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Conceptual Cross-Linguistic Influence

Exploring the L1 Lemma Mediation Hypothesis in L3 Vocabulary Acquisition

Lari-Valtteri Suhonen

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Supervisor
Dr. Henrik Gyllstad

“And if anyone knows anything about anything,” said Bear to himself,
“it’s Owl who knows something about something,” he said,
“or my name is not Winnie-the-Pooh,” he said.
“Which it is,” he added. “So there you are.”
— A. A. Milne

Abstract

An increasing number of students of various minority and immigrant backgrounds makes greater knowledge of the sources of cross-linguistic influence among bilingual students not only of theoretical value, but also beneficial for improving language teaching and instruction. The aim of this thesis has been to investigate conceptual cross-linguistic influence in functional bilinguals with a focus on investigating whether the context and frequency of the bilingual's use of the two languages explain cross-linguistic influence towards an L3, and whether variation in acquisition could be explained by linguistic similarity, either factual or perceived. The present study replicated the results of Jiang (2002) regarding the effect of the L1 on the lexis of the L2 in terms of similarity evaluations, with the addition that this effect is also observable with two groups of language learners. Furthermore, the findings support the previous hypotheses that the lexical development in the L3 is not only guided by the mother tongue, but also by other previously acquired languages which is in line with the expectations of the L1 lemma mediation hypothesis (Jiang, 2000).

Keywords
Language acquisition, psychotypology, third language acquisition, bilingualism, cross-linguistic influence.

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The participants at the Langnet conference in Lund helped brainstorm research questions for the original research proposal. Furthermore, my fellow students at the English, Psychology, and Linguistics departments deserve lots of hugs for their support. A special thank you goes to Sara Farshchi for having all the answers and to Christine Schulze for occasionally advising me against thinking too far out of the box. During the last few years I have had some extremely interesting conversations with fellow L3-enthusiasts – particularly Erica Verde – that have surely guided my approach to psycholinguistics and language acquisition. I would also like to thank my brothers for helping out with printing, organizing, stapling, paper-clipping, and hand-marking participant identifiers on roughly two reams of paper that formed the answer sheets for the experiment.

I need to apologize to my housemates at 12B Två Trappor Upp for bearing with my same-song-on-repeat-for-the-100th-time writing procedure, and to my beloved psychology study group The Carebears for dealing with my occasional irritation and tired humour after thesis all-nighters. I also have amazing friends who haven't yet abandoned me despite me skipping all kinds of meet-ups with the continuous excuse of thesis work for the last year or so.

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Any shortcomings, if present, are my own.

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Chapter 1

Introduction

The aim of this study is to investigate conceptual cross-linguistic influence in functional bilinguals. An increasing number of students of various minority and immigrant backgrounds renders research on the sources of cross-linguistic influence among bilingual students not only of theoretical value, but it is also beneficial for improving language teaching and instruction. This study investigates the Finland-Swedish group of learners. However, findings from studies of conceptual cross-linguistic influence[1] are also relevant to other bilingual groups in a global context.

Cross-linguistic influence is explained in detail in section 2.3, but consider here an example of a potential confusion (in Table 1) for a language learner when acquiring a new word. The boundaries of words and their referents do not always match across languages. To give an example, in Savosavo, a single term covers both the English words "hand" and "arm," whereas in Jahai – three words cover the English "hand" and "arm," meaning 'upper arm,' 'lower arm,' and 'hand,' respectively (McGregor, 2009, p. 129-130).

Table 1

The vocabulary items for 'hand' and 'arm' in English, Savosavo, and Jahai (adapted from McGregor, 2009, p. 129-130)

English	Savosavo	Jahai
arm	kakau	bling
		prbér
hand		cjas

A speaker of two or more languages must process conceptual differences in language, which can lead to under-differentiation of meaning distinctions or extending the meaning of the primary counterpart – e.g., using the English word "language" in place[2] of "tongue" (Arabski, 1979, p. 49; Ringbom, 1987, p. 116). The human memory can be separated into short-term memory and long-term memory, the latter being of greater interest with respect to vocabulary acquisition.

