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Ab Initio Adult Third Language Acquisition

Transfer source selection and effects of CLI in acquisition of an artificial language

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Abstract

The field of generative third language acquisition has seen considerable activity in the last decade, resulting in several dominant models which seek to explain the phenomenon of cross-linguistic influence (CLI) and transfer. This study investigates the role of previously acquired languages, Norwegian and English, in the acquisition of morphosyntax of a miniature artificial language (MAL) at the absolute initial (*ab initio*) stage of third language acquisition (L3A).

The study explores three factors in transfer source selection during third language acquisition: order of acquisition, structural vs. typological similarity, and the language of the acquisition environment. Results are drawn from a group of $n = 77$ Norwegian/English bilingual participants via two acceptability judgment tasks focused on sentence-level word order and verb seconding, completed following a training on the lexicon of the MAL. Separating the two assessments was an additional training segment where participants were exposed to two additional morphosyntactic structures found in their first language (L1), Norwegian, but not their second language (L2), English.

The results indicate support for the Linguistic Proximity Model (LPM; Westergaard et al., 2017; Westergaard, 2019, 2021a, 2021b) as the current model which most accurately explains the data, and suggests that CLI is the result of activation of linguistic structures with multiple sources of input (e.g. that CLI occurs property by property) and that language learners are receptive to a wide variety of cues which guide transfer source selection.

Preface

I would like to preface this thesis by saying that its writing has been a long and arduous and *thoroughly* amazing journey. From setbacks related to an executive function disorder (the treatment of which finally allowed me to complete this project) to the global situation which arose in the middle of it all, 2020 did not start off as a strong year. Regarding the latter, I've heard it said that all anthropological work stretching into the unknown future will be known as the "post-Corona" epoch of study, and I feel that's a fair moniker to extend to many other fields of study - linguistics included. Without the power of the internet, I most certainly could not have completed this thesis, but just as my interest in the field has grown and evolved, so too has the world.

I never expected to call myself a syntactician. In the traditional, philological approach to linguistics my first love in this field was and has always been historical linguistics, though it was actually language creation which introduced me to the field and what sparked my initial journey into this amazing science. Imagine my surprise when I learned that I could utilize my favorite hobby in linguistic research! Granted, it's a small portion of said hobby, but imagine my excitement nonetheless. Meanwhile, I consider myself a history *aficionado* and do still greatly enjoy learning about old languages and how things were however many hundreds of years ago. To see the development of cultures and languages around the world to bring us where we are today is absolutely fascinating.

Equally fascinating, however, is the diversity of language which gives rise to multilingual communities the world over. As a sequential bilingual who has studied many more languages on top of my first two, the cognitive mechanics of what happens when people learn multiple languages has become a fascination of mine. With everything that we learn about language and its interface with cognition, and for all of the answers which we have gleaned over the years of study, we end up with many more questions yet unanswered. Living and studying at this point in time offers linguistics researchers an unprecedented look into the epoch of a global, multicultural, and increasingly multilingual world despite the overall number of languages falling due to cultural hegemony and universally used languages.

For this reason, I have switched the domain of my study of language from one of history to one of modernity. With an ever expanding world (which somehow also feels as if it is ever-shrinking), I believe that it is vitally important to question what the role of multilingualism

plays in terms of human cognition and strive to answer these resultant questions. Thus, my thesis tackles one of the current problems found in multilingualism: what happens with multiple language systems when they coexist in a language learner's brain? What happens when a bilingual person acquires a new language? As a multilingual myself, these are ever-present curiosities and I hope to, at the very least, add to the discussion that I feel must be had.

Finally, I bid you the reader, while combing through this text, to please acknowledge and accept that my writing style is decidedly conversational in tone. Personally, I work best when solving a problem or working out the particulars of a question while engaged in dialogue, and I invite you to join me in the following dialogue.

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Thank you as well to Yulia Rodina, without whose course on multilingualism I would not have chosen this particular topic, and without said course I would not have realized that I could combine my favorite hobby with linguistics research.

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And finally, a small handful of additional thanks - first, to all the scientists whose work I have referenced and studied and whose work I hope I do justice by; and second, to the originator of a phrase which has been a constant in the back of my mind throughout the process of writing this: "The perfect is the enemy of the good."

1 Introduction

As the field of language acquisition advances, and particularly as it advances ahead of the field of bilingualism study, questions remain as to how people successfully acquire a third or additional language (henceforth, L3A; additionally, the language being acquired is referred to as the target language) in adulthood. Specifically, it is unclear exactly what role, if at all, Cross-linguistic Influence (CLI) plays in the very early stages of adult acquisition of a language. It is clearly observable that adults are able to become incredibly proficient speakers of an additional language – one must simply look at global migrant populations to find people who learn a new language to a high degree of fluency, even in advanced age. One must ask, then, that if people who are already bilingual learn a third language, what is the degree to which their existing bilingualism assists or hinders their language acquisition? How is it affected in the earliest stages of language learning?

The field devoted to the study of L3A is relatively nascent, particularly in the realm of morphosyntax, and inherits a peculiar problem from the field of bilingualism study: that of multiple potential sources of CLI. As detailed in Rothman et al. (2019), this problem is accounted for in a variety of prior works and proposed models, which will be discussed in more detail in Chapter 2. These models typically fall into one of two categories: order of acquisition models, where order of acquisition is the key factor in determining a source of influence, and structural/typological models, which assert that the source of influence ultimately is derived from the typological or structural similarity between the third language and one of the two previously acquired languages.

The usage of an artificial or constructed language as the research medium allows for a researcher to conduct studies while controlling for prior knowledge and exposure of the target language, as well as offering the unique ability to control the variables of the third language being learned. This amount of flexibility allows for a surgical focus on aspects of CLI which would otherwise have too many variables to study in a succinct manner and with repeatable, verifiable results. Therefore, because language is a human phenomenon and thus is variable, the clinical ability to control for the variables is an invaluable tool available to the language research community.

In this thesis, a Miniature Artificial Language (MAL) called *Englike* is used to facilitate research on CLI in the earliest stages of L3A by Norwegian-English bilinguals in a quantitative study of 77 individuals. All participants speak Norwegian as their L1 and English as their L2, and by utilizing a MAL the current study is equipped to explore the absolute initial stage of L3A and how CLI interfaces with the acquisition of morphosyntax.

In the following chapter I describe the background which informs the current study, list the models of CLI in L3A, and discuss the relevant languages – Norwegian and English. In Chapter 3, I outline the design philosophy and research questions guiding the present study, as well as describe the study and the results of the pilot. In Chapter 4 both the present study and its results are analyzed, while in Chapter 5 I discuss how the results of the present study interface with the research questions and hypotheses outlined in Chapter 3; Chapter 6 concludes this thesis.

2 Background

As mentioned in the introduction, L3A is a relatively nascent field (see for example García Mayo & Rothman, 2012). As a result, the debate about the processes behind L3A continues, and the question of transfer and CLI has resulted in multiple models and predictions within the generative tradition. Therefore, in this chapter, I summarize the background of the field of L3A and how it and the models developed within it; specifically, models which attempt to explain the process of CLI in the broader context of L3A.

In this chapter, I discuss some of the specifics of CLI and transfer as concepts. I then go on to describe the prior literature in this field and the models which come out of it, as well as discuss the dominant models and how they both differ and draw from the prior models. These two models, the Typological Primacy Model (TPM) and Linguistic Proximity Model (LPM) have the most bearing on this thesis, and therefore are discussed on their own. I then detail the relevant background of the first and second languages spoken by the participants of the present study – Norwegian and English, respectively – and compare the two. Finally, I discuss the morphosyntactic properties relevant to the present study – verb seconding, postnominal possession, and postverbal negation.

2.1 Cross-linguistic Influence

As a technical term, it is possible to define grammar as the collection of linguistic representations present within the mind of the speaker of a given language, which includes the phonology of a language, its morphology and morphosyntax, the semantics of its use, and so on. All of these factors, as they are understood - consciously or not - and internalized by a speaker, therefore, comprise what is called *grammar*. The grammar then serves two purposes as it is utilized to parse language: comprehension, the act of parsing linguistic input via the grammar where it is deconstructed and mapped to ideas; and production, the act of parsing linguistic output via knitting ideas to language and configuring it such that it is understandable as such (whether spoken or, increasingly, written). When a speaker of a language receives linguistic input, that is filtered through their grammar and thus deconstructed for understanding - in the reverse, ideas are filtered through the grammar and constructed to produce speech.

CLI, then, is the process by which a language can affect the usage and processing of another language in an individual speaker (Sharwood Smith, 1983, 1989; Kellerman & Sharwood Smith, 1986), and the generative tradition is continuing to make strides in understanding the role CLI plays in the language usage, production, and acquisition of multilingual speakers. Generally, CLI can be seen at the lexical, phonological, and structural levels.

This thesis focuses on a narrower understanding of CLI, transfer, where the features of one language are applied (or *transferred*) onto another such that they are available to both grammars. Throughout this thesis, for the sake of simplicity, I utilize the terms CLI and transfer interchangeably, though Rothman et al. (2019, p. 24) describes this particular terminological shorthand as having "nontrivial consequences at all levels of scientific inquiry". In the views expressed there, there is a fundamental and necessary distinction between transfer (the copying of features from a previous language onto the target language) which operates exclusively on the internal grammar itself, and "cross-linguistic effects" (CLE) which manifests as cross-linguistic influence in other domains, thus following the classical divide between linguistic competence and performance which follows Chomsky (1965). In that view, transfer occurs solely within the domain of linguistic competence, or the internal grammar of a language, while CLE operates on performance - in other words, everything else.

Importantly, it must be noted that the term *transfer* as a concept is not without its own limitations even as a "handy metaphor," as mentioned by Sharwood Smith (2020, p. 2). As discussed in that article, the term transfer is potentially misleading: Sharwood Smith argues that if, indeed, linguistic properties that become available to the burgeoning L3 grammar truly transferred from one grammar to the other, the original grammar from which said properties are transferred would deteriorate. Crucially, this does not occur – the original grammar remains intact. Therefore, because the term "transfer" brings connotations of movement from one place or domain to another, where nothing is left behind, it is argued that the term is insufficient to explain the phenomenon.

Further, Sharwood Smith (2020) rejects the term transfer in its entirety and defines CLI as "a matter of alternative connections within a network" (Sharwood Smith, 2020). This builds on the Modular Cognitive Framework (MCF), which is itself the wider umbrella under which the

Modular Online Growth and Use of Language (MOGUL) framework falls (Sharwood Smith, 2019; Truscott & Sharwood Smith, 2019). MOGUL and the MCF, as a cognitive framework, presents the mind as a "network of interacting expert systems each of which has an identical basic design." (Sharwood Smith, 2019, p. 3)

Thus, transfer is not a process wherein one linguistic feature is not transferred from one grammar to another, but rather where the feature can serve as a shared resource from one grammar that is accessible by another. Understanding this, however, for the time being I have decided to continue to use the term transfer as the current state of the field continues to use it; therefore, the term is applicable in this context.[1]

Transfer, regardless of its usage as a very narrow term or a broader one, can have two vastly different effects on language usage and processing, depending on whether or not the effects of transfer are positive or negative. Positive (or facilitative) transfer is where the properties of one prior language (or both) are sufficiently similar to those of the target language. The language learner is then able to utilize these properties when interacting with their target language, successfully parsing target language input and producing speech that a native speaker of the target language would deem acceptable. The inverse is negative (or non-facilitative) transfer, where the properties of one prior language (or both) are sufficiently dissimilar to those of the target language yet are utilized regardless. In this case, the language learner incorrectly parses target language input and produces speech that a native speaker would not deem acceptable.

2.1.1 Prior Literature

One of the earliest ideas of CLI in L3A, though not explicitly formalized as a model, is that a speaker's native language (L1) is held in a privileged position (on the basis that it was the first language acquired) which allows it to be the sole source of CLI. Though there have been no formal models put forth which explicitly argue this factor, findings from various studies have

[1] Going forward, I do agree with Sharwood Smith and Truscott that the term is likely best dropped in favor of more broadly applicable and more refined terminology, as well as removing the unfortunate connection to behaviorism and the connotations which accompany that approach to linguistics.

shown that the L1 provides the main source for CLI in some cases: Hermas (2014) which showed that L1 Arabic speakers exclusively transferred from their L1 over their L2, French, during early stage English acquisition. Jin (2009), in a study of L1 Chinese/L2 English speakers learning Norwegian found that participants exclusively transferred from their L1 rather than their L2. This factor is typically referred to as the First Language Factor (L1F). However, other studies have shown that the second language (L2) can provide the main source for CLI, such as Bardel & Falk (2007), which showed transfer almost exclusively from the L2 in L3 learners of Swedish or Dutch in bilingual speakers of one V2 and one non-V2 language and which led to the development of the L2 Status Factor model (L2SF).

The L2SF contends that a learner's L2 is held in a privileged position, preventing the L1 from being a viable source of CLI. Because of the divide in memory (as discussed for example in Falk & Bardel, 2011, and Bardel & Falk, 2012, following Paradis, 2009), the L2SF posits that the L2 is not stored in procedural memory (unconscious long-term memory) which is implicit and not directly accessed. Crucially, it argues that only the L1 is stored in procedural memory while the L2 is stored in declarative memory (conscious long-term memory) which is explicit, directly accessed memory. However, the results of these studies contradict the results from other studies (such as Hermas, 2014; Jin, 2009), as discussed above.

In stark contrast to both the L1 Factor hypothesis or the L2 Status Factor Model, the Cumulative Enhancement Model (CEM; Flynn et al., 2004; Berkes & Flynn, 2012) argues that CLI can be motivated by either a speaker's L1 or L2, as all previously acquired languages are available to provide a source of CLI during L3A. The CEM posits that the acquisition of the target language is under constant evaluation and is a wholly cumulative process, and that during L3A a learner is constantly evaluating the properties of the target language such that transfer is a maximally efficient process. In this way, a learner is building on their previous language exposure and linguistic knowledge, allowing for the selection of properties most like their L1 or L2 if and only if the properties would allow for facilitative transfer. Essentially, for a given property, the corresponding property in a learner's prior languages is examined; then, if one language has an equivalent (or near equivalent) property, it is selected to transfer; if neither language can provide that source, then the property is learned anew.

2.1.2 Typological Primacy and Linguistic Proximity

The two dominant models, proposed in 2010 and 2017, respectively, are the Typological Primacy Model (TPM; Rothman 2010, 2011, 2015; Rothman et al., 2019) and the Linguistic Proximity Model (LPM; Westergaard et al., 2017; Westergaard, 2019). These two models for transfer in L3A build on previous models, sharing similarities in some regards and diverging wildly in others.

The TPM argues that in the process of L3A a prior language finds a privileged position by way of the language learner parsing and interpreting the typological proximity between the target language and one of the languages already acquired, not by the order in which it was acquired. The language parser, then, selects a language which becomes the sole source of possible transfer, both facilitative and non-facilitative. The TPM argues that transfer occurs when the grammar from either the L1 or L2 is copied to provide the initial state grammar of the L3; i.e., that the language parser copies, whole cloth, the grammar from a previous language onto the new one via a "reduplication of a representation from previously acquired linguistic representations, as an initial hypothesis for a given domain (literally, a copy)." (Rothman et al., 2019, p. 24).[2] In this way, the TPM is abstractly similar in its scope to both the L2SF and the L1F, but crucially dissimilar in that it does not assume that the order of acquisition is what privileges one language over another with regards to transfer source selection, but that its privilege is found through typological proximity to the L3.

Additionally, Rothman (2019, p. 157) further clarifies that wholesale transfer draws from experiences of linguistic transfer in second language acquisition. The crux of the argument for transfer as a singular instance of wholesale copying, in addition to the principle of cognitive economy discussed later in this section, is that a sequential bilingual has only one language from which it is even possible to transfer (because they are acquiring their second language). Therefore, the conclusion drawn by Rothman (2019) is that transfer must occur as a wholesale process. Rothman (2019, p. 24) argues as well that there is a fundamental difference between transfer and "CLE" (cross-language effects; arguably better known as CLI, as it is referred to

[2] The TPM, to my knowledge, is also the only model to advocate for wholesale transfer, though it does build off of Schwartz and Sprouse (1996) and the resultant Full Transfer/Full Access Model. The TPM, however, goes a step further than the process outlined by Schwartz and Sprouse; for more discussion, see Westergaard (2021b).

in this text), where the former is linked specifically to the competence of a speaker and the latter is linked to the performance of the speaker following the conventional competence/performance definition of the generative tradition, following Chomsky (1965).

