP (n=18)	
Context	CONDITION	Raw count	Percentage	Raw count	Percentage
1[a]	Ningú…VERB	85/88	96.59	69/72	95.83
2[b]	VERB…res	52/88	59.09	46/72	63.88
3[c]	Ningú…NOT	14/88	15.90	8/72	11.11
4[d]	CON...res	10/88	11.36	9/72	12.50

Counts and percentages of: [a] negative interpretations; [b] negative interpretations; [c] DN interpretations; [d] negative readings.

Table A.E.2. Raw counts and percentages (%) of the interpretations of each condition for the learners in the SPANISH task.

		L1-Cat (n=22)		L1-SP (n=18)	
Context	CONDITION	Raw count	Percentage	Raw count	Percentage
1[a]	Nadie…VERB	86/88	97.72	64/72	88.88
2[b]	VERB…nada	84/88	95.45	67/72	93.05
3[c]	Nadie…NOT	34/88	38.63	26/72	36.11
4[d]	CON...nada	79/88	89.77.	61/72	84.72

Counts and percentages of: [a] negative interpretations; [b] negative interpretations; [c] DN interpretations; [d] negative readings.

Appendix K: Statistical Models (Study 4)

Generalised mixed-effects models for the *ab initio* learners in TIME 1 analysis.

Model: Nobody/Anybody…VERB			
	OR	CI: LL, UL	*p*
Intercept (Ref: Anything…VERB; Instruction-Cat)	0.06	0.03; 0.17	<. 001
Condition	1.25	.38; 16.12	= .39
Instruction	.51	.07; 3.35	= .48
Dominance Score	1.01	.99; 1.01	= .32
Condition*Instruction	1.01	.06; 15.69	= .99
Condition*Dominance Score	.99	.98; 1.01	= .91
Instruction*Dominance Score	.99	.98; 1.01	= .72
Condition*Instruction*Dominance Score	.99	.99;1.02	= .57
Model: VERB…nobody/anybody			
	OR	CI: LL, UL	*p*
Intercept (Ref: VERB…anything; Instruction-Cat)	2.89	1.56; 5-34	<. 001
Condition	1.66	.74; 3.75	= .21
Instruction	1.44	.53; 3.92	= .46
Dominance Score	1.01	1.01; 1.02	= .04
Condition*Instruction	.99	.98; 1.01	= .12
Condition*Dominance Score	.21	.06; .71	<. .01
Instruction*Dominance Score	99	.98; 1.01	=.31
Condition*Instruction*Dominance Score	1.01	.99; 1.01	= .99

Model: Nobody/Anybody…NOT			
	OR	CI: LL, UL	*p*
Intercept (Ref: Anything...NOT; Instruction-Cat)	.06	.02; .18	<. 001
Condition	1.41	.43; .4.57	= .56
Instruction	2.41	.67; 8.51	= .17
Dominance Score	1.01	.99; 1.01	= .62
Condition*Instruction	.46	.09; 2.33	= .35
Condition*Dominance Score	.99	.98; 1.01	= .29
Instruction*Dominance Score	.99	.98; 1.01	= .47
Condition*Instruction*Dominance Score	1.01	.99; 1.02	= .31
Model: Conditional…nobody/anybody			
	OR	CI: LL, UL	*P*
Intercept (Ref: Anything...NOT; Instruction-Cat)	.08	.03; .21	<. 001
Condition	1.37	.47; 4.01	= .56
Instruction	1.79	.57; 5.61	= .32
Dominance Score	1.01	.99; 1.01	= .69
Condition*Instruction	.88	.17; 3.37	= .73
Condition*Dominance Score	.99	.98; 1.01	= .67
Instruction*Dominance Score	.99	.98; 1.01	<. 22
Condition*Instruction*Dominance Score	.99	.98; 1.02	= .98

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Short biographical note

Eloi Puig Mayenco was born and raised in Osona and lived there (Manlleu) until he moved to the metropolitan area of Barcelona to do a degree in English Philology at Universitat Autònoma de Barcelona. During his degree, he worked as a teacher of English and lived a year Manchester (UK) where he did an Erasmus. After finishing the degree and working for a year, he decided to do a MA in Linguistics at the University of York where he graduated with distinction (2013-14). Since 2015, he has been working on his doctoral dissertation. He submitted his dissertation in 2019.