The long-term memory can subsequently be divided into procedural[3] and declarative,[4] the latter holding the episodic and semantic information where the semantic information essentially is the base of our vocabulary knowledge (Goldstein, 2011, p. 156). The semantic memory holds the concepts, which Rosch (1977, p. 46) suggests are defined by something called prototypes – the most typical and familiar members of a category. Since these prototypes are dependent on personal experiences, there might be vast differences in prototype concepts. If we consider our vocabulary knowledge to be built on top of this conceptual information, we can assume different speakers to have different underlying representations for their vocabulary. Hence, the purpose of this study. Much of the previous focus of study on the relationship between a bilingual's two languages has been on whether the two language systems are autonomous or inter-dependent, and whether or not the systems are constantly on-line. It seems that "forms in one language call up associated form(s) in the other language, [which] has implications both for the representation of the two languages and for control and inhibition in switching between the two languages" (Gathercole & Moawad, 2010, p. 1). An intriguing aspect here is variation between individuals or rather the extent to which the usage aspects between the language user's mastered languages affect the building of meaning in each language. It is this very process of meaning building in a learner's additional language that this study aims to take a closer look at with a particular focus on semantic and conceptual information.

Cross-linguistic influence from Finnish and Swedish towards English has been extensively studied[5] at an intra-group level (c.f. Ringbom, 1987; Jarvis, 1998; Meriläinen, 2010; Odlin 2012). This study goes beyond a paradigm of examining cross-linguistic influence from L1 to L2, from L1 to L3 and from L2 to L3, and instead focuses on what is considered an interplay of two naturally acquired languages that are available in the learner's environment, choosing instead to look into the background variables and the target language – the learner's third language. The study acknowledges that establishing which language is L1 and which is L2, may not only be difficult, but might not even be relevant, considering varying use in different domains and the varying amounts attached to the different domains.

While in the Finnish context, knowledge of Swedish has been considered a source of positive transfer towards English,[6] in the Swedish context a multilingual background with school

pupils has been associated with issues in language education (Ringbom, 2007, p. 41; Lindberg & Hyltenstam, 2013, p. 122). Understanding individual variation in language acquisition across multilingual contexts, particularly those individuals with non-related languages, can contribute to our understanding of the learning process of the students. Finland has been considered to be a favorable location for a study of cross-linguistic influence due to the structural distance between the Finnish and the Swedish languages[7] and because of the cultural and educational similarity between the speakers of the two languages (Ringbom, 1987, p. 2). The majority of European languages, including English and Swedish, belong to the Indo-European language family, but this study's additional language – Finnish – is an exception[8] (Comrie, 2009, p. 10). However, there have been cultural ties between Finnish and Swedish speakers for centuries. Finland is officially a bilingual state (with Finnish and Swedish[9] as the national languages) and was a Swedish territory for roughly 600 years before becoming a Grand Duchy under Russia in 1809 which lasted until 1917 when Finland became a truly independent state (Palviainen, 2013, p. 3).[10] This, indeed, makes Finland an interesting object of study with regard to cross-linguistic influence.

This thesis is divided into seven sections. Following the present introduction, theoretical background relevant to the topic is presented in Section 2. The background section is followed by the explicit research questions and predictions for the experiment. The next three sections cover the method and the results of the experiment with a discussion on the theoretical implications of the results. Finally, a short conclusion is presented. The materials used in the experiment are available at the end of the thesis in the Appendix.

Chapter 2

Background

2.1 Outline

This background is divided into five subsections. Since the terminology and definitions of bilingualism do not always coincide between studies, the first subsection (2.2) briefly discusses bilingualism and offers an explanation regarding the choice of groupings made in this study. The second subsection (2.3) presents various models of conceptual representation and cross-linguistic influence, using Jiang's (2000) Model of Lexical Representation as a starting point. The third subsection (2.4) consists of a brief presentation of psychotypology. In order to understand the bilingual situation in Finland and the longstanding integration of the Finnish and Swedish realms, the next subsection (2.5) presents some historical context surrounding the two languages in Fennoscandia.[11] Finally, a short summary is provided in the last subsection (2.6).

2.2 Bilingualism

It would be justified to blame proficiency as a source of such problems as the tip-of-the-tongue effect, using a wrong language in a wrong context, or varying language skills depending on stress or alertness, but compromised lexical access and control are more likely the cause. These problems are not unique to bilinguals, and yet they have been used to claim that bilingualism has a detrimental effect on bilinguals (Meuter, 2009, p. 1; Li Wei, 2000, p. 18). The comparative English comprehension between high school students in the Nordic countries were tested by Delsing & Lundin (2005), who found that the comprehension skills were best amongst the Finland-Swedish

group of students, above those of the Swedish-only students while the Finnish-only students were below the level of the Swedish-only students (pp. 89-95). Furthermore, bilingualism, or multilingualism, is actually more common than monolingualism across the world: it is estimated that two-thirds of children grow up bilingual (Crystal, 2003, p. 17). According to Grosjean (1999, p. 3), a bilingual can be in a completely monolingual mode, a completely bilingual mode, or anywhere in between, depending on such variables as the context, the stimuli, and/or the nature of the task (Jarvis, 2009, p. 105). Bilinguals, or multilinguals, often use different languages for different purposes or tasks, and their proficiency – both in terms of general proficiency and task-specific proficiency – does not usually match between the two languages (Li Wei, 2000, p. 8).