The TPM, then, argues that transfer is motivated by the typological similarities between one language or the other with regards to the target language which follows a hierarchy of properties outlined in Rothman (2013) and orders the properties of the target language as it is being assessed in the early stages of language acquisition. The hierarchy of properties as follows is given in left-to-right, descending order of "relative impact/influence":

$$Lexicon \gg Phonological\ cues \gg Functional\ Morphology \gg Syntactic\ Structure$$

This hierarchy clarifies the earlier notions of typology on which the TPM was initially founded and provides the model with a framework with which it is then possible to predict which language a learner will select for the source of transfer. Given the parameters of the target language, whichever property is simultaneously (a) most-alike one of the two previously acquired languages, and (b) higher-ranking in the hierarchy will provide the parser with the ability to select a source of transfer. Because this process takes the entirety of a grammatical system and superimposes it over a target language, it allows for non-facilitative transfer - like the L2SF, but unlike the CEM.

Rothman (2015; building on Rothman, 2013) also further clarifies that, per the TPM, the process of transfer is already complete in the earliest stages of language acquisition and that the source of transfer is motivated by the principle of maximal cognitive efficiency. From Rothman (2015):

> [T]he TPM's claims are based on considerations stemming from the notion of general cognitive economy and cognitive processing factors inherent to the bilingual mind. As is well known, bilingual language production requires involvement of the executive control system differentially than a monolingual mind since, among other things, inhibition is needed to suppress the effects of activation of the other grammar. In consideration of the complex processes inherent to the management of multiple grammars in a single mind, it is reasonable to claim that complete transfer based on early assessment of

typological/structural factors between the L3/Ln and other systems would be the most efficient strategy.

Later works on the TPM further refine the model (such as Rothman 2013, 2015; Rothman et al., 2019), allowing for property-by-property transfer to occur both before the wholesale transfer step and after it, particularly in the case of fourth language acquisition, as a language learner may be reticent to produce language output that is clearly not like that of a native speaker and which can potentially be attributed to non-facilitation having occurred during prior attempts at language acquisition.

The LPM, advanced by Westergaard et al. (2017), then, is both similar to and dissenting of the TPM. That is to say, the LPM as a model interprets the process of transfer as being a property-by-property phenomenon, not unlike the CEM, and directly arguing against the idea of wholesale transfer. The LPM is likewise a structural model, though it rejects the notion that typological proximity is the motivating factor for transfer source selection; the LPM does account for interactions which would superficially resemble the hierarchical assessment assumed by the TPM, but does not limit transfer source selection by the hierarchy. Initially, the LPM assumed a position where transfer is motivated by underlying structural similarities between the L1 or L2 and the target language, though the most recent revision to the model instead generalizes that to activation of linguistic structures more broadly, as discussed below. Thus, the LPM rejects the notion that the order of acquisition is the primary factor in selecting for sources of transfer, though it is noted by Westergaard (2019) that language learners can default to a "foreign language mode", a sentiment anecdotally expressed by many language learners, which might superficially resemble the L2SF.

The LPM, then, posits a model where L3A is a property-by-property process which, like the CEM, builds on the grammars of previously-acquired languages. This allows for both facilitative and non-facilitative CLI to occur, however, which is very unlike the CEM. Unlike the TPM, however, the LPM posits that the motivational factor for sources of CLI is typically a broader depth of structural similarity, rather than surface-level similarity, at least at later stages of acquisition. Distinct from the TPM, the LPM allows for a property-by-property basis where the similarities and dissimilarities between the L1, L2, and target language are assessed and, thus, allows also for a selection to be made by the language parser on a case-by-case

basis. In direct opposition to the TPM, Westergaard et al. (2017) argues that a property-by-property process of transfer is indeed the maximally efficient option in terms of cognition, in that it would not require unlearning of incorrectly applied grammar on the target language. Additionally, Westergaard (2019) further clarifies that the topic of cognitive efficiency is an "elusive concept" and that its use as justification for a large operation which must be dismantled later if the applied grammar is inconsistent with that of the target language is itself not entirely justifiable.

The LPM also proposes that facilitative CLI is based on the correct parsing of L3 input as overlapping with a property from the L1 or L2, while non-facilitative CLI stems from inaccurately parsing of the L3 input as overlapping with a property from the L1 or L2. Westergaard (2019) elaborates on this, and non-facilitative transfer can be explained as occurring when the L3 exhibits a structure that resembles (but importantly is not identical to) a prior language or is misanalyzed as such, and the learner then produces structures which are not similar to the target language.

The most recent instantiation of the LPM (Westergaard, 2021, in press) modifies the foundational basis of the LPM. In light of recent work and discussion surrounding the field of L3A, the LPM has been reformulated to a model where CLI occurs as a result of "co-activation of corresponding [linguistic] structures in the previously acquired languages". This is closely tied to the MCF and MOGUL framework as described in Section 1. Sharwood Smith (2020) reformulates the LPM with more direct MCF terminology, summarized here as: L3 input is processed and parsed, and in so doing the various related existing structures are activated simultaneously, though to differing degrees, allowing properties from existing grammars to be shared with the emergent L3 grammar.

It is important to note that the multilingual brain "is not three (or more) separate monolingual brains in one individual's head," (Slabakova, 2017, p. 656)[3] and research shows that the

[3] Slabakova (2017) also proposes the Scalpel Model of L3A, which in many ways is similar to the LPM; in Westergaard et al. (2017), the analogy of language parsing and acquisition as a scalpel is also used, and both models describe selection for a source of transfer as a precise operation, thus arguing against the notion of wholesale transfer. However, due to its similarities with the LPM, the Scalpel Model is generally not discussed as a foundational model for this thesis.

language-specific regions of the brain function the same regardless of whether a speaker is monolingual, bilingual, or multilingual (Abutalebi & Green, 2017). Because of the fact that both the L1 and L2 grammar remain active and must be suppressed (a notion raised in Rothman, 2015, as evidence for the cognitive efficiency aspect of the TPM; and which is further explored in Bialystok, 2011, regarding the systems utilized by bilinguals in terms of language processing), the LPM contends that all previously acquired languages are available to provide sources of transfer, because all grammars of previously acquired languages can be (and are) activated.

These two models are both the predominant and the most promising, both in terms of what it means for this thesis as well as the field of L3A study overall. The prior models showing either a privileged position of the L1 over the L2 or vice-versa, and the experiments that lend their data to those conclusions, are in contention with one another: the results from Jin (2009), which show evidence of transfer from L1 Chinese into L3 Norwegian instead of from L2 English, clash very directly with the results from, for example, Falk & Bardel (2011), which show evidence of transfer from L2 French (with L1 English) or L2 English (with L1 French) into L3 German. Likewise, the CEM is unable to explain results of non-facilitative transfer as evidenced in either the results of the aforementioned studies or studies which lend evidence in support of the TPM (such as Rothman & Cabrelli Amaro, 2010), which finds evidence of non-facilitative transfer from L2 Spanish onto L3 French) or LPM (as in Westergaard et al., 2017, which finds evidence of non-facilitative transfer from L1 Norwegian to L3 English).

These models have merits in their favor, though supporting data were drawn from different populations; support for the TPM is drawn predominantly from studies comparing English and a Romance language, while supporting evidence for the LPM is drawn predominantly from Norwegian, English, and Russian. The emergent problem with the TPM, however, is that it is unable to account for selection of more typologically distant languages as the source of transfer, for example the results found by Jin (2009); or in Westergaard et al. (2017), which showed evidence that both typologically proximal and typologically distant languages were selected as sources of transfer (where structural co-activation can explain it). Further, the LPM presents a more unified approach to language acquisition as a whole and does so in a manner consistent with current research on cognition.

2.1.3 The Dominant Language of Communication

A study on Mazandarani/Persian bilinguals (Fallah et al., 2016) came to conclusions which, considering the models discussed thus far, might present an issue to the analyses afforded by the models discussed thus far – though, as will be explored later, the LPM handily explains the data reported by that study.

In said study, all participants were in the absolute initial phase of English acquisition, and were proficient bilinguals acquiring a third language (with a monolingual control group); bilingual participants were native Mazandarani speakers with Persian as their L2 who spoke either Mazandarani or Persian as the daily language of communication.

Of the three groups (the two language of communication groups and the monolingual control), the data showed a clear demarcation in the results demonstrative of influence from their language of communication. The group with Mazandarani as the daily language consistently scored higher than the group with Persian as the daily language or Persian monolingual groups in all three tasks in the study. The Mazandarani dominant group consistently selected for the correct English constructions when compared to the Persian dominant and monolingual groups who, in stark contrast, interpreted or generated sentences which patterned like Persian.

The initial thought stemming from these results, with regards for the bearing on the present study, is that, in addition to the language-internal factors of order of acquisition or typological proximity (the TPM), it is important to consider the possibility that external factors (rather - these factors which are outside of the scope of a given language's grammar) have the possibility to influence the selection of source(s) of transfer in early stages of L3A. The participants' exposure to English in the study outlined in Fallah et al. (2016) amounts to 24 hours on average, and because of this it is possible to describe the participants as being in the early stages of acquisition; thus, the conclusion that the authors come to (that the dominant language of communication decides transfer source selection in early stage L3A, as well as the resultant model: the Dominant Language of Communication Factor; DLF) impacts the design of the present study.

Additionally, the results of the study would appear to show that language learners are open to factors which exist *outside* of their internal linguistic systems. The frequency of use, as noted below, is a possible candidate for influence on an internal linguistic system - and therefore the dominant language could exert a disproportionately greater amount of influence during the selection of transfer source(s).

2.2 Conflicting Models

As discussed in Westergaard (2019) and Rothman (2019), the theoretical interest in L3A can aptly be described as *active*, a state which has resulted in multiple models which have dominated the landscape of the discussion in recent years. It is discussed in Westergaard (2019), however, that two of the most recent models (the Scalpel Model and the LPM) directly argue against the wholesale transfer of the TPM and in turn against the typological hierarchy (though, importantly, not the concept - at least, not in abstraction). Both models posit that a language learner is able to select for the source of transfer more efficiently for each property as they are exposed to it, selecting that source based not on a hierarchical list of properties, but rather a seeming amalgam of different inputs. This argumentation is further developed when drawing parallels to childhood first language acquisition (Westergaard, 2019, p. 15):

> In first language acquisition, children seem to follow an economy principle that is in line with the latter type of development; i.e. they do not (over-)generalize a learned pattern across-the-board to major categories, but extend their grammars in small steps ...

This leads back to the issue raised in Section 1.3, above: that language learners are seemingly receptive of influence from factors outside of the internal systems of a language. Thus far, only the DLF presented in Fallah et al. (2016) argues directly for this factor.

Of the TPM and LPM, the TPM does not account for this possibility (something Fallah et al., 2016, discuss in their conclusion). Under the TPM, it is rigidly argued that the typological similarity of any given set of languages being compared would provide the sole selection criteria for transfer, given the hierarchy as described above in Section 1.2, therefore leaving it

unable to account for the phenomenon at hand. Meanwhile the LPM as defined in Westergaard et al. (2017) ascribes the occurrence of CLI in L3A to a given language's structural similarity to that of a learner's L1/L2, thus also not accounting for this possibility on the face of the issue. Both Westergaard (2019) and Slabakova (2017), however, note that there is certainly no dearth of potential factors which might influence selection for a source of transfer.

Westergaard (2019, p. 21) adds to the list given by Slabakova (2017), which includes frequency of a given construction, prevalent usage, and structural complexity. Indeed, it can be said that linguistics research is a complex web of factors and that there is rarely (if ever) a singular factor capable of explaining the entirety of the present data.

With this in mind, then, it is potentially possible to posit that, at the earliest stages of L3A, a language learner could be influenced by the language which is dominant in the environment in which they are learning a given language; considering that the LPM as formulated in Westergaard (2021b) states that structural activation is the facilitator of CLI, then the activation of one grammar by the language of the environment would explain this.[4] In the most common settings, this factor would reflect the dominant language of the region in which the learner is located. In a laboratory setting where bilinguals are tested using a miniature artificial language, it is possible to further manipulate the variables such that this factor can be controlled for.

2.3 Natural Languages

In this section, I detail the relevant background of the participants' L1 and L2, Norwegian and English respectively, paying particular attention to the interaction between the morphosyntactic and phonological properties present in the MAL, named Englike, outlined in Chapter 3. Because the participants in the study outlined in the following chapter are native Norwegian speakers who speak English to a high degree of proficiency as their L2, they are regarded here as Norwegian-English bilinguals (henceforth, NEBs). It does not matter whether or not the participants are simultaneous or sequential bilinguals, as the working

[4] In Chapter 5, I reformulate the DLF in terms which bring it in line with the LPM and MCF.

models for this study and thesis does not assume that the order of acquisition is a major factor regarding CLI during L3A. However, it is pertinent to detail and compare the languages as they stand both from a typological, morphosyntactic, and phonological point of view.

2.3.1 Comparison of English and Norwegian

English and Norwegian are both Germanic languages, and as a result share many similarities – though the two languages differ in several key areas, notably the lexica, phonology, and syntax. As of 2017, Norwegian is spoken by 5.2 million people in Norway and wherever there is a Norwegian diaspora, per SIL Ethnologue (Eberhard et al., 2021b). English, in contrast, is a global language spoken worldwide by nearly 890 million people as a second language, with 4.3 million speakers in Norway (as of 2019; SIL Ethnologue; Eberhard et al., 2021a). Education in English is compulsory in Norwegian primary and secondary school curricula. Both English and Norwegian have many dialects, which presents a problem for any linguistic work attempting to ascribe universal features to either "the English language" or "the Norwegian language".

As mentioned in Askedal (2005, p. 1585), the "notion of a standard spoken Norwegian" is a problematic one, in that the amount of dialects present in Norway offer a broad and diverse spectrum of syntactic, lexical, and phonological differences. Often, the variety of Norwegian that is considered to be "standard" aligns most closely with the dialect associated with the region around the Norwegian capital, Oslo, and the written form of Norwegian which most closely resembles that dialect, Bokmål. With that said, it is possible to describe elements and properties of the Norwegian language, where they are relevant to the study outlined in the following chapter, as a generalization of this "standard" dialect over the broad landscape of the Norwegian language; the relevant morphosyntactic properties addressed here are present in all applicable varieties of Norwegian. Owing to this generalization, all examples of the Norwegian language will be written in Bokmål.

Because of English's status as a globally utilized language, the dialectal variation of English is broad; combined also with the fact that there is no standardizing body which oversees the English language, it is nearly impossible to select a wholly "standard" variety of English which can be utilized as a default. With that said, however, it is possible to recognize two

broad groupings of English: North American English and British English. Fortunately, the three morphosyntactic properties which are pertinent to the study are not in contention between the various dialects and varieties, yet the term “English” used throughout this body of text will refer to an idealized, homogenous whole of the English language. For standardization, similarly to the examples of Norwegian, English examples will be standardized to a General American English accepted at any university where English is the language of instruction, much like the broader text of this thesis.

For the current study, I am assessing transfer in the earliest stages of L3A, utilizing a MAL which exhibits features both like and unlike Norwegian and English. Phonologically, the MAL is identical to English. Structurally, however, the MAL is identical to Norwegian. Here, I describe the properties of English and Norwegian as they are relevant to the construction of the present study and the MAL, and describe the MAL in more detail in the following chapter.

In the strictest sense, Norwegian is typologically classified as a V2 language, which is to say that, regardless of the first element of a given declarative sentence, the finite verb sits in the second position. In declaratives which contain a complete predicate, *i.e*. transitive sentences, this often results in a surface-level SV word order which resembles English in a similarly superficial manner, though it is by no means the only environment in which the V2 rule is found. The following are two examples of this phenomenon showing V2 constructions (adapted from Faarlund et al., 1992, pp. 872–875), where the verb is underlined and fronted elements are in italics:

(1)	*Jeg*	<u>så</u>	denne	filmen	i går.
	I	saw	that	film	yesterday
	SVO-Adv				

(2)	*I går*	<u>så</u>	jeg	denne	filmen.
	yesterday	saw	I	that	film
	Adv-VSO				

This is a feature of the Norwegian language that is closely linked to topic or thematic fronting, a concept explored in more depth in Section 5.1 with regards to the syntax behind

verb movement to the second position. It can be briefly said that through topic fronting it is possible to move either the direct object or an adverb (adverbials of time are often seen in these cases) to the beginning of the sentence, resulting in declaratives which follow either an *object-verb-subject or adverb-verb-subject-object* ordering, respectively.

In contrast to Norwegian (and, indeed, to all contemporary Germanic languages save English; see for example Holmberg & Platzack, 2005), the lexical verb in English declaratives, as a rule, follows the subject of a sentence. Relative to this text, English is classified as a typologically SVO language, with a strict subject-predicate clausal structure (Huddleston & Pullum, 2002). Following the examples given above for Norwegian, examples (4) and (5) would be ungrammatical:[5]

(3) I saw that film yesterday.

(4) * That film saw I yesterday.

(5) * Yesterday saw I that film.