There are, however, no generally agreed-upon definitions of bilingualism. For a comprehensive list of terms that have been used to refer to different types of bilinguals, Li Wei (2000) provides an excellent overview. Definitions of bilingualism can be roughly divided into those based on function (cf. Weinreich, 1953; Oksaar, 1971[12]) and competence (cf. Bloomfield, 1933; Braun, 1937[13]), and to those of minimalist[14] (cf. Weinreich, 1953) and maximalist[15] (cf. Haugen, 1987, pp. 13-20) approaches. There are also differences regarding requirements of the age of acquisition, balance, and self-evaluation (Skutnabb-Kangas, 1981, p. 93; Hammarberg, 2010, p. 94). The Finland-Swedish participants investigated in this study fall into many of the categories presented in Li Wei (2000) depending on their individual situations, namely: compound bilinguals[16] or simultaneous bilinguals[17] (participants whose parents represent speakers of both Finnish and Swedish), successive bilinguals[18] (participants who acquired the language [Finnish or Swedish] that is not spoken at home via a language immersion program or at day care), and secondary bilinguals[19] (participants who come from only-Swedish-speaking families and whose learning of Finnish has taken place mostly in the school environment).

This thesis assumes a somewhat maximalist, yet function-oriented definition of bilingualism akin to that of Grosjean (1982, pp. 235, 307) referring to bilingualism as the use of two languages in daily life, or more specifically functional bilingualism,[20] referring to the ability to use both languages, which covers the in-group differences in the Finland-Swedish group, but does not take into account whether the participants have acquired the two languages simultaneously or consecutively (Li Wei, 2000, p. 6). This brings us into analyzing the differences between acquiring a language and learning a language. In condensed form, the answer could be reduced to “time, input, teacher’s role, and skills” (Ringbom, 1987, p. 27). The Finland-Swedish participants in this study live in somewhat predominantly Finnish-speaking areas and attend Swedish-medium schools.

Additionally, the use of the terms L1, and L2 tends to vary between studies. L2 is often used as a generic term to refer to all languages "learned after the first one" (Hammarberg, 2010, p. 91). While it would be possible to account for the relationship between the three languages in this study along a chronological scale – namely Finnish, Swedish, and English, with the use of L1, L2, and L3, respectively – such would not account for many participants' scenarios. Among the Finland-Swedish population, there are students who have acquired both languages since early childhood, report themselves as being native speakers and have high proficiency in both languages, and receive mother-tongue-oriented teaching at school for both languages. Designating one of the languages as L1 and one as L2 in these students' cases would not be adequately descriptive.[21]

The processing of the language in (even in the early) bilinguals is not necessarily identical with monolinguals. For example, in comparison to Swedish – the Finnish language is processed inherently differently in the Finland-Swedish bilinguals. Lehtonen et al. (2012) tested highly proficient Finnish-Swedish bilinguals for factors of frequency, morphology, and lexicality in word recognition. Finnish has a rich use of morphology,[22] but some highly frequent inflected forms develop full-form representations in monolingual[23] Finnish speakers, which causes the morphological processing effect to disappear. Despite having acquired the language from early childhood, the bilinguals, on the other hand, showed no disappearing morphological processing effect even for highly frequent inflected words.

Considering the aforementioned issues with classifying a single source language, when possible, the terms source language – i.e. the language from which the cross-linguistic influence is expected to take place, and target language – i.e. the language to which the cross-linguistic influence is expected to take place, are used in this thesis. The terms L1, L2, and L3 are used in conjunction with the present theoretical background, and when required by the theories that the analysis builds upon.

2.3 Semantic Cross-Linguistic Influence

Two characteristics of second language acquisition make it substantively different from first language acquisition: cross-linguistic influence and fossilization (Odlin, 2003, p. 457). Of these, Odlin defines transfer (or cross-linguistic influence) as "the influence resulting from the similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired" (Odlin, 2003, p. 436). There is neither an agreement of what cross-

linguistic influence is, nor a commonly accepted definition for the term – which is obviously problematic for research (Jarvis, 2000, p. 249). The resulting learner languages, or interlanguages, are more than just the sum of the source and target languages, as they are shaped by the natural human language-learning tendencies and include patterns similar to those present in children learning their first language: thus, they are systematic in their own right (Ortega, 2009, pp. 81-2).

The question is that of how much, when, and why cross-linguistic influence exists, as opposed to whether it exists, and this has been the question for a long time, with the role of cross-linguistic influence changing throughout the years. Until the 1970s, cross-linguistic influence was primarily studied within the behaviorist framework, and the terms transfer[24] and interference[25] hail from Lado's Contrastive Analysis Hypothesis, CAH, which is based on Skinner's learning theory.[26] Lado – who worked with Charles Fries at the English Language Institute at the University of Michigan in developing the Michigan Method and the ELI English Language Testing Program – envisioned that contrastive analyses would predict difficulties in second language learning (Ringbom, 1987, pp. 1-2; Sayehli, 2013, pp. 4-5; ELI, 2014). According to the CAH, it is more likely that there is going to be interference towards the target language with an increasing amount of linguistic difference between a given aspect of the L1 and the L2 (Kellerman, 1995, p. 126). As behaviorism (as a psychological school) fell out of favor, research on cross-linguistic influence faded in the 1970s, but it flourished again in the 1980s. It was then assumed that similarity, as opposed to difference, accounted for most of the L1 influence (Ringbom, 1987 p. 1; Jarvis, 2000, p. 248).

"He bit himself in the language" (Ringbom, 1983, p. 208) is perhaps one of the most classical examples of production errors in second language acquisition that are assumed to be a result of cross-linguistic influence. Finnish shares a single translation equivalent *kieli* for both 'tongue' and 'language.' The two can be used interchangeably for some of their uses in English: one can talk about a "native language" and "native tongue," which can certainly confuse the language learner even more. Ringbom has worked on cross-linguistic influence from Finnish and Swedish as source languages for over three decades, and suggests that lexis is the most bound area of language knowledge to be affected by perceived similarity between the languages (2001, p. 60). Perhaps the key finding, in relation to conceptual cross-linguistic influence from Ringbom's research, is the different areas of language knowledge that seem to be prone to an effect from the mother tongue and the previously acquired language. The data showed (albeit for a translation task, which is not only a production task, but one that does not necessarily measure processing by allowing the use of explicit information) that while influence at the level of semantic extensions seem to come predominantly from the L1, psychotypology plays mostly role in the transfer of form

(2001, pp. 61-62, based on data from Ringbom, 1987).

Mostly, L1 effects towards subsequently acquired languages have been studied, and the term forward transfer[27] has been used to describe this type of cross-linguistic influence. The opposite, cross-linguistic influence from the subsequently acquired languages to the L1, is called lateral transfer,[28] on which the quantity and quality of proficiency, typology, and recency of acquisition are expected to have an effect (Jarvis & Pavlenko, 2008; Sayehli, 2013; Williams, 1998). Cross-linguistic influence occurs in several areas of language use and acquisition. Table 2 presents some dimensions of language and possible types of cross-linguistic influence associated with the dimension. This thesis focuses on cross-linguistic influence at the cognitive level, namely conceptual cross-linguistic influence, and the area knowledge of semantics, more specifically vocabulary acquisition. A certain interrelation exists between the two. Of the levels of linguistic processing, semantics is the one most concerned with the representation and processing of meaning, which sets it in a unique position with respect to other areas of memory and perception. However, one should not mix the terms semantic and conceptual. Words do share features of semantic meaning across languages, but this is not uniformly the case, as they might represent different underlying concepts, or further still, they might exist in one language only nominally, as in the earlier example (see Table 1) of the names of various parts of the human arm (Altarriba & Bashnight-Brown, 2009, pp. 79-80).

Table 2

Types of cross-linguistic influence associated with dimensions of language (Jarvis & Pavlenko, 2008 in Sayehli, 2013, p. 9).

Dimension	**Types of transfer**
1. Area of language knowledge	phonological, orthographic, lexical, semantic, morphological, syntactic, discursive, pragmatic, sociolinguistic
2. Directionality	forward, reverse, lateral, bi- or multidirectional
3. Cognitive level	linguistic, conceptual
4. Type of knowledge	implicit, explicit
5. Intentionality	intentional, unintentional
6. Mode	productive, receptive
7. Channel	aural, visual
8. Form	verbal, nonverbal
9. Manifestation	overt, covert
10. Outcome	positive, negative

To understand the meaning of a vocabulary item, there are more levels of knowledge required than merely the components of meaning, semantics, and concepts[29] thus far discussed. Jarvis (2009) defines lexical transfer as "the influence that a person's knowledge of one language has on that person's recognition, interpretation, processing, storage and production of words in

another language" (p. 99). For an individual to be able to (truly) know a word, he or she must know the word's spelling and pronunciation, meaning, and grammatical information (such as class and syntax), as well as the words with which it typically occurs, the associations (at both lexical and conceptual levels), the frequency at which the word appears in the given language, and the register to which it belongs (Jarvis, 2009, p. 100; Nation, 2001, p. 27). Cross-linguistic influence has the potential to affect the knowledge of all these factors in the target language.