[5] A potential point of contention with this analysis, however, is the presence of postverbal negation in contemporary English. In such a construction, for example the sentences “she *knows not* her own strength”, “I *ate not* today”, or “the dog *sleeps not*” the verb would appear to move to the second position, moving to the left of the negator – instead of relying on *do*-support, for example in negative or interrogative constructions. As discussed in Macleod (2020), this construction rose to prominence in the late Middle English period and displaced the previous pre-verbal negation paradigm; it eventually fell out of use as *do*-support became the norm. Macleod additionally comes to the conclusion that the lexeme ⟨not⟩ has undergone a lexical split, conditioned by continued usage of deliberate and stylistic archaisms and evidenced by a lack of degradation in “normal” *do*-support-plus-negation constructions. Thus, contemporary postverbal negation patterns as normal verb-adverb pairs. For example, consider again the sentences above, where the negator is substituted with an overt adverb: “she knows *full-well* her own strength”, “I ate *quickly* today”, or “the dog sleeps *soundly*”. English similarly retains an older instantiation of postverbal negation that has fossilized in certain contexts, namely with the use of auxiliary verbs in both declarative and interrogative sentences. “I did *not* see the film” is a well-formed sentence in Contemporary English, compared to the Early Modern English *I saw* not *that image* (though there is a noted resurgence in contemporary usage of postverbal negation, though this is a marked structure which serves specific semantic functions, and arose separately after the development of *do*-support in Early Modern English (Macleod, 2020), as discussed above).

Norwegian, additionally, exhibits a key morphosyntactic feature in postnominal possessive constructions. While prenominal possessors are a syntactically valid construction in Norwegian, and the sole method of ordering for them in English, the ordering of a possessor before the noun is a secondary strategy in Norwegian. As explained in Anderssen et al. (2018), the extended Norwegian determiner phrase can be abstracted to the order demonstrated in example (6), below:

(6) [Determiner] - [Adjective] - [Definite article] - [Possessor] - [Noun]

Therefore, it is possible to have determiner-noun ordering of possessives which is the arguably simpler approach but is not the more common of the two. *Min bil* ("my car") requires no syntactic movement compared to the more common *bilen min*, which is the more complex of the two orderings as explored in Anderssen and Westergaard (2010). It is then possible to demonstrate nearly the entirety of the extended determiner phrase in Norwegian with the phrase *min egen bil* ("my own car"), with the possessive pronoun *min* acting as a possessive determiner, much as the possessors in English.

In English, and contrasting further with Norwegian, possession which does not use the genitive clitic - *'s* involves the use of a specific subset of the personal pronouns - *my, your, his, her, its, their* - which function as possessive determiners. In this way, the translations of the above Norwegian examples (*my car, my own car*) conform to the broad strokes of the Norwegian pattern, though there is only one possible ordering.

2.4 Morphosyntactic Properties

As mentioned above, verb seconding is the morphosyntactic property principally explored in the current study. The MAL, Englike, similarly features two additional properties which form the exposure segment of the experiment, a phase detailed in the following chapter – postnominal possession and postverbal negation. In this section, I discuss the properties in greater detail, elaborate on the specific syntax of the properties in question, and discuss how they relate to the MAL used in this project.

The V2 rule, as mentioned previously, is a feature common to all Germanic languages save contemporary English (a statement made in many papers on the subject, for example,

Westergaard, 2008; Haider, 2010), and "a language is called a verb-second (V2) language when the finite verb is obligatorily the second constituent, either specifically in main clauses or in all finite clauses" (Holmberg, 2015). It can be said then that Norwegian has a complementizer phrase-initial structure (C or COMP initial) with a generalized extended projection principle feature (EPP), following Chomsky (1982), which allows for a broad range of phrases to act as the fronted element and serve as the topic or focus of a clause; from Holmberg, 2015, the variety of elements which can be fronted include: noun phrases (as both subjects and objects), prepositional phrases, embedded clauses, adverbs, predicative adjective phrases, &c.

Put more succinctly, we can state that the V2 rule in Norwegian arises as the result of satisfying two requirements, per Holmberg (2015):

1. A functional head in the left periphery attracts the finite verb;
    a. In this case, the functional head is C.
2. And the functional head wants a constituent moved to its specifier position.
    a. As listed above, this can be any number of lexical categories.
    b. This constituent fronting can be called a generalized EPP feature.
    c. This generalized EPP feature prevents further upward movement past the constituent which has satisfied the EPP feature.
3. Therefore, V2 constructions arise.

If we assume as above that the subject of a sentence is a determiner phrase formed in the specifier of *v*, then a Norwegian sentence like the examples in section B.1 could be diagrammed in the following manner:

(7) [C [C+EPP JegSUB såV+PST] [T PST [*v* *t*SUB [V [D denne filmenOBJ] [V̄ *t*V [ADV i går]]]]]]

In the above diagram, the verb *se* ("to see") first moves from the specifier of V̄ to a feature in the specifier of the tense phrase (T), which both requires the verb and allows it to license the tense information (in this case, past tense) becoming *så*, where it is further drawn to C by the rule requiring a finite verb in the specifier of C. C further has the generalized EPP feature requiring it to have a constituent, which motivates the movement of the subject *jeg* from *v* to

C, fulfilling the EPP feature and resulting in the V2 rule being satisfied and producing an overt SVO word order.

Utilizing this analysis, we can show the V2 rule with the satisfied EPP feature in the other two cases:

(8) The case which results in overt OVS:

[C [C+EPP Denne filmenOBJ såV+PST] [T ~~PST~~ [*v* jegSUB [V [*t*OBJ] [v̄ *t*V [ADV i går]]]]]]

(9) And the case which results in a fronted adverb:

[C [C+EPP I gårADV såV+PST] [T ~~PST~~ [*v* jegSUB [V [D denne filmenOBJ] [v̄ *t*V [*t*ADV]]]]]]

In contrast, English can be analyzed as having a stricter EPP feature. In this way, English finite verbs require a subject to immediately precede the finite verb, leading to the strict subject-predicate ordering of English. Assuming that the generative processes for Norwegian sentence formation hold true for English, then the initial state of the sentence "I saw that film yesterday" looks much the same as its Norwegian counterpart:

(10) [C [C+EPP ISUB sawV+PST] [T PST [*v* *t*SUB [V [D that filmOBJ] [v̄ *t*V [ADV yesterday]]]]]]

Meanwhile, it is possible to approximate the Norwegian sentences with the other word orders (Adv-V2 and OVS orderings) though English would maintain its stricter SV ordering even if other constituents of the clause are fronted and emphasized. To achieve a fronted adverb (in this case, "yesterday") then the English sentence would become "yesterday, I saw that film," with the adverb fronted and the main clausal structure intact. Similarly, for the object-fronted example, the English equivalent would be something akin to "(As for) that film, I saw (it) yesterday." In this case, the English versions have a fronted relative clause which contains the full direct object while a dummy pronoun is inserted as a placeholder object in the main clause, and thus the strict subject-predicate ordering is preserved.

The second property, postnominal possessive placement, involves movement of the noun across to the position of the definite article with the possessor following it, as explained above and in Anderssen et al. (2018). The definite article in Norwegian is outwardly the same as the indefinite articles for both the common and neuter genders, where the common gender is

derived from the masculine gender. Norwegian, unlike English, lacks a compulsory determiner in the indefinite, resulting in the possibility of saying *en film* and *film*, or *et bord* and *bord* "a table", though in many contexts the forms lacking a discrete determiner is the more common construction.

Generally speaking, it is not possible to disentangle the Norwegian definite construction from the postnominal possessive constructions, as the two are intrinsically linked in all examples. Therefore, to understand the construction of postnominal possession in Norwegian, it is then important to understand the mechanics of suffixed definite articles. Considering the above, then, it is possible to explain the formation of simple Norwegian definites as follows, assuming that the definite article functions as a determiner, which succeeds the determiner and precedes the noun in the extended determiner phrase:

(11) $[_{D+DEF}\ bord_N\text{-}et_D\ [_N\ t_N]]$

In this example, the determiner phrase forms at the base level as the definite determiner and the noun, *bord*. It is possible to assume that there is a strong uninterpretable feature on the determiner which attracts the noun to it, forming the noun-determiner pair (in that order). It is similarly possible to assume that the gender information on the noun informs the selection of the final form of the definite, which is realized as *-et* in this case (because *bord* is neuter, it therefore takes the neuter definite).

Following this, we are able to form a well-constructed possessive phrase with postnominal possessives by assuming that the possessors form in the extended domain of little-*n*, which itself succeeds the determiner and precedes the noun, as outlined in Adger (2003, p. 225)[6]:

(12) $[_{D+DEF}\ bord_N\text{-}et_D\ [_n\ hans\ [_N\ t_N]]]$

In the above example we see the determiner phrase form as above, with the addition of the possessor in *n*. The same process as before occurs, though this time attracting the noun across

[6] Though this referenced section details adjective formation and modification of nouns in English, it is reasonable to assume that both the possessor and adjective form in the domain of *n*, and the pair of the two then satisfies the feature on the determiner instead of the noun, preventing the noun from crossing that boundary and merging with the definite article, evidenced by Norwegian adjectives inflecting for definiteness, ex: *det grønne bord* "the green table".

the possessor to the definite article, resulting in the phrase *bordet hans* "his table", thus following the Norwegian pattern for unmodified possessives: noun+definite article+possessor.

In contrast with Norwegian, however, English possessors pattern as full determiners, which is evidenced by the fact that English possessors and determiners cannot coexist.[7] That is to say that the phrase "his table" is well-formed and grammatical, but "his the table" (all of which is marked for in the Norwegian examples above). Thus, the analysis for the English possession ordering would be as follows, with the determiner initially forming in the domain of little-*n* then moving to the specifier of D.[8]

(13) [D hisD+POS [*n* *t*POS [N table]]

Compare the English sentence "I did not see that film" with the contemporary Norwegian *jeg så* ikke *denne filmen*, which showcases postverbal negation. In both Norwegian and English, the negator patterns as an adverb (though in English, negative formation is typically assisted by *do*-support as noted in the footnote in the previous section), thus it is possible to assume that the negator forms in the specifier of little-*v*, forming the expected postverbal negation as we see in Norwegian (or would see in older forms of English; Adger, 2003, p. 193):

(14) [T [D JegSUB] [T̄ såV+PST ikkeADV [*v* *t*V [V [D denne filmenOBJ][*t*V]]]]]

2.5 Chapter Summary

This chapter introduced the core of what this thesis explores – cross-linguistic influence, where the grammar of one language affects another – and gave an overview of the theories and models which inform this active field of research. Specifically, these models (as well as this thesis) focus on a particular type of CLI called transfer, which manifests during the acquisition of a third language.

[7] At least in the domain of English possessives that do not use the genitive clitic *-'s* or the possessive *of*, such as *<u>the</u> child*'s *blanket* or *<u>that</u> chair* of *mine*.

[8] As mentioned in Adger (2003, p. 226), the actual analysis of English possessors is a contended subject. Here, I am operating under the assumption that English possessive determiners form in the domain of *n* and move to D.

Of the models discussed here, two of them assume that the order in which a language is acquired is the key aspect of transfer source selection. The L1F assumes that a learner's first language is going to be the language from which a learner transfers. Conversely, the L2SF assumes that a learner's second language is going to be the language which more readily transfers. Both of these models are supported by experimental data showing that transfer can seemingly occur from either the first language (thus supporting the L1F) or the second language (supporting the L2SF).

The two dominant models in the field, however, do not assume that the order of acquisition plays as important a role in this process. The TPM, then, posits a hierarchy of properties which assists a language learner's unconscious assessment of the L3 input, allowing the parser to select whichever language (the L1 or L2) is most like the L3 in terms of typological similarity to be the sole source of transfer. Meanwhile, the LPM describes transfer in terms of linguistic cognitive structures, the activation of which informs and assists the building of the L3 grammar.

The two languages which are studied here, Norwegian and English, were then discussed and compared. While both languages are, to a relative degree, somewhat closely related, they differ in key morphosyntactic aspects: typology, where Norwegian obligatorily places the verb in the second position within a clause while English has a fixed subject-predicate ordering; verbal negation, where Norwegian negates verbs with a following negator and English with a preceding negator; and nominal possession, where Norwegian places the possessor in the postnominal position while English possessors precede the nouns they possess.

In the following chapter, I discuss the design of the present study, and introduce the predictions and hypotheses drawn from the models discussed in this chapter. I also introduce the miniature artificial language used to facilitate the experiment, as well as the pilot study and its results.

3 Methodology

In the previous chapter, I introduced the theoretical and experimental background which sets the stage for the present study. In this chapter, I introduce the design philosophy and research questions which informed the design of the study, then make concrete the predictions introduced in the previous chapter. I then outline the methodology utilized to test the research questions with a description of the training and assessment tasks participants were instructed to complete and a brief on the participants.

3.1 Design Philosophy

While there are many learners of third languages around the world, and indeed it is possible to find people whose first language is Norwegian who also speak English to a high degree of proficiency and who, in turn, are learning a third language, it is difficult to find a homogenous population who are all learning the same third language.

According to the language-learning website Duolingo, in Norway the most popular language being learned on the platform is Spanish (Pajak, 2016).Considering that English instruction is mandatory in Norwegian primary education, it is then possible to infer that the most common third language being learned in Norway today is Spanish.

However, it is not possible to assume that this group is homogeneous; learners of a third language rarely are homogenous outside of a classroom setting, and even then it is most likely that different learners will progress at varying rates and have varying rates of exposure to their target language. In order to ensure that a group of language learners is, indeed, homogenous, it is therefore important to ensure an equal level of competency and exposure across the participants. Given a group of language learners, some may have only just begun to study the third language in question, while others may have studied their target language for weeks, months, or years with any potential amount of exposure, be it passive or active. With this disparity in mind, tracking the effects of CLI across the process of L3A can be accounted for when studied in a laboratory setting with an artificial language.

In addition, the usage of an artificial language can ensure that all of the participants are learning the same language, thus allowing a researcher to collect an appropriate set of data

with a significant number of participants. This allows for a controlled environment where a researcher can control for as many variables as possible. As mentioned above, it can be assumed that while Spanish is the most common third language being learned in Norway, other possibilities include the native Sámi languages, Kven, the neighboring Swedish, Danish, Russian, and Finnish, or the German and French offered in many Norwegian primary school curricula. Because of this, I designed a miniature artificial language for use in the current study, called *Englike*.

Englike as an artificial language was designed to mimic English in terms of its phonology, phonotactics, and orthography, while it patterns with Norwegian on a structural and morphosyntactic level. These decisions are the result of three thoughts, which are tied to the research questions outlined below; the miniature artificial language is described in more detail in Section 1.1, below.

The first thought is that through exposing Norwegian-English bilinguals to a language which is *structurally* similar to their native language (Norwegian), it is possible that the order of language acquisition, specifically regarding the potentially privileged status of either the first or the second language as described by the L1F and L2SF, can be ruled out as a primary influence when selecting for a source (or sources) of transfer.

The second thought is that, per the transfer hierarchy outlined in the TPM, language learners will select a source of transfer based on a property that is most like their L1 or L2, starting at the top and working down; the top level of the hierarchy is the lexicon of the target language, followed by phonology. Because Englike is both lexically and phonologically similar to English, participants would be expected to select for English-like constructions in the experiment nearly exclusively.

However, Englike is not structurally similar to English - instead, its morphosyntax is patterned after that of Norwegian. If participants then select for Norwegian-like examples (ie, the examples which would be the prescribed forms for Englike) instead of English-like examples, then it is possible to say that morphosyntactic structure can provide a motivation for selection of a source of transfer, instead of the expected lexical or phonological similarities (as morphology and syntax are the two lowest properties in the hierarchy).

The third and final thought is that, during the course of running the study, participants may be influenced by the language of instruction which could serve as a psychological prime. Priming, generally, is a response to a stimulus which changes the result of a task (McNamara, 2005, p. 3). Studies typically involve semantic priming and reaction times, where one word (the prime) is presented to a participant, then the participant must select one of two words which soon follow. Primes which are semantically related to one of the two choice words prime the participant, who then often selects the semantically related word more quickly than without the stimulus.

This thought then becomes a question: does the language of instruction matter? The two most prominent models, explained in more detail in Chapter 2, both interact with this factor in different ways - something also discussed in the following chapter. If the language of instruction during the study is Norwegian, then it is possible that it will reinforce the selection of Norwegian-like constructions, and vice-versa if English is used as the language of instruction. This possibility is not without its drawbacks for the models presented in the following chapter, though it is more problematic for some models over others. For example, the possibility that external sources could motivate the selection of a source of transfer is an inherent problem for the TPM; the LPM, meanwhile, might suggest that this is not a "bug" but a feature (to borrow terminology from the field of information technology) of the apparatus responsible for language acquisition, as a wide range of factors could influence the selection of a source for CLI - and with this in mind, I tentatively propose it is possible to incorporate the results from the study briefly described below and discussed in more detail in the following chapter with the LPM.