In second language acquisition, what concepts are connected to the L2 items being learned if we assume a hierarchical model in which the conceptual information is separate? Also, will there later be a new concept developed for the item in the L2, or will the existing concept always adapt in cases in which the ones in the source and target languages do not match? There have been suggestions for conceptual restructuring, with increasing experience and proficiency in the L2 allowing mapping to a separate set of conceptual features, and a recombination or restructuring of conceptual features in L2 acquisition. The phenomenon of mapping L2 words with existing meaning in the L1 has been recognized for some time and has also been treated as a positive element in second language learning: For example, already in 1964, Ausubel suggested that learning a new language should be easier for adults than children because adults "need not acquire thousands of new concepts but merely the new verbal symbols representing these concepts (p. 421; Jiang, 2002, p. 618).

In the introduction to this thesis, the memory processes were divided into the procedural and the declarative. In guided, or classroom-based, language learning, students often learn the differences between words and concepts at the level of explicit knowledge, but this does not necessarily lead to the automatic, or implicit, process of changes in the proposed conceptual level (Pavlenko, 2009, p. 150). It has previously been considered that when one learns a new language as an adult, the process occurs by mapping existing concepts acquired through the L1. However, with the review presented here regarding the access and acquisition of vocabulary, it could be said that the L2 vocabulary learning is more that of conceptual restructuring. In the case of highly fluent bilinguals, this may eventually continue to the point that the L2 categories are influencing the L1 categories (Pavlenko, 2009, p. 141-2). Given the explicit nature of language teaching, one must consider the level at which the explicit instruction can affect the conceptual restructuring. One effective barometer could be the quantification of errors, but the lack of transfer errors does not necessarily mean that the conceptual restructuring has been made at the conceptual level. Cross-linguistic influence is not only that of overt errors (Jiang, 2002, p. 632); the long-term memory might contain instructions regarding the use of certain words outside of the conceptual memory that are acquired through explicit instruction. Thus, in the examination, the language learner remembers

the teacher's reaction to earlier performed errors and corrects his or her own use of the L2 vocabulary item.

Most vocabulary items in the L2 fossilize to represent the L1 conceptual information due to constraints imposed on L2 learning and thus the lexical information in the L2 is fundamentally different from that of the L1. The integration of all the required information into the lexical entries in the L2 would require extensive, highly conceptualized exposure to the necessary semantic, syntactic, and morphological information. Classroom learners often lack this input, and in tutored learning the task is primarily to remember the word. The learner might still produce the correct form, regardless of the lacking contextual information in the L2, due to having learned explicit rules about the word (such as the non-equivalence of the terms for the different parts of the arm in Table 1), but these are not a part of the mental lexicon (Jiang, 2000, pp. 47-51).

The lexical entry is assumed to be separated to that of a lemma[30] and a lexeme,[31] with the lexeme being further divided into morphology and form. The lemma, on the other hand, is divided between the knowledge of the meaning of the word and the associated syntax. In terms of conceptual cross-linguistic influence, it is the meaning part of the lexical entry that is of interest in the present study (Jiang, 2002, p. 619).

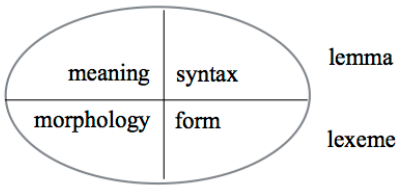
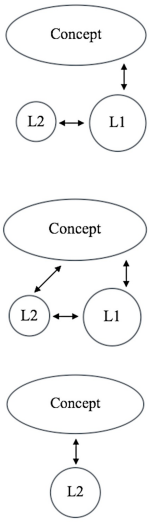


Figure 1. The lexical entry in the mental lexicon based on Levelt, 1989 (adapted from Jiang, 2002, p. 619).

In relation to the organization of the lexical entry in the L1 (see Figure 1), Jiang (2000) proposes a three-stage system for vocabulary acquisition in second language learning that takes into account the effects of the L1 conceptual system, which is outlined in Figure 2. This model of vocabulary acquisition, builds upon the L1 lemma mediation hypothesis. The progression between the stages is continuous, rather than one that takes place in distinct stages. The model also proposes that it is possible for a language learner to fall short of reaching the third stage, particularly when a word is learned by negotiating meaning with the L1. This means that the language learner continues mapping the meaning of the word to the L1 concept and thus the meaning attached to it, which may

cause processing and production difficulties such as, for example, under-extension[32] or over-extension[33] of the meaning in the target language.



Stage I
The formal stage of lexical development

The information about the L2 word is stored in general memory or episodic memory, i.e., it is not a part of the mental lexicon. It is a part of one's lexical knowledge, but not one's lexical competence. The L2 word activates its translation equivalent in L1.

Stage II
L1 lemma mediation stage

Simultaneous activation of the L2 and L1 word forms. Through use, information is transferred from L1 lemma to L2 representation and finally the two resemble each other.

Stage III
L2 integration stage

The transferred lexical entry in L2 will be very similar to that of an L1 lexical entry, i.e., a concept is also directly mapped to the L2 word, and acts like an L1 entry in terms of representation and processing.

Figure 2. Jiang's three-stage system for vocabulary acquisition in second language learning (Jiang, 2000, pp. 51-54)

At the initial stage, or stage I, the use of L2 words takes place via the activation of their L1 translations. In comprehension, the L2 word first activates its L1 translation equivalent, which then activates the associated semantic, syntactic, and morphological information. When the language learner continues to activate the L1 translations through the use of L2 words, the representations are activated simultaneously, which results in a connection between the L1 and the L2, i.e. Stage II. Another way to look at this would be to consider that the information from the L1 lemmas is being copied to the L2 lexical forms, and that a word has reached the second stage when the lemma space of the L2 word is occupied by the L1 lemma information. Stage III, the L2 integration stage, has the L2 word acting (in terms of processing and representation) independently like an L1 entry would. This would be representative of full lexical competence in the target language (Jiang, 2000, pp. 50-54).

Before moving to the implications the aforementioned model by Jiang has on the present study, a short overview of further previous research and its implications might be in place. In early bilingual lexicon research, one of the primary questions was whether a bilingual's lexicons for vocabulary in each language were separate or shared (Kroll & Sunderman, 2003, p. 105). It has generally been assumed that at least the semantic code is shared by the bilingual's two languages.[34] One reason for this is that bilinguals are able to translate words from one language to the other. Van

Heuven et al. (1998) proposed the Bilingual Interactive Activation (BIA) model, which assumes that the lexicon is integrated and that the access is non-selective. Later research has seemed to support the non-selectiveness of lexical access, with the access being driven by the properties of the input, not by choice of the reader (Kroll & Sunderman, 2003, p. 106-8).

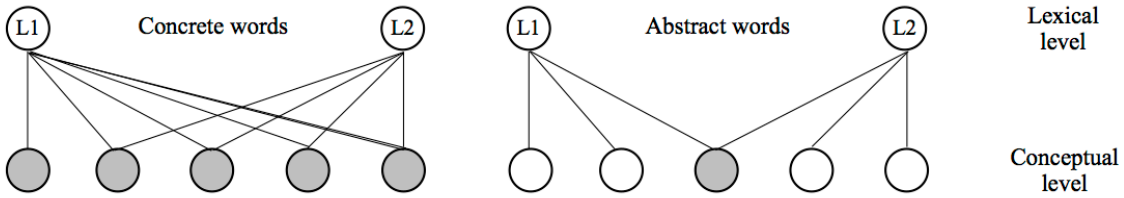


Figure 3. The Distributed Feature Model (Van Hell & De Groot, 1998, p. 205; Kroll & Sunderman, 2003, p. 111)

Research on conceptual organization prior to the proposal of the distributed model by Van Hell and De Groot (1998) had focused on concrete nouns, which affected the assumptions of shared representation in bilinguals. Based on computer modelling, De Groot and her colleagues have proposed a Distributed Feature Model (see Figure 3 above), in which the concepts are not necessarily the same or different, but rather differentiated by degree. Concrete words tend to have a more shared representation than abstract words do – a point supported by research that shows that bilinguals' translating of concrete nouns is faster than that of abstract nouns (Kroll & Sunderman, 2003, p. 110-3).

In response to the complex situation of the concepts being partially shared between the bilingual's two languages, Kroll and Stewart (1994) proposed a (proficiency-based) developmental model.[35] The Revised Hierarchical Model (RHM) assumes that the weighting of the strength of the lexical links between the L1 and the L2 depends on the stage of the L2 acquisition. In the early stages, the words in the L2 are connected to translations in the L1 when accessing the conceptual information. As the learner's proficiency increases, a direct connection between the L2 word and the concept gradually develops (Kroll & Sunderman, 2003, pp. 114-5).