This particular idea was tested in Fallah et al. (2016) utilizing a mirror study of Mazandarani-Persian bilinguals learning English, where the researchers found that the dominant language of communication appears to play a significant role when determining the source of transfer. The results of the aforementioned study showed that participants who predominantly spoke Persian in their daily lives consistently selected for it as the source of transfer in the study tasks while those who predominantly spoke Mazandarani in their daily lives consistently selected for Mazandarani as the source of transfer. This phenomenon is discussed in more detail in Chapter 5, but its presence is notable in its effect on the research questions as formulated in Section 2, below.

3.1.1 Englike – A Miniature Artificial Language

An artificial language, as opposed to a natural language, is a language that is constructed for the specific purpose of experimental study. Earliest uses of this technique alternatively referred to artificial languages as "artificial linguistic material" or "artificial grammars" (as in Reber, 1967), but in the 1980-90s the term "artificial language" (see Saffran et al., 1996, for example) rose to prominence, and in the late 1990s artificial languages had become a more common tool for linguistic research.

Artificial languages allow for an unparalleled control of variables and stimuli and allow a language researcher to select for the properties to be studied. Miniature languages (or miniature artificial languages; MALs) are artificial languages which contain a minimal amount of information and are small enough in their scope that they can be easily acquired in a laboratory setting in a short time span, typically in the realm of a few minutes for particularly small languages to several hours for larger languages (Fedzechkina et al., 2016). MALs are utilized to study all aspects of language, particularly language acquisition, including complicated topics such as morphosyntax (see for example Fedzechkina et al., 2012).

Englike, the miniature artificial language created for the present study, was designed to have a phonology, phonotactics, and orthography that patterns as English, while structurally it functions like Norwegian. Englike contains a lexicon of 10 nouns, five adverbials of time, three verbs, one possessive pronoun, and one verbal negator. All lexical items are designed to closely resemble their English-language counterparts, and predominantly designed to avoid clear Norwegian cognates in an effort to facilitate the study as described here.

From a phonological standpoint, Englike and Norwegian differ in a few key aspects. Chief among the differences is that of the vowels: the Norwegian vocal inventory has 17 phonemic monophthongs compared to the 11 of English[9]. Norwegian, further, distinguishes between rounded front and central vowels which English does not, including /ʏ/, /yː/, /œ/, and /øː/, as well as a phonemic length distinction on vowels. The length distinction does have a similar

[9] Though two vocalic phonemes, /eɪ/ and /oʊ/, are diphthongs that are generally analyzed as phonemic monophthongs; see Wells, 1982, p. 187, for example.

quality distinction to English, in that Norwegian short vowels are also lax (for example, /ʏ/ vs /yː/), though English lacks the length distinction.[10]

Additionally, English differs from Norwegian with its rhotic realization. In General American English, the rhotic *r* is a post-alveolar approximant /ɹ/, while in Norwegian it is the tap /ɾ/. Similarly, the "v" phoneme in Norwegian is given to be an approximant /ʋ/, while in English it is the labiodental fricative /v/. Both Norwegian and English make similar distinctions on their stop consonants, with Norwegian and English voiced stops being unaspirated, while their unvoiced counterparts are. Further, Norwegian has a set of retroflex consonants derived from rhotacization. The consonant cluster *rC* (where C is an alveolar consonant) produces the retroflex allophones [ɳ ʈ ɖ ɭ], and Norwegian features the phonemic retroflex sibilant /ʂ/. Norwegian also has the palatal fricative /ç/; English lacks all of these.

In order to attempt answering the research questions outlined below, I created Englike such that it has a grammatical structure that is entirely identical to Norwegian for the morphosyntactic property tested. Because Norwegian features the V2 rule and Englike is designed to have morphosyntactic structure as Norwegian, Englike also features the V2 rule. While the V2 rule is explored in more depth in Section E, below, it is important to note that because Norwegian can front practically any constituent, so too does Englike allow for this kind of movement.

Finally, Englike is designed to mimic English phonology and phonotactics, approximating this to the participants via an English-like orthography. To achieve this, Englike contains the following consonantal phonemes /m n p b t d k g f s~z ʃ t͡ʃ l~ɬ ɹ/ as well as the following vocal phonemes /iː ɪ uː eː ɛ ə~ʌ oː æ ɑ/. A full lexicon of Englike with phonetic transcriptions is available in the Chapter 3 appendix.

This is significantly simplified from the broader English phonological system, but its basis is firmly in English phonology. Englike contains only these phonemes and no others, save the commonplace syllabic-*r*, ɚ (or ɻ̩), the syllabic-*n* (n̩), and the singular allophone of /l/, which is

[10] Most true long vowels in English disappeared during the Great Vowel Shift of Late Middle and Early Modern English, having been replaced by the diphthongs /aɪ/, /eɪ/, /aʊ/, and /oʊ/, as well as the monophthongs /iː/ and /uː/ (from earlier /iː/, /aː/, /uː/, /ɔː/, /eː/, /ɛː/, and /oː/ respectively; McMahon, 2007).

/ɬ/. All phonemes are found in the examples of Englike. Because orthography here is serving as an analogue for phonology and phonotactics, the orthography of Englike follows English conventions, including the orthographic irregularity of English vowels. The grapheme *a* is used to represent /ɑ/, /æ/ and /ə/, *ie* for /iː/, *o* for /ɑ/ and /oː/, *e(a)* for both /eː/ and /ɛ/, *oo* for /uː/, *u* for /ʌ/, and *i* for /ɪ/.

3.2 Research Questions

The primary questions which this study and paper aim to explore are thus:

1. Can the language of instruction influence the selection of sources of transfer?
    - Given two groups for the experiment, one which receives the instructions for the experiment in English and the other in Norwegian, will those two groups function differently?
2. Can morphosyntactic similarity motivate transfer despite the strong lexical and phonological similarity factors, in the earliest stage of language acquisition?
    - That is to say, while acquiring a novel language which is structurally identical to Norwegian while phonologically identical to English, do Norwegian-English bilinguals transfer from their L1 (Norwegian) or L2 (English)?
    - Are Norwegian-English bilinguals sensitive to morphosyntactic structural similarity when determining the source of transfer during the initial stages of acquisition?
3. Does order of acquisition matter when determining transfer source selection in the earliest stage of language acquisition?
    - Will Norwegian-English bilinguals prefer to parse linguistic input from their L1, Norwegian, or L2, English, outside of all other potential factors?

These research questions and the study outlined in this chapter are designed to tackle a handful of specific issues in determining the source of transfer during the early stages of L3A.

Briefly put, it is difficult to say if Norwegian-English bilinguals will more readily transfer from their L1 or L2 and for what reasons, or whether the results of the present study are indeed indicative of transfer or simply representative of the human capacity for language and

learning. With that said, however, it is possible to posit the following: Should the results more readily pattern with participants' L1, then it is possible to say that the L2 does not impede the ability of the L1 to be a source of transfer. However, both of the dominant models (the TPM and LPM) as well as the L2SF would predict that transfer would occur (at least predominantly) from the L2, English, due to different factors (as discussed in the previous chapter), with only the LPM predicting that transfer from Norwegian could occur in a more substantial manner than other models. How large a role, then, does the dominant language play in learning a new language, and is that factor compatible with the models? Is the language of instruction a viable alternative for the dominant language of communication?

3.3 Predictions

In the previous chapter, I outlined the models which informed the present study, each of which would make potentially similar (yet distinct) predictions with regards to the experimental data. Here, the brief predictions given in the previous section are expanded upon and explored, then given as hypotheses to be tested in the current study.

The models which suggest that the order in which previously acquired languages are acquired, the L1 Status Factor and the L2SF, would predict, respectively, that the participants would select their L1, Norwegian, or L2, English, as the dominant sources for transfer. The L1F

The TPM would predict that, on initial exposure to the third language and the ensuing initial state of language acquisition, participants would cross check the target language against their L1 and L2, using the typological hierarchy as the method of comparison. Because the miniature artificial language used here is phonologically identical to English, participants would (like the L2SF) transfer solely from English despite the grammar to which participants are exposed being identical to Norwegian. The copy of English grammar which is the result of transfer then serves as the learner's internal grammatical representation of the target language until such time that the learner would be corrected.

Similarly, the LPM would predict that at the early stages, surface level similarity would likely motivate transfer from the participants' L2, English, despite the evidence of morphosyntactic structures which are identical to Norwegian being present. However, the LPM would also

predict that the learners would be receptive to the presence of the Norwegian structures and could potentially select Norwegian as the source of transfer for those properties.

The DLF would predict that, with the study taking place in Norway and with the participants predominantly speaking Norwegian in their daily lives, they would likely select their L1, Norwegian, to be the source of transfer. However, with the study conducted as split between an English-language instruction group and a Norwegian-language instruction group, it is then potentially possible to expand the domain of the DLF such that the language of instruction would play a role: those in the English-language instruction group would transfer from English, while those in the Norwegian-language instruction group would transfer from Norwegian.

The table below illustrates the predictions that would be drawn from all of the models discussed here, though it includes the L1 factor which was only discussed in brief.

Table 1: Predicted outcomes in terms of facilitative (F) contra non-facilitative (N) transfer on acquisition of Norwegian-like morphosyntax by Norwegian-English bilinguals in the present study.

	Norwegian LOI Group		**English LOI Group**	
	Pre-Exposure	**Post-Exposure**	**Pre-Exposure**	**Post-Exposure**
(1) L1F	Norwegian (F)	Norwegian (F)	Norwegian (F)	Norwegian (F)
(2) L2SF	English (N)	English (N)	English (N)	English (N)
(3) TPM	English (N)	English (N)	English (N)	English (N)
(4) LPM	English (N)	Norwegian (F)	English (N)	Norwegian (F)
(5) DLF	Norwegian (F)	Norwegian (F)	English (N)	Norwegian (F)

Similarly, both the TPM and LPM would predict that the participants would likewise select for English to be the source of transfer, albeit for vastly different reasons than the L2SF. While the L2SF would predict this is due to the order of acquisition, the TPM would predict that this is due to the phonological and lexical similarity to English. Following the TPM hierarchy, then, we see that due to the phonology and lexicon of Englike, participants will

regularly select for English-like constructions regardless of the similarity between Englike and Norwegian in terms of morphosyntax, thus leading to non-facilitative transfer from English.

The LPM would predict that the surface level similarities between Englike and English would also motivate selection of English as the primary source of transfer, particularly in these early stages. At the beginning of the L3A process, most morphosyntax would be decidedly opaque and, therefore, it is more reasonable to predict that English would be the most viable source from which to transfer, therefore resulting in non-facilitative transfer from English. However, it is also possible (likely, even) that the morphosyntactic features being tested are sufficiently salient – particularly after exposure to additional syntax – that Norwegian would be selected as an additional source of transfer, particularly considering that both the Norwegian and English grammars could be activated simultaneously.

Finally, considering the DLF, we can predict two differing results based on the groups tested. For the participants in the Norwegian-language instruction group, it is expected that the dominant language being Norwegian would prompt participants to select for the V2, Norwegian-like constructions and therefore exhibit facilitative influence from Norwegian. Conversely, with the English-language instruction group it is expected that participants will select for English-like SV constructions and therefore exhibit non-facilitative influence from English.

Given the above, it is possible to list five hypotheses which this experiment tests:

1. Participants' L1 commands a privileged position over their L2, preventing their L2 from being a source of transfer. Participants will readily select for V2 constructions during both phases of the syntax selection task, regardless of exposure to other structural properties. Additionally, even when given instruction in English the participants will select for V2 constructions at a comparable rate to those in the Norwegian LOI group.
2. Participants' L2 commands a privileged position over their L1, preventing their L1 from being a source of transfer. Participants will less readily select for V2 constructions during both phases of the syntax selection task, regardless of exposure to other structural properties. Additionally, even when given instruction in Norwegian

the participants will select for V2 constructions at a comparable rate to those in the Norwegian LOI group.

3. Participants' L2 is most like the L3 when compared using the hierarchy of properties, leading participants to exclusively transfer from their L2. Participants will less readily select for V2 constructions during both phases of the syntax selection task, regardless of exposure to structural properties. Additionally, even when given instruction in Norwegian the participants will select for V2 constructions at a comparable rate to those in the English LOI group.
4. Participants' L2 is most like the L3 in terms of lexicon and phonology, but their L1 is most like the L3 in terms of structure, leading to a mixture of results due to the differing degrees of structural co-activation. Prior to their exposure to additional morphosyntactic structure, participants will less readily select V2 constructions, with the English LOI group doing so less readily yet compared to their Norwegian LOI counterparts. After exposure to the additional structure, participants will more readily select V2 constructions than during the pre-exposure phase.
5. Participants receive instructions for completing the study in either their L1 or L2, leading to a mixture of results delineated along the lines of the LOI group. Because of this, the English LOI group will select V2 constructions less readily than their Norwegian LOI group counterparts.

Of these hypotheses, the former two are strongly disputed by the models supporting the latter three. As mentioned previously, the TPM and LPM (as well as the DLF) dispute the idea that the order of acquisition is the dominant factor during transfer source selection. Therefore, the structure of the present study is designed to test the hypotheses laid out above. As outlined at the beginning of this chapter, the experiment was divided, ultimately, into two phases: pre-exposure and post-exposure. This structure was designed to test the above hypotheses and is explained in more detail in the following section. In brief, however, the pre-exposure phase sets the baseline against which the participants' results in the post-exposure phase can be compared against.

3.4 Experimental Overview

The broad outline of the steps in the current study are as below:

1. Division of participants into two groups: one which received the experiment in English (English language of instruction; English LOI), and one which received the experiment in Norwegian (Norwegian LOI);
2. Consent form and background questionnaire with language proficiency self-assessment;
3. Vocabulary training;
4. Vocabulary assessment;
5. Initial syntax selection task between V2 and SV constructions;
6. Syntax training on post-verbal negation and postnominal possession;
7. Secondary syntax selection task between V2 and SV constructions.

The experiment was built using *lab.js* (Henninger et al., 2019) and hosted on the UiT JATOS server. The experiment was designed to collect data from the absolute initial stage of language exposure, and to do so over the course of approximately fifteen minutes.

At the beginning of the experiment, participants were randomly assorted into either the English LOI group or the Norwegian LOI group. After the anonymous sorting, participants were directed to the consent form. In the consent form, participants were directed to indicate both that they were over the age of 18 and that they consent to participate in the experiment. As part of the consent form, participants were informed that the data collected will be completely anonymous, and that they were free to withdraw from the study at any time and that all given data will be deleted. Due to the anonymity of the data it is not possible to connect data to individual participants nor share participant data with participants after the conclusion of the experiment. The text of the consent form, in both languages, is available in Appendix C.

In the background questionnaire, participants were asked to input their age, the highest level of education they have completed, whether or not they are a native Norwegian speaker, and at what age they began to learn English (formally or informally). The participants were then asked to self-assess their language ability in both English and Norwegian on a scale from 1-5, where 1 is “poor” and 5 is “native/native-like fluency”.

During the lexical training, participants were directed to a timed training on the lexical items of the MAL, which showcases the ten nouns of the MAL. The lexical items were each shown for 5000ms and presented as an image with the associated word underneath. Images for the lexical items were created in Adobe Illustrator following the Duolingo style guide for language learning content, in order to maintain a pleasant and consistent style (Duolingo, Inc., n.d.). The lexical items and images presented in the vocabulary training are shown in Appendix A.

Participants were then directed to complete a self-timed vocabulary assessment of the lexical items presented to them. In the assessment, participants were shown an image of one of the lexical items from the prior section for a total of ten training segments. Underneath each image, two words from the lexicon were presented - one which corresponds to the image, and one chosen at random. The placement of the lexical items on the screen was randomized on the horizontal axis, and participants made their choice using either the *S* or *L* keys on their computer keyboard or by clicking on the word (or tapping on it, if the participant undertook the study via a mobile device). This method of choice selection allowed for participants to clearly make a selection without confusion while maintaining usability for participants using a mobile device.

The syntax selection task (SST) was presented to participants as a two alternative forced choice task (2AFC). Following the vocabulary assessment, participants were directed to select between one of two options presented to them, which were provided in a manner like the vocabulary assessment; participants were directed to select the sentence they believed to be correct. In the SST, participants were shown an image depicting a scene with two sentence options beneath, for a total of 15 individual assessment segments. Each sentence followed one of two patterns:

1. V2 constructions, in adverb-verb-subject-object order; Norwegian-like construction. See example (9) in Chapter 2, Section 4.
2. SV constructions, in adverb-subject-verb-object order; English-like construction. Contrast the above example with “yesterday, I saw that movie” – a well formed English sentence.

All sentences were transitive and featured a fronted time-adverbial indicating an approximate time of day (such as morning, night, afternoon; represented as a seven-segment display digital clock face in the corresponding images). All sentences and images used in the SST are included in Appendix B. During this initial SST, the baseline for participant response was established, and Section 5 of this chapter showcases this for the pilot experiment while the following chapter details the results of the final experiment. With this baseline established, it becomes possible to compare participants' data from the post-exposure phase against their initial judgements.