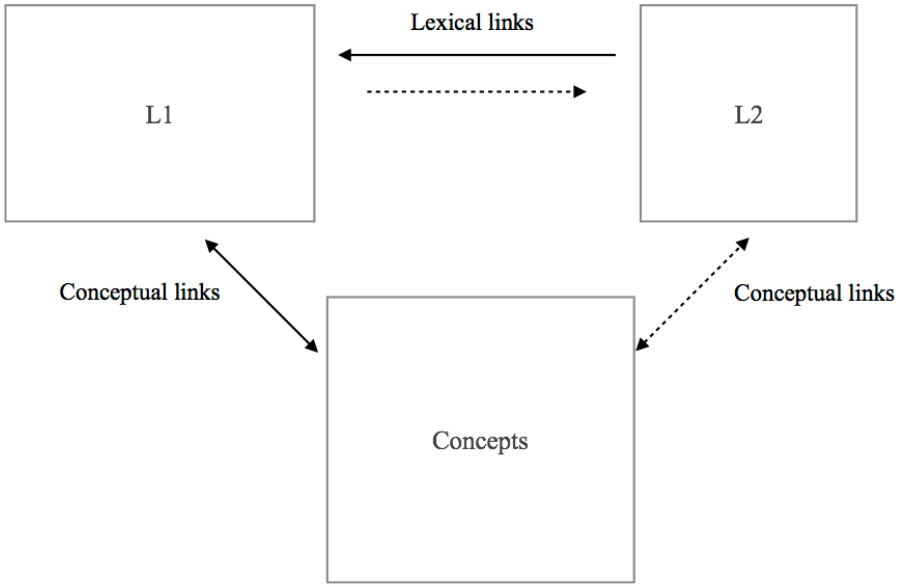


Figure 4. The Revised Hierarchical Model (Kroll & Stewart, 1994, p. 150)

Note. The bold arrow between the L2 and the L1 represents the lexical link from the L2 to the L1 that is caused by the translation approach to the use of the words in the L2. The dotted arrows refer to the prediction that L1 words are lexically mediated to the concepts via the L2, but that the connection is weak when the proficiency is low in the L2. As the proficiency in the L2 increases, a stronger activation from the L1 to the L2 is assumed. The arrows between the L1 and the conceptual level, and the L2 and the conceptual level represent the links between the lexical knowledge and the conceptual information. At lower L2 proficiency levels, the access from the L2 is via the L1 by default, but a direct connection can be established.

Pavlenko (2009) suggests that developmental change is the strength of the RHM model, but assumes that it cannot account for conceptual non-equivalence, since the assumption in the model is that the concepts between the languages match (Pavlenko, 2009, p. 143). This is problematic from a linguistic relativity perspective. Thus, Pavlenko suggests a revision of the RHM model – the Modified Hierarchical Model (MHM) – which is presented in Figure 5 below. The difference between the RHM and the MHM is that, in the latter, the conceptual level is not fully shared between the languages; instead, there are both shared and separate areas. There are three major differences between the two models: 1) the aforementioned conceptual store; 2) the inclusion (in MHM) of conceptual transfer, which can take place bidirectionally (from the L1 to the L2 or from the L2 to the L1); and 3) the learning aspect of the second language acquisition being integrated directly into the model. The learning is considered a gradual, implicit process (Pavlenko, 2009, pp. 143, 146). Pavlenko's addition of the conceptual restructuring and the possibility of separate conceptual development is highly relevant for research on the effect of the bilingual's two

languages towards the L3 because it allows the conceptual base behind the lexical knowledge to differ based on, for example, the usage factors of the two languages of the bilingual.