Thus, in order to judge the participants' receptiveness to morphosyntactic structures other than lexical verb placement, participants were trained in two additional structures. During this training on postnominal possession and postverbal negation, the two additional structures found in Norwegian but not English, participants were shown a further ten training segments for 4000ms each, consisting of five segments showcasing each structure.

In the segments training the possession marking, five lexical items were shown as being possessed, using the possessive pronoun *his*, for example *dogga his*, "his dog". In the segments training postverbal negation, five sentences were shown with a red X marking that the action was not being done, coupled with the verbal negator *na*, for example *shierp eits na flara*, "the sheep does not eat the flower". Presentation of the structural training segments was not grouped by property, and each segment was randomized as with the lexical training section. All sentences, phrases, and images are included in the chapter appendices.

Finally, each participant repeated the prior SST with no changes, other than the inherent randomness of the order in which segments were presented during each phase. Here, it becomes possible to contrast the results of the second SST with those of the first, allowing analysis of the data.

3.5 Pilot

Chapter 4 will be concerned with the analysis of the results of the study, though it is worthwhile to explore the process and results of the pilot study here. As with the final study, all analysis of the participants and the resultant data was completed using *R* (R Core Team,

2020). Before the study was run, a pilot study was conducted in two rounds with a total of nine participants: five in the English LOI group, and four in the Norwegian LOI group.

Of the participants, the average age was 24.4 years old for the English LOI group, and 28.5 years old for the Norwegian LOI group. An initial density plot of the participants' ages showed a right skew for the data, which coincides with the mean age of 24.4 but does not (initially) indicate a normal distribution. However, the ages of the participants largely aligned with the intercept-line of a quantile-quantile plot thus indicating normality (with one outlier). Further, a Shapiro-Wilk normality test, followed by an F-test of the age variances, and finally a Kruskal-Wallis rank sum test did indicate that the participants were, indeed, comparable in terms of their ages ($\chi^2 = 8$, df = 8, $p = 0.4335$).

Further, the same steps revealed immediate normality in the ages at which the participants began learning English - on average, the English group began to learn English at 7.4 years of age while the Norwegian group began to learn English at 6.5 years of age. A Kruskal-Wallis test of the age of English acquisition weighted by the participants' current ages indicated that, as before, the participants were comparable regarding that factor ($\chi^2 = 3.6082$, df = 5, $p = 0.6071$). All participants in the final pilot were L1 Norwegian/L2 English speakers.

All participants, on average, rated their English proficiency at a *4* on a scale from 1-5 indicating an advanced command of English, though not native-level fluency. Table 2, below, summarizes the participant information from the pilot study.

Table 2: Comparison of participants in the final experimental pilot, with mean participant age, age of English acquisition (AOA), and self-rated English proficiency by LOI group.

	Norwegian LOI	**English LOI**
Mean age	28.5	24.4
Mean AOA	6.5	7.4
Mean English proficiency	4	4

During the pilot experiment, both groups conformed to hypothesis 5 from Section 3, which aligns with the proposed hybrid DLF as described in Chapter 2. Of the total possible selections which could be made (75 per phase in the case of the English LOI group, or 60 per phase for the Norwegian LOI group), the English LOI group selected for the SV (English-like) constructions 98.67% of the time, for a total of 74 SV selections out of 75 possible during the initial SST.

Meanwhile, the Norwegian LOI group selected for SV structures contra V2 structures somewhat more evenly, though still preferred SV structures overall; of the 60 possible selections, the Norwegian LOI group selected for SV structures 35 times (58.33% selection rate), and V2 structures 25 times (41.67% selection rate). There is significant difference between the two groups in this regard:

1. Participants the English LOI group selected for V2 structures precisely once during the pre-exposure phase of the SST;
2. Participants in the Norwegian LOI group selected for SV and V2 structures more evenly, though still preferred to select for SV structures, selecting them more frequently.

This initially indicates support for the hypothesis which states that participants in the English LOI group would select for V2 constructions at a lower rate than their Norwegian LOI counterparts. Considering that the English LOI participants selected V2 structures only once while the Norwegian LOI participants selected V2 structures 41.67% of the time, the pre-exposure SST results considerably seem to favor the DLF.

During the post-exposure phase, in the secondary SST, we see a radical shift in the rates at which participants select one property over another. The English LOI group saw a decrease in SV construction selection rates, dropping from 98.67% to 77.33% (from 74 SV selections of 75 total possible to 58 SV selections). The English LOI group also saw an astonishing increase in V2 selection rates, going from a selection rate of 1.33% to 22.67%. Table 3, below, outlines the V2 selection rates by group and phase of the experiment.

Table 3: Comparison of final pilot participants by group and phase.

Group	Phase	Construction	Selection Rate	Percent
	Pre-	SV	74/75	98.67%
	exposure	V2	1/75	1.33%
	Post-	SV	58/75	77.33%
English	**exposure**	V2	17/75	22.67%
	Pre-	SV	35/60	58.33%
	exposure	V2	25/60	41.67%
	Post-	SV	30/60	50%
Norwegian	**exposure**	V2	30/60	50%

What is immediately apparent is that the difference between the groups, both before exposure to additional morphosyntax and after (with the additional properties being, to reiterate, postnominal possession and postverbal negation), is a staggering change in the performance of the English LOI group. The change in V2 selection rate, from 1.33% to 22.67%, is a 1600% increase meaning that the participants were 16 times more likely to select V2 constructions during the post-exposure phase than before. Additionally, the difference between the two groups during both phases of the pilot, averaging a difference of 33.84% across both phases, coupled with the difference between the LOI groups across phases, suggests that the hypotheses drawn from both the LPM and DLF might be correct.

With only these data from the pilot at hand, it would be tempting to say that the domain of the DLF can be expanded to include the language environment of acquisition, i.e. the language of instruction. Meanwhile, it is similarly tempting to say that language learners are indeed receptive to morphosyntax during transfer source selection in early stage third language acquisition.

The initial conclusions of the final pilot suggest that there is merit to some attempt to hybridize the LPM and DLF as explanatory models for transfer source selection, insofar as the DLF would seemingly be able to extend the domain of the dominant language of communication to the language of the acquisition environment. The LPM in its current iteration and the DLF, when combined, would suggest that the participants were consistently

influenced by both English and Norwegian, and that the English LOI group had a stronger influence from the English-language instructions.

3.6 Chapter Summary

This chapter introduced the experiment which informed this thesis, explained the concept of artificial languages, introduced the miniature artificial language utilized by the present study, and discussed the pilot experiment undertaken prior to the present experiment.

The core of this thesis seeks to explore transfer as a topic of heated debate and subject of active research in third language acquisition; the results of which have resulted in the models described in the previous chapter. Here, predictions for the current study were drawn from these models, where the L1F and L2SF would predict that participants would transfer from either Norwegian or English, respectively. The TPM would predict that participants would transfer from English, owing to the typological similarity between the MAL and English. The LPM would predict that participants would predominantly transfer from English, though critically participants who are instructed via Norwegian would transfer more from Norwegian before the second phase of the experiment, where the two groups would see increased rates of transfer from Norwegian. The DLF, expanded to the domain of the language of the acquisition environment, would predict that the group which were instructed in Norwegian would transfer from Norwegian, while the group instructed in English would transfer from English.

Based on the results of the pilot, the DLF would seem to be the strongest predictor of transfer source selection, while the predictions of the LPM are not far from the mark. The results of the present study, which are discussed in the following chapter, are explored with more statistical rigor, however – and would suggest somewhat different conclusions than the pilot does.

4 Results

In the previous chapters, I introduced the theoretical background behind the present study, the models which guide the field as it stands now, discussed the methodology behind the present study, and introduced the pilot which was undertaken before the current study.

In the pilot, the results indicated that, going forward, participants of the present study would be influenced by the language of instruction (LOI) as well as the experimental phase; that is, whether or not the participants have been exposed to additional morphosyntactic structure. To reiterate from the previous chapter, the present study was divided into two phases: the pre-exposure phase and the post-exposure phase, where in each phase participants completed a Two Alternative Forced Choice (2AFC) task which served as an acceptability judgement assessment of V2 structures in the MAL. Separating the two phases was a training section where participants were exposed to two additional morphosyntactic structures – postnominal possession and postverbal negation – where, due to the similarity with Norwegian (as both properties are permissible in Norwegian and not in English), it was expected that participants would exhibit a change in their rate of V2 selection after exposure to additional structure. Further, following the pilot it was expected that there would be a significant difference between the two groups where the English LOI group would, across both phases, select for V2 structures less readily than the Norwegian LOI group. With the pilot results in mind, the present study commenced.

Thus, after completing the final round of piloting, the experiment was hosted through the UiT *JATOS* server and participants were recruited via Prolific (Prolific, 2021). The results and comparisons between the participants were analyzed using *R* (R Core Team, 2020). With the experiment designed to examine language learners at the absolute initial state of language exposure, the experiment took place over an average of approximately thirteen minutes (with an estimated completion time of fifteen). In total, the present study recruited $n = 77$ participants. As with the pilot, participants were assigned to either the Norwegian LOI group or the English LOI group at the outset of the experiment. As the participants were pseudo-randomly assigned to each group, this randomization resulted in a bias towards assigning participants to the Norwegian LOI group; on completion of the study the Norwegian LOI group had $n = 42$ participants compared to 35 for the English LOI group.

4.1 Participant Information

At the onset of the experiment, the participants were randomly assigned to one of the two LOI groups – one to receive instruction in English, and the other to receive instruction in Norwegian – and were directed to complete a consent form. Then, participants completed a background questionnaire which asked participants for their age, highest level of completed education, when they began learning English, and for a self-assessed proficiency in both Norwegian and English.

Table 3: Mean and median age of participants by LOI group.

Group	Mean Age	Median Age
English	27.5	28
Norwegian	31.4	28

Participants averaged ages ranging from their late 20s to early 30s, with both groups sharing a median age of 28 years. A Shapiro-Wilks normality test comparing the ages of the participants gives $p = 9.76e^{-7}$, which indicated non-normality of the data, while a follow-up F-test to compare the variance of the ages similarly returned a low p-value ($p = 4.277e^{-12}$), indicating that the participants were not comparable in terms of age. However, visual analysis of the data as both a density plot and quantile-quantile chart and transformation of the recorded ages by the natural logarithm of the set (a repeated Shapiro-Wilks test gives $p = 0.01507$, indicating insignificant non-normality) allows for comparison of the data. A Kruskal-Wallis rank sum test ($\chi^2 = 76$, df = 76, $p = 0.4784$) confirmed that the data was, indeed, comparable across that factor.

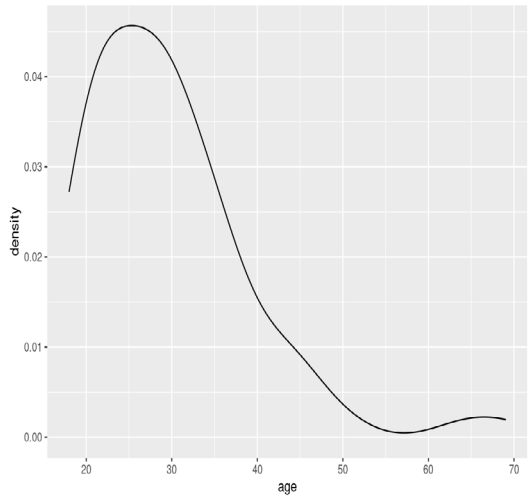

Figure 1: Density plot of participant ages.

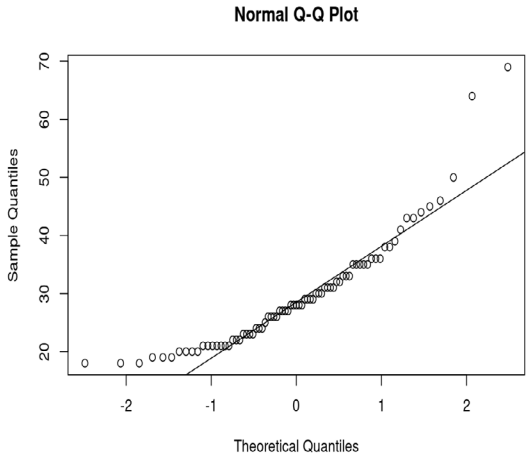

Figure 2: Quantile-quantile plot of participant ages.

Table 4: Mean age of English acquisition (AOA) and time spent as a speaker of English in years (Avg. Yrs. English).

Group	Mean Age	Mean AOA	Avg. Yrs. English
English	27.5	6.57	20.91
Norwegian	31.4	6.67	24.74

Participants in both groups began learning English around the same age: between six and seven years old. On average, participants in the Norwegian LOI group learned English later than the English LOI group and have spoken English for longer.

As before, a Shapiro-Wilks test and F-test indicated that the data was not comparable ($p = 1.485e^{-5}$ and $p = < 2.2e^{-16}$ respectively) indicated incomparable, non-normal data though the follow-up visual analysis and logarithm-transformed cube-root of the data (with the repeated Shapiro-Wilks test giving $p = 0.0083$, showing significant non-normality) suggests that the data are comparable. A Kruskal-Wallis test ($\chi^2 = 30.066$, df = 27, $p = 0.3112$) indicated that the participants were similarly comparable across this factor.

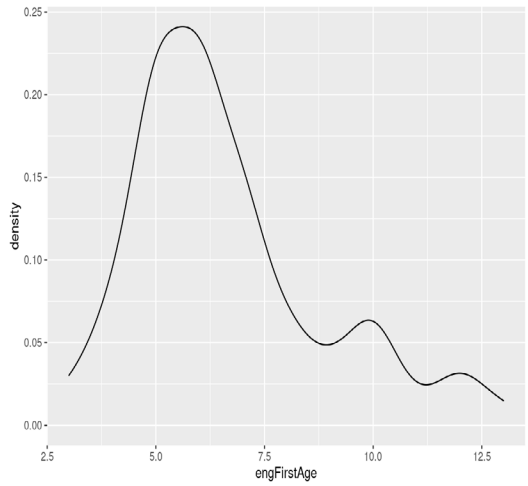

Figure 3: Density plot of participants' age of English acquisition.

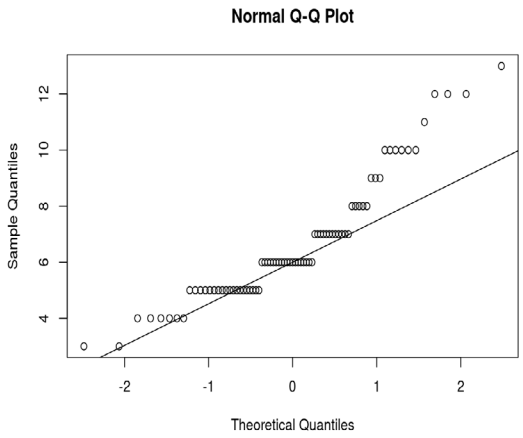

Figure 4: Quantile-quantile plot of participants' age of English acquisition

Table 5: Participants' mean self-rated proficiency in English by LOI group.

Group	Mean Eng. Proficiency
English	4.40
Norwegian	3.34

Participants in the English LOI group rated their proficiency in English higher than their Norwegian LOI group counterparts on the proficiency self-assessment. A Welch two sample T-test comparing the averages of the two groups ($t = 5.7309$, df = 1.007, $p = 0.1088$) indicated an insignificant difference in the average English proficiency levels, and that the two groups were comparable across this factor.

4.2 Results

Overall, the results of the experiment differed rather significantly from those of the final pilot. As we saw in the previous chapter, the final pilot participants who received the experiment in English overwhelmingly selected SV constructions during the initial syntax selection task (98.67% selection rate vs. a rate of 42.67% for the Norwegian LOI group). However, during

the final experiment participants barely differed between the two LOI groups, as can be seen in Tables 4 and 5 below.

Table 6: Comparison of the rate of V2 construction selections during the pre-exposure phase by LOI group.

Group	Construction	Selection rate	Percent
English	SV	471/525	89.71%
	V2	54/525	10.29%
Norwegian	SV	532/630	84.44%
	V2	98/630	15.56%

During the pre-exposure phase SST, the English LOI group selected V2 constructions at a rate of 10.29%, while the Norwegian LOI group selected V2 constructions at a rate of 15.56%. At this point, the participants have not been exposed to any morphosyntactic structure short of that which they were asked about. The syntax selection task, as explained in the previous chapter, takes the form of a two alternative forced choice task where participants were given a choice between a construction featuring a subject-verb word order and a verb second word order.

Table 7: Comparison of the rate of V2 construction selections during the post-exposure phase by LOI group.

Group	Construction	Selection rate	Percent
English	SV	429/525	81.71%
	V2	96/525	18.29%
Norwegian	SV	513/630	81.43%
	V2	117/630	18.57%

As we can see here, the participants predominantly selected for English-like SV constructions throughout both phases of the experiment. Interestingly, both groups seemingly equalized during the post-exposure syntax selection task – where participants were exposed to two additional morphosyntactic properties: postnominal possession and postverbal negation – the difference between the two groups in terms of V2 selection rates was only 0.28%. Overall, the groups selected for V2 constructions 77.78% and 19.4% more often (for the English LOI

group and the Norwegian LOI group, respectively) post-exposure than before. A Kruskal-Wallis rank sum test comparing the rate of V2 selection between the pre- and post-exposure phases ($\chi^2 = 12$, df = 1, $p = 0.0005$) shows that the difference between selection rates across the phases is significantly positive (i.e. that participants selected V2 constructions more often during the post-exposure phase). Follow-up Wilcoxon rank sum tests with an applied Holm-Bonferroni correction to avoid Type I errors corroborates this ($p = 0.0005$).

4.3 Statistical Analysis

Taking the set of collected data points as representative of the data and effects in which we are interested, the data set that results from the present experiment is one that is coded for the LOI group (English vs. Norwegian), the phase of the experiment (pre-exposure vs. post-exposure), and whether or not the participants selected the V2 construction during the tasks (with the alternative being that the participants selected the SV construction). The figure below (Figure 5) shows a bar plot of V2 selection rates compared by both group and phase – on average, as we see in Tables 4 and 5 above, the Norwegian LOI group selected for V2 constructions more often than the English LOI group during the pre-exposure phase and both groups were nearly identical during the post-exposure phase.

Figure 5: Bar plot showing V2 selection rates by group and phase, where "eng" is the English LOI group, "nor" is the Norwegian LOI group, "postExp" is the post-exposure phase, and "preExp" is the pre-exposure phase.

To analyze the data resulting from the experiment, I built a model using a step-wise step-up procedure to find the optimal model which explains the data. To this end I attempted to fit a binomial mixed-effects regression model to the data. Because the responses of the SSTs took the form of, essentially, "selected the V2 construction" or "did not select the V2 construction", the response is a binary variable (whereby there are only two possible observations) and, therefore, a binomial analysis is the most applicable. Additionally, because the structure of the present study contained two independent fixed variables (in level of exposure and group) as well as the random effect of each participant, a mixed-effects regression model is the ideal.

In order to ensure that including random effects is justified when building a model for the data, it is important to be certain that a model which includes only the fixed effects (in the case of the present study, these are the LOI group and the experiment phase) is not a better fit for the data. To do this, I compared the Akaike information criteria (AIC; an estimator of prediction errors for a given model for a given set of data, thereby acting as an estimate of the quality of the model, McElreath, 2016, p. 189) of two models: one which accounts for the selections only and one which accounts for the selections which includes each participant as a random effect.

Table 8: AIC comparison of a fixed-effect only model vs. a mixed-effects model including each participant as a random effect.

	Fixed-effects model	**Mixed-effects model**
AIC	2018	1448

Table 6 above clearly shows that the AIC of the mixed-effects model is lower. Considering that the AIC is an estimator of the amount of information lost when fitting a model to a data set (Akaike, 1974), a lower AIC is indicative of a better fit of a model to a given set of data.

In order to further test whether the inclusion of random effects is justified, a Chi-squared test comparing the log-likelihoods of each model was applied, giving $p = 6.975e^{-128}$; with a *p*-value so low, applying a mixed-effects model is absolutely justified for analysis of the data.

4.3.1 Procedural Generative Model-building

Once the inclusion of random effects was confirmed to be justified, I began the step-wise step-up procedure of generative model-building in order to find the minimal applicable model (MAM) which best explains the data. Each iterative step in the process eliminates a model until the MAM is found, where a new model is formulated by adding an additional effect to the former model, checking the variance inflation factors (VIFs) of the new model, and then comparing the new model to the previous using an analysis of variance (ANOVA) test. VIFs are a measure of model variance (James et al., 2013, p. 101), and higher VIFs indicate the presence of multicollinearity where the effects of one variable in a model can be linearly predicted from another variable; Zuur et al. (2010) suggests that VIFs remain lower than three, and that VIFs higher than that number indicate an unstable model.

While the first model only compared the V2 selection rate per participant, where the latter was included as a random effect, the second model in this process incorporated the phase of the experiment as a fixed effect. That is to say that the second model generated in this process accounted for the phase of the experiment (pre-exposure or post-exposure) on the V2 selection rate. This second model had an improved AIC (1424) over the baseline (AIC = 1441), and the phase of the experiment correlated with the rate of V2 selection ($p = 1.387e^{-4}$), allowing for the phase of the experiment to be included in the model. Following that was the inclusion of the LOI group as a variable, which increased the AIC (1426), showing a worse fit to the data compared to the previous model[11], and indicated no correlation between the LOI group with the rate of V2 selection ($p = 0.4553$). This model was, therefore, eliminated. The final model, which would become the MAM, included the effect of phase by group (thus also including the group as a variable). This model had a further reduced AIC (1421), indicating a better fit to the data, as well as showing a correlation between the interaction of the phase and the group on the rate of V2 selection ($p = 0.01145$).

[11] However, this AIC still shows a better fit to the data than participants alone, as AIC = 1426 is still better than AIC = 1441; it was a worse fit for the data than just the phase of the experiment, however.

Table 9: Overview of model comparisons showing effects tested, degrees of freedom, AIC, log-likelihood model fit, residual deviance, chi-squared score, p-value of effects on V2 selection rates, and statistical significance of the models for the data.

	Participant + Phase	**Participant + LOI Group**	**Participant + Phase + Phase:Group**
Df.	3	4	5
AIC	1424.3	1425.74	1421.24
Log-likelihood	-709.4	-708.87	-705.62
Residual Deviance	1418.3	1417.74	1411.24
χ^2	18.89	0.56	7.07
***p*-value**	0.00001	0.45526	0.02923
Significance	*Strong* (< .001)	*Not significant*	*Weak* (<.05)

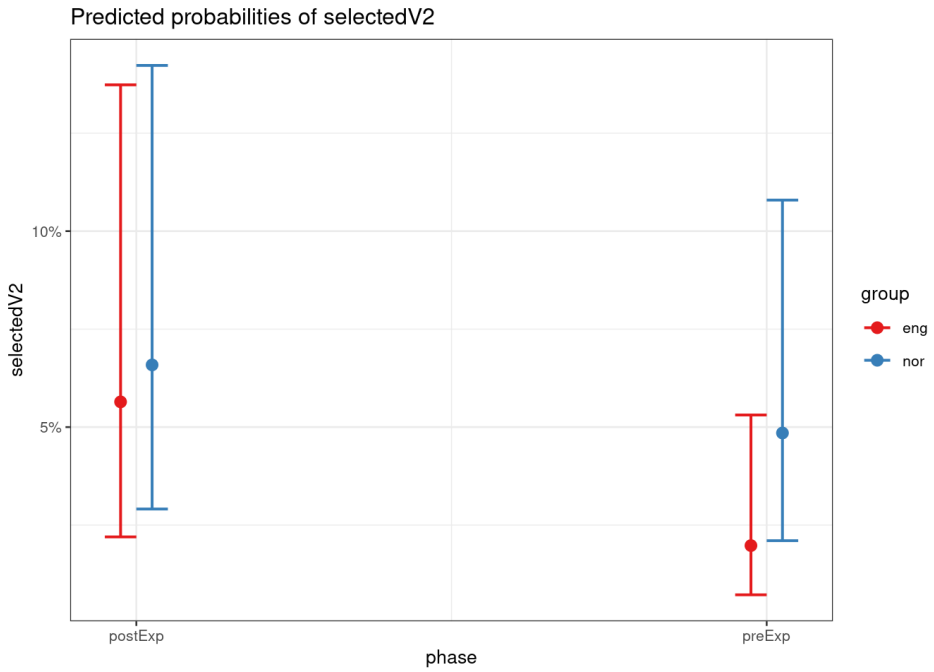

Figure 6: Predicted probabilities of V2 selection rates by experiment phase and group.

The results of the model comparisons are given as an overview in Table 7, above, adapted from the output of an R-script from Martin Schweinberger (2014). As Table 7 shows, the final model (the MAM) is a good fit for the data and offers a statistically significant explanation for the observations (though the MAM offers a less significant explanation of the data than

the phase of the experiment alone). Figure 6, above, is a bar plot showing the predicted probabilities of V2 selection by exposure and group, as predicted by the MAM.

The final test was to ascertain the fit of the MAM to the data, established by calculating the C-statistic and Somers' *D*. The C-statistic and Somers' *D* both range from 0-1 as a measure of predicted versus observed responses, and C-statistic values above 0.8 are indicative of true predictive power (Baayen, 2008, p. 204). Calculating these for the MAM gives C = 0.9097 and D_{xy} = 0.8194, indicating that the model has true explanatory power.

4.4 Analysis of the Results

The resultant model generated by the previously outlined steps, a binomial mixed-effects regression model, accounted for each participant as a random effect while considering the phase of the experiment, the LOI group into which each participant was sorted, and the interaction between the phase of the experiment and the LOI group.

The model which best fit the data showed that the phase of the experiment was the strongest predictive factor for predicting the rate of V2 selection (χ^2 = 18.89, p = < 0.001), while the LOI group was insignificant (χ^2 = 0.5575, p = 0.45), and the intersection of the phase of the experiment and the LOI group was weakly significant (χ^2 = 7.07, p = < 0.05). The model had an optimal fit (C = 0.9097, Somers' D_{xy} = 0.8194) and a strong explanatory power (conditional R^2 = 0.647).

Both the data and statistical analysis reveal two things:

1. The language of instruction does not significantly affect the rate of V2 construction selection as explored in the current study.
2. Exposure to morphosyntactic structures other than lexical verb ordering affects the rate of V2 construction selection as explored in the current study.

Revisiting the predictions made in Chapters 2 and 3, the results of the present study align most closely with prediction four, drawn from the LPM as the model for transfer source selection in L3A. The statistical model outlined in this chapter showed that V2 selection is more likely to occur after exposure to related morphosyntactic structures than before it, and

while there is a disparity between the two groups the effects are less pronounced than one might expect under a different model. Overall, the Norwegian LOI group did select for V2 constructions during the pre-exposure SST more often than their English LOI group counterparts, but the difference is only weakly significant. Between the two phases, the effect of the LOI group was insignificant.

In the following chapter, I discuss the results of the present study in more detail and outline how they align with the predictions made in Chapters 2 and 3.

5 Discussion

In the previous chapter I presented the current study, the results of the study, and the process which was utilized in order to arrive at the results. To reiterate, I followed a step-wise step-up procedure to build a binomial mixed-effects regression model which would adequately explain the data. At the end of the process, the minimal adequate model (MAM) was one which compared the rate of V2 selection across the phase of the experiment, the language of instruction (LOI) group into which each participant was sorted, and the interaction of the phase and the LOI group, taking into account each participant as a random effect. Here, I discuss the relevance of the statistical analysis and how the results of the present study both align with the hypotheses presented in Chapter 2 and are relevant to the field going forward.

5.1 Introduction

The MAM showed that the strongest predictive factor when determining the rate of V2 selection was the phase of the experiment (pre- and post-exposure to additional morphosyntax; with the MAM giving a resultant p-value = < 0.001 for that factor), and a Kruskal-Wallis rank sum test showed that the difference between the two phases was statistically significant (p-value = >0.001). Additionally, the MAM showed that the LOI group – i.e. whether the participants received instruction in either English or Norwegian – is not a significant factor (giving a resultant p-value = 0.45 for that factor). However, there is a slight interaction between the phase of the experiment and the LOI group (with the MAM giving a p-value = < 0.05 for the interaction between those two factors). The MAM optimally described the data of the present study (C = 0.9097, Somers' D_{xy} = 0.8194) and had a strong explanatory power (conditional R^2 = 0.647) while avoiding the problems of overfitting and multicollinearity (where the model is only able to explain the data on which it was built and that one factor of the experiment would directly explain the results of another).

Briefly put, the results of the present study show that Norwegian L1/English L2 bilinguals, at the earliest stage of third language acquisition, are receptive to morphosyntax when determining sources of CLI. Additionally, the results show that the participants were receptive to multiple sources of CLI.

In the following sections, I describe how the results of the current study align with the hypotheses and predictions outlined in Chapter 2, and how they answer the research questions first formulated in Chapter 1. As will become clear, the results show the most alignment with one hypothesis of the five postulated in Chapter 3.

5.2 Research Questions, Data, and Model Fit

In Chapter 1, I gave the three research questions which guided the development and undertaking of the current study. Once more, these questions are: Is the order of acquisition the strongest predictive factor when determining transfer source selection in L3A? Are L3 learners receptive to morphosyntax when determining transfer source selection, or are lexical/phonological cues too strong to overcome? Does the language of instruction influence the L3A process, and can the domain of the dominant language factor be extended to include the language of instruction?

The present study therefore attempted to explore elements of the ongoing debate surrounding this phenomenon, comparing current factors and models, and collecting data which would lend to the body of research in the field. Overall, as described above, the observed data aligns most closely to what the LPM would predict, based on the hypothesis drawn from that model. In this section, we will discuss how the data and models align with the research questions.

5.2.1 Question One: Order of Acquisition vs. Linguistic Similarity

The first question of the three explores whether or not a given L3 learner would see the most influence from their L1 or L2, based on the understanding that one would hold a privileged position over the other. As discussed in Sections 1.1 and 1.2 above, the data does not support this notion. Given the L1F, it would be expected that participants would only be receptive to grammar from their L1, Norwegian; conversely, given the L2SF, it would be expected that participants would only be receptive to grammar from their L2, English. Of these two languages, participants clearly derived more from their L2 given the data, lending some support to the L2SF. However, it is also clear to see that the participants were also influenced by exposure to additional morphosyntax which, in turn, influenced the rate of V2 selection.

Therefore, it is not clear that the order in which a given L3 learner has acquired their previous languages plays a significant role in transfer source selection, particularly given the significant influence that morphosyntactic exposure had on the results. To my mind, the results show that the order of acquisition is not the determining factor in transfer source selection.

5.2.2 Question Two: Receptivity to Morphosyntactic Structure

The second question then explores whether or not participants would be receptive to morphosyntactic cues, given that the salience of a language's lexicon and phonology are traditionally understood to be the more salient properties (and, therefore, the cues are more readily available to L3 learners). The TPM solidifies this in its hierarchy of properties, with the lexicon being the most 'important' of the four cues, followed by the phonology, then morphology, and finally syntax. Therefore, the TPM would argue that for a learner's L1 or L2, whichever language that has a lexicon and phonological system most like the target language would be the one selected to provide the initial state grammar for the L3. The LPM, however, argues that an L3 learner would be receptive to multiple sources of transfer on the basis that multiple grammars can be activated, and different structures within the grammars can be activated (albeit to differing degrees, depending on exposure).

Considering the results of the present study, that participants not only selected for V2 structures more often after exposure to additional morphosyntax, which suggests that the MAL to which participants were exposed behaves more like Norwegian than it does English in terms of morphosyntax, and that participants selected for V2 structures more readily (though to a less significant degree) when they were actively parsing Norwegian (via the language of instruction), and the answer becomes clearer. That is to say, in my opinion it is apparent that L3 input parsing and transfer source selection does not stop at lexical and phonological similarity, and that L3 learners are receptive to morphosyntactic similarity.

5.2.3 Question Three: The Dominant Language

As discussed above, the present study sought to explore whether the dominant language of communication could extend its domain to the dominant language of the acquisition environment, given here as the language in which instructions were presented to participants. This extended-domain DLF would then assume that the language in which participants were instructed would have an effect on the rate of V2 selection, namely that participants who received the experiment in English would select V2 structures less readily than those participants who received the instructions in Norwegian. Does, then, the dominant language of the acquisition environment have an effect on transfer source selection in early stage L3A?

The ultimate answer is both yes, and no. The results of the present study show that participants in the two LOI groups did not exhibit statistically significant differences in the rate of V2 selection overall, and during the post-exposure phase selected for V2 constructions at an almost identical rate (again, with less than 0.3% difference between the two groups). However, the Norwegian LOI group did select for V2 constructions at a significant rate more often than the English LOI group *prior* to additional exposure to morphosyntax, before the two groups levelled off. As shown above, however, this can be handily explained by the LPM: given that CLI is the result of grammatical structure activation, instruction in Norwegian would lead to increased activation of the Norwegian grammar, motivating increased rates of V2 construction selection.

In truth, it stands to reason that a base assumption in the design of this study, that the domain of the DLF could extend – in effect, narrowing the scope – to the language acquisition environment, does not hold. However, it would seem that the inverse does play in to the LPM's structural activation argument, in that continuous activation of one grammar would necessarily facilitate the activation of that same grammar during language acquisition. As a result, the hybridization of the DLF and LPM as briefly mentioned in Chapter 3 would not seem so far-fetched; it would be simpler to explain the DLF in terms of the MCF and LPM, as given here, however. Thus, if one were to combine the two, the simplest and most-explanatory way to do so would be to describe the DLF/LPM interaction in the following way:

The dominant language of communication constantly activates one grammar in a bilingual speaker, resulting in the other language being constantly suppressed. This imbalance facilitates further activation of the dominant grammar during third language acquisition, leading it to lend structures more readily with the emergent third language grammar.

5.3 Predictions, Hypotheses, and Data

In Chapters 2 and 3 I listed predictions for the results of the present study drawn from five different models which address the research questions. Namely, the order of acquisition models would predict that either one or the other of the participants' prior languages would be the sole source of transfer, thus under the first language factor (L1F), participants' L1 will prevent their L2 from being a candidate for transfer, while under the L2SF the participants' L2 would prevent their L1 from being a candidate for transfer. Under the TPM, the participants would be open to both their L1 and L2 being the source of transfer and L3 input would be analyzed via the property hierarchy. With the MAL having English-like phonology and lexicon, the participants' L2 would be selected for the source of transfer. Under the LPM, because of the co-activation of both English and Norwegian grammars it would be expected that English would provide the majority transfer source with Norwegian providing a significant secondary source of transfer. Finally, the DLF, with the expanded domain as tested here, would predict that the participants who received instruction in English would transfer from English and the participants who received instruction in Norwegian would transfer from Norwegian. Below, I discuss the hypotheses from Chapter 3 and how they relate to the results of the study.

5.3.1 Hypothesis One: First Language Factor

The first language factor (L1F), as mentioned in Chapter 2, is not a formalized model. However, the conclusion that a language learner's L1 prevents their L2 from being a source of transfer is drawn, for example in Jin (2009) and Hermas (2014). Jin found, in a study of L1 Chinese/L2 English speakers learning Norwegian, that participants transferred from their L1 rather than their L2. Similarly, Hermas found that L1 Arabic/L2 French speakers learning

English transferred from their L1 rather than their L2. It can be said that the L1F assumes a default, privileged position for a speaker's L1 leading to it being the sole candidate during transfer source selection.

The hypothesis as described in Chapter 3 and tested in the present study, drawing from the L1F as an explanatory model, stated that participants' L1, Norwegian, would command a privileged position over their L2, English, thus preventing CLI from English. As a result, we would expect to see participants readily select for V2 constructions during both phases of the experiment, regardless of exposure to other structural properties. Further, the language of instruction (LOI) would not be a relevant factor, where the English LOI group would select for V2 constructions at a rate comparable to the Norwegian LOI group despite instruction in English.

In one sense, the hypothesis correctly postulated that the participants would be comparable across the LOI groups, in that neither the English LOI group nor the Norwegian LOI group significantly outperformed the other. However, the results were largely English-like: participants in both groups selected, during the pre-exposure phase, V2 constructions at a rate of approximately 13% when averaged between the two groups; during the post-exposure phase, participants selected V2 constructions at a rate of approximately 18.4% when similarly averaged between the two LOI groups.

On the face of it, this hypothesis – that the L1 commands a privileged position over the L2 and is the sole candidate during transfer source selection – does not hold for these data. This is supported by the statistical analysis, which shows that exposure to additional morphosyntactic structures was the primary explanatory factor in that participants more readily selected for constructions resembling their L2, English, during both phases of the experiment, but that V2 constructions were selected for more frequently during the post-exposure phase. Therefore, this hypothesis can be discarded as it is insufficient in explaining the results.

5.3.2 Hypothesis Two: Second Language Status Factor

Like the L1F, the Second Language Status Factor (L2SF) assumes that, during transfer source selection in L3A, one of the participants' prior languages commands a privileged position over the other. The L2SF, however, contends that this is the learner's L2; this is explained in Bardel & Falk (2012) and Falk & Bardel (2011) as being the result of differing long-term memory types (a notion which follows Paradis, 2009): declarative memory is readily and directly accessible, while procedural memory is unconsciously accessed and, therefore, not readily available for recall. Falk and Bardel then argue that, among bilinguals, the L1 grammar is stored in procedural memory while the L2 grammar is stored in declarative memory. This notion that the L2 grammar is more readily accessible then describes a situation wherein it is more economical to transfer from the L2, following a path of least resistance.

The hypothesis drawn from the L2SF stated that participants' L2 would hold a dominating position over their L1, and that as a result the participants would less readily select for V2 constructions throughout the experiment, regardless of exposure to additional morphosyntactic structures. Like the hypothesis drawn from the L1F, this hypothesis also stated that there would be no significant difference between the two groups, with the Norwegian LOI group selecting V2 constructions at a similar rate to the English LOI group despite instruction in Norwegian.

Unfortunately, as with the first hypothesis, this does not adequately explain the results. While both LOI groups did perform at comparable levels, and while the participants did largely select for SV constructions, it is unclear that the L2 was truly privileged with regards to preventing transfer from the L1. Coupled with the evidence that participants did more readily select for V2 constructions during the post-exposure phase compared to the pre-exposure phase, the status of the L2, in my opinion, is debatable. Thus, like the first hypothesis, this hypothesis can be discarded, though admittedly with reservation.

5.3.3 Hypothesis Three: Typological Primacy Model

Unlike either model which assumes that the order of acquisition is the dominant factor in transfer source selection, the Typological Primacy Model (TPM; Rothman, 2010, 2011, 2013, 2015; Rothman et al., 2019; Rothman & Cabrelli Amaro, 2010) asserts that surface-level

structural similarity (i.e. typological similarity) is the primary motivator for this process. In a sense, it can be said that the TPM similarly assumes a language having a privileged position over another, either the L1 or L2, but that its dominant position is critically motivated by comparison of typological features.

Where the L1F assumes that the first acquired language is the primary source of transfer and the L2SF assumes that the second language (of sequential bilinguals)[12] is the primary source of transfer, the TPM argues that there is a four-level hierarchy of linguistic properties used as a comparison metric to determine which prior language should be the source of transfer.

This hierarchy of properties would suggest that when comparing a learner's L1 and L2 against the target language, a given learner would select a language to transfer on the basis that it is most similar to the L3 with regards to the leftmost property. The grammar for this language is then copied in its entirety, and the resultant copy serves as the grammar for the L3, thus allowing parsing of L3 input (at least until such time as the learner internalizes corrections, allowing for the grammar to become more target-like over time).

Therefore, the hypothesis drawn from the TPM stated that, because the L3 is most like participants' L2 in terms of lexicon and phonology, while most like participants' L1 in terms of morphosyntax, participants would less readily select for V2 constructions contra SV constructions regardless of exposure to additional morphosyntax – at least at the outset, though the TPM does assume that explicit learning of the L3 does occur at a later date. Participants, like both hypotheses built on order of acquisition models, would additionally perform comparably regardless of LOI group and that the Norwegian LOI group would select V2 constructions at a rate similar to the English LOI group. Because the MAL utilized in the present study features a lexicon and phonology which are both English-like and morphosyntactic properties which are Norwegian-like, the prediction is that English would be selected as the source of transfer and that a representational copy of English grammar would serve as the initial state grammar for the L3.

[12] Bardel & Falk (2020) argue that there is a significant difference between sequential and simultaneous bilinguals, though this text does not assume such a position.

The results of the present study do, to an extent, align with this hypothesis. The majority of selections during both phases of the experiment were, indeed, SV selections – indicating a preference for English morphosyntax. Additionally, as supported by the statistical analysis, there was not a significant difference between LOI groups as both the Norwegian LOI group and English LOI group selected for V2 constructions at comparable rates. However, as discussed in Chapter 2, English does not (normally) exhibit verb seconding with lexical verbs; modal and auxiliary verbs, as well as the copula, do become fronted in questions (ex. "where *did* they go?" or "what *are* you doing?") and with negation (ex. "I *did* not eat today" or "the dog *will* not come inside"). As stated previously, English syntax follows a fairly rigid subject-predicate ordering where lexical verbs precede the direct object and follow the subject in declarative sentences. Though there does appear to be some degree of superficial verb seconding in contemporary English (discussed in Chapter 2, Sections 4 and 5.3), the applicability of contemporary postverbal *not* in modern English is not sufficient argumentation against the notion of English lacking V2 structures (the common analysis).

In the end, the applicability of this hypothesis as sufficiently explanatory for the data is contestable. On the one hand, it did (like the order of acquisition model-based hypotheses) correctly predict that the LOI group would not be a significant factor in determining transfer source selection. However the rate of V2 construction selection, particularly during the post-exposure phase and coupled with the increased rates of V2 selection from the pre-exposure to post-exposure phase, does not readily support the idea that participants relied solely on English grammar to inform their selections – as would be expected if a copy of English grammar served as the entirety of the initial state L3 grammar.

It is not a fair assumption, in my opinion, to suggest that second-language speakers of English (despite high degrees of proficiency in their L2) necessarily possess verb-seconding as a morphosyntactic feature of English, when it is not readily present in contemporary speech that is not deliberately archaic. Similarly, while it may be possible to categorize the difference between pre- and post-exposure rates of V2 selection as "statistical noise", the results of the Kruskal-Wallis test in the previous chapter show that there is, in fact, a statistically significant difference with regards to the rate of V2 selection between phases (with a resultant p-value = < 0.001 indicating strong statistical significance) – a far cry from "statistical noise". To my mind, this does indicate that participants seem to be receptive to additional structural

information than the hierarchy of properties would suggest and, as a result, this hypothesis does not (entirely) adequately explain the data.

5.3.4 Hypothesis Four: Linguistic Proximity Model

The Linguistic Proximity Model (LPM; Westergaard et al., 2017; Westergaard, 2019, 2021a, 2021b), like the TPM, argues against the order of acquisition being the prime conditioning factor with regards to transfer source selection. In contention with the TPM, however, the LPM does not argue for wholesale transfer, instead arguing that transfer happens in a step-wise manner where it occurs property by property. That is to say, instead of an entire representational copy of one language's grammar (be it a learner's L1 or L2) forming the initial state grammar of the target language, it is formed from constituent elements of existing grammars, piece by piece, until such time as a target-like grammar is present. This approach is in line with the notion of Full Transfer Potential (FTP; Westergaard, 2019), which argues that in sequential bilingual acquisition the initial state of the L2 is the entirety of the L1 grammar supported by access to Universal Grammar (UG) and which postulates that "anything may transfer". The initial state of the L3 grammar would therefore be the entirety of both the L1 and L2 grammars, allowing for properties from either to be used in building the L3 grammar.

The most recent iteration of the model then goes on to argue, based on current research in cognition and cognitive modularity and drawing from the Modular Cognitive Framework (MCF; Sharwood Smith, 2019, 2020; Truscott & Sharwood Smith, 2019), that CLI occurs as a result of "co-activation of corresponding [linguistic] structures in the previously acquired languages". What this means, in short, is that as language learners are exposed to their target language, they are continuously parsing the input which results in varied degrees of cognitive structure activation dependent upon the frequency and salience of features in the input.

The hypothesis derived from this model, then, stated that participants would exhibit differing rates of V2 selection due to differing degrees of structural activation, as the L3 is most like participants' L2 in terms of phonology and lexicon but most like participants' L1 in terms of morphosyntax. Due to the primary activation of the English grammar both during the vocabulary training and throughout the experiment, participants would select for V2

structures less readily in general; however, after exposure to additional morphosyntactic structures (thus resulting in increased activation of the Norwegian grammar) participants would more readily select for V2 structures during the post-exposure task contra the pre-exposure task. Additionally, each LOI group would likely exhibit either compounding activation of the English grammar (for the English LOI group) or conflicting activation of the English grammar and additional activation of the Norwegian grammar (for the Norwegian LOI group), leading to the Norwegian LOI group more readily selecting for V2 constructions, initially, than the English LOI group.

Participants, to a large degree, selected for SV constructions over V2 constructions. At first glance it is difficult to tease apart whether this can be accounted for by sole activation of the English grammar or primary activation of the English grammar with secondary activation of the Norwegian grammar. Considering that there was a statistically significant interaction between the phase of the experiment and the LOI group on the rate of V2 selection, this indicates that the LOI played some role when influencing V2 selection rates (even if, alone, it could not explain the observed responses in their entirety) – a result which aligns with the hypothesis, in that the Norwegian LOI group would be expected to see an increased activation of the Norwegian grammar, leading to a higher rate of V2 selection than the English LOI group during the pre-exposure phase. It is, however, also difficult to say that the rate of SV selection is not also explained by participants resorting to a less marked, SVO default.

Recall in Chapter 2, Sections 4 and 5.1, I discussed verb seconding in the context of Norwegian, and that it is analyzed as being tied to topic or theme fronting. Considering markedness in the context of topics (see Davison, 1984, p. 804 for example), and that verb seconding in Norwegian leads to a large amount of surface-level SVO sentences, it is possible that the fronted adverb presented in the study was more marked. That is to say that fronting the time adverb draws attention to it, potentially making it a less preferred option when selecting between a sentence which features it and one which does not. This analysis does not, however, make the apparent V2 construction an unviable choice – simply less attractive. However, considering also that the most salient features of Englike which participants are exposed to (namely, lexicon and phonology/phonotactics) are overwhelmingly English-like, the initial analysis, that participants saw a primary activation of English grammar and a secondary activation of Norwegian grammar, adequately explains the results.

Additionally, the fact that participant response was vastly different after exposure to the two additional morphosyntactic structures – post-nominal possession and post-verbal negation, both of which are standard usage in Norwegian and are not allowed in English[13], leading to increased activation of the Norwegian grammar – shows that participants were receptive to deeper structural cues, and were seemingly able to overcome the strong, surface-level cues of phonological and lexical similarity.[14] Considering that the majority of the L3 input throughout the experiment would have been predominantly English-like, it stands to reason that participants saw a primary activation of the English grammar with a secondary activation of the Norwegian grammar (when assuming the LPM as the most applicable model). This would handily explain the disparity in the results, considering the general preference for SV constructions as mentioned above, the change in V2 construction selection in the post-exposure phase, and interaction between the LOI group and exposure status as significant factors in early-stage transfer source selection.

5.3.5 Hypothesis Five: Dominant Language Factor

The final factor[15] discussed here, like the two prior models, also assumes that the primary factor in transfer source selection is not the order in which languages are acquired. Instead, the Dominant Language Factor (DLF; Fallah et al., 2016) proposes the notion that the dominant language of communication is responsible for conditioning transfer source selection. In a study of two groups of bilingual Mazandarani/Persian speakers learning English compared with Persian monolinguals, also learning English, Fallah et al. found that, for the syntactic constructions tested, the bilingual group who predominantly spoke Mazandarani (which patterns as English for the properties examined) significantly

[13] Barring the above-discussed *not*$_2$ which, as mentioned, patterns as a typical adverb and not a standard verbal negator.

[14] It bears noting that the phonological cues, forming the second feature of the TPM hierarchy, would be more accurately described as “segmental cues”, and that phonological structures can be much less salient than the TPM hierarchy necessarily gives them credit for (for more information, see Archibald, 2020).

[15] The DLF is given here as a factor; the paper it derives from does not present it as a full model and is referred to as a factor.

outperformed the Persian monolinguals as well as the other bilingual group (who predominantly spoke Persian, and who performed at a rate comparable to the monolingual Persian speakers).

This led Fallah et al. to come to the conclusion that the dominant language of communication would be responsible for conditioning CLI during L3A. For the purposes of the present study the domain of the DLF was expanded, operating on the assumption that the dominant language could potentially extend to the dominant language of the acquisition environment. The hypothesis then drawn from this derivation of the DLF stated that participants who received the instructions of the study in English would be less likely to select V2 constructions than the group who received instructions in Norwegian.

This partially aligns with the data, but it is clearly not the sole (or, truly, significant) factor. From the observed data, it is plain to see that the English LOI group did prefer to select for SV constructions when compared against the Norwegian LOI group, but the difference in the rate of selection was not statistically significant. What was significant, however, was the interaction between the phase of the experiment and the LOI group. As explained in the previous section, the Norwegian LOI group initially selected for V2 constructions more readily than the English LOI group. It is possible that the degree to which participants were exposed to either Norwegian or English via the experiment's instructions was not sufficient to invoke a response like what Fallah et al. received in their data, though accounting for this would require a much longer study examining results at more than the absolute initial stages of L3A, as explored in the present study. Regardless, this discrepancy between the results from Fallah et al. and those reported here is not sufficiently explained by the DLF, though it is not necessarily an indictment of the factor itself but, rather, an indictment of the expanded domain as tested here, as the language of instruction does not seem to be a sufficient approximator of the DLF as a whole.

What is a (potential) indictment of the DLF, however, is the fact that the participants in the present study selected so heavily for SV constructions contra V2 constructions throughout the entirety of the experiment. This is an inference from absence, because the present study did

not include the dominant language of daily life (as tested by Fallah et al.) as a factor[16], but we can consider the following: participants tested were bilingual Norwegian/English speakers; three participants voluntarily indicated that they predominantly speak English due to either having a partner who speaks English as their native language or because they live outside of Norway. A fair assumption to make, then, is that the remaining participants (or a significant majority of them) utilize Norwegian as the language of daily life. Therefore, the fact that participants did, overwhelmingly, select for SV constructions throughout the experiment suggests that the DLF might not be as strong of a factor as given by Fallah et al.

In Chapters 2 and 3, I briefly discussed the notion that the DLF could be a potential factor in transfer source selection under the LPM. While I do not necessarily believe that this is or should be the case (that the LPM should subsume the DLF and integrate it into the model), the current version of the LPM would also explain this factor without the need to incorporate the DLF. With continuous activation of one grammar via its status as the dominant language of communication, it stands to reason that it could exert a stronger influence during the early stages of the process before the L3 grammar is sufficiently built up. Because of this, I feel like the hypothesis drawn from the DLF can be rejected as the data is more sufficiently explained by the hypothesis drawn from the LPM.

[16] Admittedly, this was an oversight on my part and could have easily been part of the experimental design.

6 Conclusion

The present study detailed here set out to explore the nature of transfer source selection at the initial stage of adult third language acquisition, as studied in the generative tradition. The usage of an artificial language to support this research, a tool which enables language researchers to study linguistic properties with fine-grained precision and language pairs which might be difficult, if not impossible, to find outside of a constructed environment such as a laboratory setting, played a crucial role in isolating specific issues at the core of this very active field.

The present study sought to explore the role of three factors in early stage transfer source selection: the order in which prior languages were acquired, morphosyntactic similarity contra typological similarity, and the role of the language environment. The results detailed here indicate that in the earliest stages of language acquisition, learners are open to a broad spectrum of influence when determining which languages to transfer from, and that multiple languages can be possible sources of transfer. This includes morphosyntactic cues as well as typological cues, and that as a bilingual language learner is acquiring a third language, cues from the acquisition environment play a role in building the emergent L3 grammar. That is to say, if the language acquisition environment favors either the L1 or L2 (in terms of surrounding linguistic input), that language will likely contribute more to the initial state L3 grammar.

The process of investigating these phenomena, with limited input in the very earliest contact with a third language, did place limitations on the conclusions that can be drawn; in no way does it invalidate it, however, and it crucially offers insight into the additional research can be done. In the future, further research which takes the same approach, that is, investigating the effects of CLI in early stage adult L3A with a split participant pool receiving instructions in either their L1 or L2 and with additive amounts of morphosyntactic structure, might consider the following approaches:

1. Increasing the amount of exposure to the L3, including lexical items and the additional morphosyntactic structure(s);

2. Repeated testing with monolingual L1 and L2 groups of sizes comparable to the bilingual participant pool;[17]
3. Increased time over which the study takes place, allowing for observations past the very initial stage;
4. In looking at the DLF, ensuring that participants do indeed use their L1 or L2 more in their daily lives and accounting for that accordingly.

With that said, it is clear to me that the results of the present study are significant. They show that L3 learners can overcome the strong typological similarity factors of phonology and lexicon, that neither the L1 nor L2 are the obviously preferred sources of transfer, and that language of instruction alone does not result in significant changes to the rates and amount of CLI expressed by L3 learners. Considering the information in the previous chapters, it would be fair to say that the LPM is the strongest, most explanatory model for the data explored here.

In the end, the results of the study detailed here, and the conclusions drawn from them, contribute to the growing body of research which informs this active field of study. The question of what exactly motivates transfer source selection has been a contentious one not only in generative third language acquisition, but second language acquisition before it. While it is easy to generalize the process as a cognitive shortcut, where it is preferable to draw from prior knowledge and utilize existing cognitive structures than to construct them *ex nihilo*, the specifics of the process continue to elude us to this day.

The result of this, then, is a multitude of models which seek to explain transfer source selection in L3A. The L1 Factor and Second Language Status Factor contend that the order in which previous languages are learned plays the key role in this process. It is argued by these models, then, that either the first language prevents the second from being ta viable choice when selecting a source of transfer, or vice-versa with the second language preventing the

[17] This was not a viable option in this case, since monolingual Norwegian speakers are increasingly rare as English is a required subject in primary education; it would be possible to recruit retirees, however that would not guarantee that the participants are similar enough in other regards to be directly comparable.

first from being a viable choice. The results of this experiment do not readily support either claim, as discussed in the previous chapter.

This study does, however, lend its support to the structural side of the debate. Specifically, proponents of the TPM might argue that the results given here would be supportive of that model. Participants *did* overwhelmingly select for SV constructions, which would align with the hierarchy of properties as the metric by which the L3 is assessed when selecting for a source of transfer. In effect, the majority of the results could indeed suggest that participants in the present study did select for the typologically more proximal language to transfer from. This would be a valid analysis, though I believe that it is not entirely descriptive of the results. As discussed in the previous chapter (Section 3.3), the supposition of the TPM that one grammar – either that of the L1 or L2, and that grammar alone – forms the initial state of the L3 grammar does not, in my view, account for the difference in the results across the phases of the experiment.

This leaves the LPM, which I believe these results most strongly support. Considering the focus on structural activation and the differing degrees to which it can occur, these results do align with the idea that CLI can be influenced by multiple factors and is a procedural, step-by-step process; not one that occurs once and must be fixed later. While proponents of the TPM might argue that the rate of selection favors that model, it seems clear to me that the difference in the rate of selection across the phases is more readily supportive of the LPM. In short, I believe that the broader picture of the issue, seen through the lens provided by the results of the current study, support the LPM and the description of CLI in terms of cognitive modularity rather than typological primacy. Overall, however, I think it is a good thing that the results here can support multiple models – all the better, in my view, that it would support the two dominant models in the field. It speaks well of both the models and the data.

As well, the results here can be challenged, as can the conclusions that I draw – in fact, I believe that the results and conclusions should be challenged, as the process of doing so furthers not only the process of scientific inquiry, but specifically this active, nascent field. Thus, the conclusions that I come to are presented in a more definitive manner than is perhaps warranted. I stand by them, however, as I believe doing so holds me – and the academic

discipline more broadly – accountable, because I cannot evade criticism by hiding behind hedged statements, couching the research in *maybe* or *possibly* or *tentatively*.

The result of this is that the conclusions presented here are clearly falsifiable. Should the findings of the present study be shown to be irreproducible, then clearly the conclusions drawn were incorrect. Should further research show that participants do not select for the property being tested more often after exposure to additional morphosyntax than before or that participants in both LOI groups do not perform to comparable levels, or that one LOI group does not outperform the other prior to additional exposure, then the results drawn were clearly incorrect and scientific inquiry progresses. I look forward to seeing additional research in this vein.

Similarly, I feel it would be remiss of me to fail to mention the invaluable research tools that are artificial languages. As discussed in the introduction and in Chapter 3, artificial languages as a tool by which the processes of L3A can be studied are used in increasing numbers, and without it the research conducted here would not be possible. I believe that the usage of artificial languages, now and in the future of the field, will enable researchers to make even greater strides in our attempts to understand the workings of the brain, cognition, and language – and the intersection of it all.

Through the usage of a miniature artificial language, the research described in this thesis was able to control for incredibly important variables: specific languages being studied, specific properties being studied, and the inherent variety found in any group of people. The usage of an artificial language truly facilitated carry out the present study, forming a uniform body of participants with comparable language backgrounds who all begin the process of acquiring the same third language simultaneously. In the future, research utilizing artificial languages can also test language pairs which might not be readily seen in the real world, allowing unprecedented precision with regards to experimental linguistics research.

Overall, it is important to say that the active research in this field, as is often the case, leaves us with more questions than answers. Though I do consider the LPM to be the strongest and most explanatory model at current, in terms of describing the role and underlying process of CLI in L3A, there is only so much that one model can do in advancing the state of research.

Going forward, the neuro-cognitive mechanisms of CLI are, without doubt, worth exploring – as we better understand the "why", I am curious to see the "how". Considering the closeness with which generative linguistics shares with disciplines concerning the physical structure and mechanisms of the human brain, it is important to move away from the abstract and study the reality. While we should not be content with uncertainty in our conclusions, neither should we be content with abstractions and theory (or, worse yet, hiding behind them like a shield when the cognitive reality of our discipline does not coincide with the theory).

No matter the direction of this line of inquiry, I am excited not only to reach the destination – but enjoy the ride along the way.

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Appendices

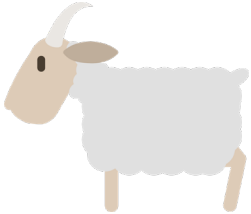
Appendix A: *Englike* nominal lexical items

7: cheiria – cherry

8: chiliad – child

9: dogga – dog

10: flara – flower



11: shierp – sheep

12: eadolt – adult

13: bridda – bird

14: carro – car

15: renkat – cat

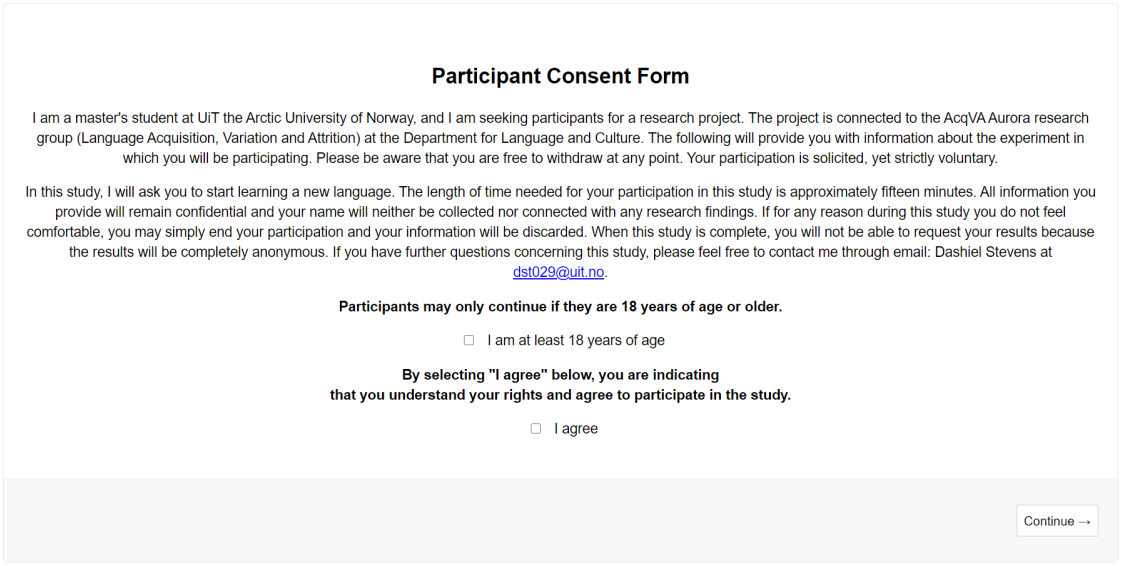
16: cheiar – chair

Appendix B: SST sentences with approximate gloss

1. *Eivena halds eadolt bridda.*
   evening holds adult bird
2. *Nogit halds eadolt renkat.*
   night holds adult cat
3. *Noonie toches eadolt corra.*
   noon touches adult car
4. *Nogit eits bridda cheiria.*
   night eats bird cherry
5. *Nogit toches bridda corra.*
   night touches bird car
6. *Marnon eits renkat bridda.*
   morning eats cat bird
7. *Eivena toches renkat cheiar.*
   evening touches cat chair
8. *Eivena toches renkat chiliad.*
   evening touches cat child
9. *Faternon eits chiliad cheiria.*
   afternoon eats child cherry
10. *Nogit halds chiliad dogga.*
    night holds child dog
11. *Marnon halds dogga renkat.*
    morning holds dog cat
12. *Noonie toches dogga corra.*
    afternoon touches dog car
13. *Faternon halds eadolt cheiria.*
    afternoon holds adult cherry
14. *Marnon eits shierp flara.*
    morning eats sheep flower
15. *Eivena halds shierp renkat.*
    evening holds sheep cat

1. *Eivena eadolt halds bridda.*
   evening adult holds bird
2. *Nogit eadolt halds renkat.*
   night adult holds cat
3. *Noonie eadolt toches corra.*
   noon adult touches car
4. *Nogit bridda eits cheiria.*
   night bird eats cherry
5. *Nogit bridda toches corra.*
   night bird touches car
6. *Marnon renkat eits bridda.*
   morning cat eats bird
7. *Eivena renkat toches cheiar.*
   evening cat touches chair
8. *Eivena renkat toches chiliad.*
   evening cat touches child
9. *Faternon chiliad eits cheiria.*
   afternoon child eats cherry
10. *Nogit chiliad halds dogga.*
    night child holds dog
11. *Marnon dogga halds renkat.*
    morning dog holds cat
12. *Noonie dogga toches corra.*
    afternoon dog touches car
13. *Faternon eadolt halds cheiria.*
    afternoon adult holds cherry
14. *Marnon shierp eits flara.*
    morning sheep eats flower
15. *Eivena shierp halds renkat.*
    evening sheep holds cat

Appendix C.1: Consent Form (English)



Participant Consent Form

I am a master's student at UiT the Arctic University of Norway, and I am seeking participants for a research project. The project is connected to the AcqVA Aurora research group (Language Acquisition, Variation and Attrition) at the Department for Language and Culture. The following will provide you with information about the experiment in which you will be participating. Please be aware that you are free to withdraw at any point. Your participation is solicited, yet strictly voluntary.

In this study, I will ask you to start learning a new language. The length of time needed for your participation in this study is approximately fifteen minutes. All information you provide will remain confidential and your name will neither be collected nor connected with any research findings. If for any reason during this study you do not feel comfortable, you may simply end your participation and your information will be discarded. When this study is complete, you will not be able to request your results because the results will be completely anonymous. If you have further questions concerning this study, please feel free to contact me through email: Dashiel Stevens at dst029@uit.no.

Participants may only continue if they are 18 years of age or older.

☐ I am at least 18 years of age

By selecting "I agree" below, you are indicating
that you understand your rights and agree to participate in the study.

☐ I agree

Continue →

Appendix C.1.i: Consent Form Text (English)

Participant Consent Form

I am a master's student at UiT the Arctic University of Norway, and I am seeking participants for a research project. The project is connected to the AcqVA Aurora research group (Language Acquisition, Variation and Attrition) at the Department for Language and Culture. The following will provide you with information about the experiment in which you will be participating. Please be aware that you are free to withdraw at any point. Your participation is solicited, yet strictly voluntary.

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Participants may only continue if they are 18 years of age or older.

By selecting "I agree" below, you are indicating that you understand your rights and agree to participate in the study.

Appendix C.2: Consent Form (Norwegian)

Samtykkeskjema

Jeg er masterstudent ved UiT Norges arktiske universitet, og søker deltakere til et forskningsprosjekt. Prosjektet er tilknyttet forskningsgruppa AcqVA Aurora (Language Acquisition, Variation and Attrition) ved Institutt for språk og kultur. Nedenfor finner du informasjon om eksperimentet. Du kan trekke deg når som helst. Deltakelse i prosjektet er ønskelig, men fullstendig frivillig.

I denne studien kommer du til å bli bedt om å begynne å lære et nytt språk. Eksperimentet tar rundt et kvarter. All innsamlet informasjon om deg holdes konfidensielt, og navnet ditt kommer ikke til å verken samles inn eller knyttes til forskningsresultatene. Hvis du av noen som helst grunn føler deg ubekvem med din deltakelse, kan du enkelt avslutte eksperimentet, og alt av informasjon som du har gitt, kommer til å slettes. Dessverre har du av hensyn til anonymiteten din ikke adgang til dine egne resultater. Dersom du skulle ha spørsmål om eksperimentet kan du kontakte meg via e-post: Dashiel Stevens dst029@uit.no.

Deltakere må ha fylt 18 år for å gå videre.

☐ Jeg har fylt 18 år

Ved å trykke "Jeg godtar" nedenfor indikerer du
at du forstår hvilke rettigheter du har og at du går med på å delta i studien.

☐ Jeg godtar

Gå videre →

Appendix C.2.i: Consent Form Text (Norwegian)

Samtykkeskjema

Jeg er masterstudent ved UiT Norges arktiske universitet, og søker deltakere til et forskningsprosjekt. Prosjektet er tilknyttet forskningsgruppa AcqVA Aurora (Language Acquisition, Variation and Attrition) ved Institutt for språk og kultur. Nedenfor finner du informasjon om eksperimentet. Du kan trekke deg når som helst. Deltakelse i prosjektet er ønskelig, men fullstendig frivillig.

I denne studien kommer du til å bli bedt om å begynne å lære et nytt språk. Ekspeerimentet tar rundt et kvarter. All innsamlet informasjon om deg holdes konfidensielt, og navnet ditt kommer ikke til å verken samles inn eller knyttes til forskningsresultatene. Hvis du av noen som helst grunn føler deg ubekvem med din deltakelse, kan du enkelt avslutte eksperimentet, og alt informasjon som du har gitt, kommer til å slettes. Dessverre har du av hensyn til anonymiteten din ikke adgang til dine egne resultater. Dersom du skulle ha spørsmål om eksperimentet kan du kontakte meg via e-post: Dashiel Stevens [e-postaddressen]

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