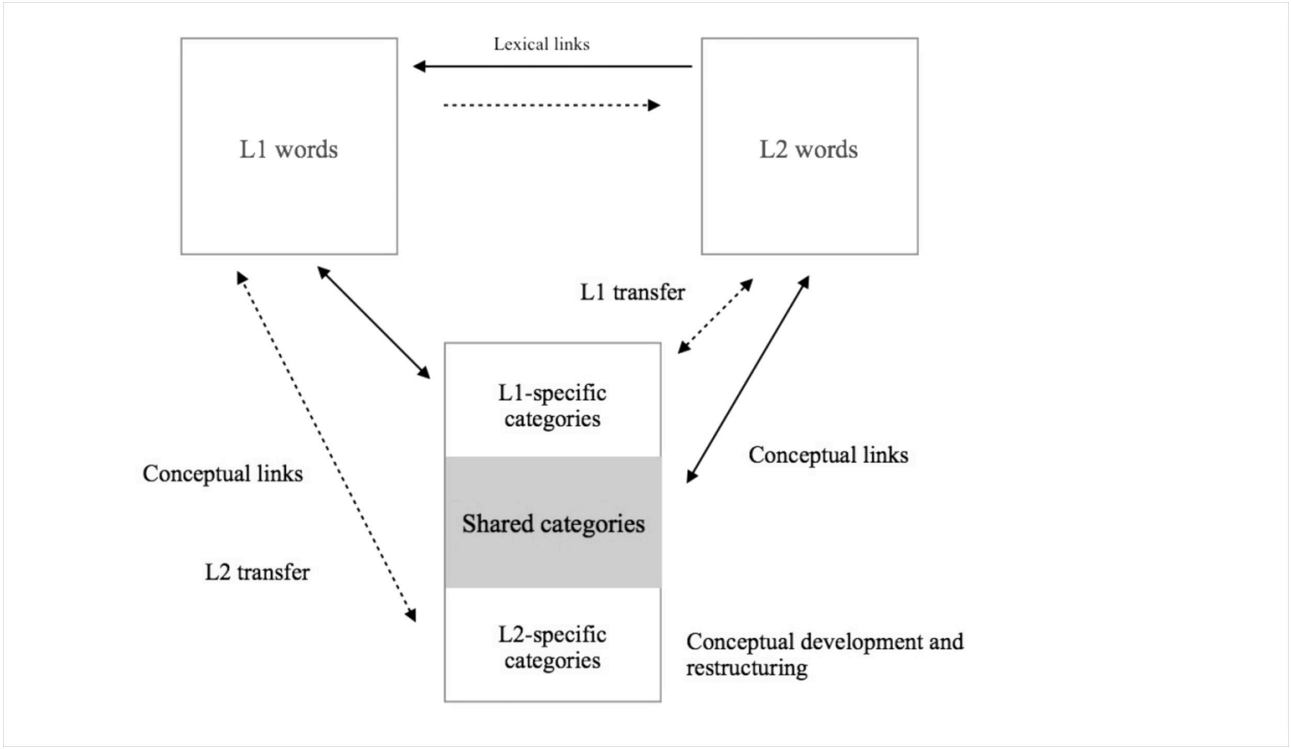


Figure 5. The Modified Hierarchical Model (adapted from Pavlenko, 2009, p. 147)

Note. See the note under Figure 4, RHM, for the explanation of the arrows in the model. The additional arrows in the MHM represent the possibility of the direct connection from the L1 to the L2-specific conceptual categories (as opposed to being mediated via the L2, and the direct connections from the L2 to the shared and L2-specific categories. The conceptual development (that affects both the L1 and the L2) is expected to take place at the conceptual level.

When it comes to the semantic organization, it seems that words often have more than one translation equivalent in another language, with estimates of non-isomorphic[36] vocabulary ranging from 25% (Tokowicz, Kroll, de Groot & van Hell, 2002, p. 35) to 69% (Prior, MacWhinney & Kroll, 2007, p. 1032) between various languages (Gathercole & Moawad, 2010, p. 2). Thus, in research on cross-linguistic influence, it is of interest to determine whether the storing of the linguistic information is shared or separate. The selection is not necessarily binary; it is probable that there are elements of a single-store system and a two-store system, and one should consider the potential role of the linguistic distance between the two languages (Ringbom, 1987, p. 35).

Cross-linguistic influence does not take place at the surface level, but rather, in the mental processes, or in the bilingual mental lexicon that occasionally makes it difficult to weave out effects that would be the result of either shared or separate processes. Cross-linguistic influence transpires through two distinct processes: "the formation of learned cross-linguistic associations, and processing interference" (Jarvis, 2009, p. 102). Several views exist as to how and why cross-linguistic influence occurs. Some believe that cross-linguistic influence takes place between the languages (e.g., Odlin, 1989), others believe that it is a constraint in learning (e.g., Selinker, 1992, p. 209), and others still believe that it is neither a process between languages nor a constraint. The latter group maintains that cross-linguistic influence is a learning strategy that allows the learner of a language to fill gaps in their knowledge (e.g., Krashen, 1983). A view that most closely resembles Jiang's model of vocabulary acquisition is that of Jarvis (1998), Kellerman (1995), and Slobin (1993), in which the cross-linguistic influence takes place as an outcome of a "shared conceptual system underlying both L1 and IL [interlanguage]" (Jarvis, 2000, p. 250).

One potential way to investigate the effects of shared and separate conceptual bases on vocabulary knowledge between languages is to tap into the effects of the L1 on the L2 that would be expected to occur beyond the level of knowledge in the L2. Jiang (2002) studied the effect of same-translation and different-translation pairs on speakers of Chinese and English. To research the effects of the L1 meaning in the associated word on the L2 meaning, Jiang (2002) crafted vocabulary pairs that either share the same translation in the L1 for the two words in the L2 or have a separate relationship both in the L1 and the L2. Figure 6 shows this relationship between the two conditions.

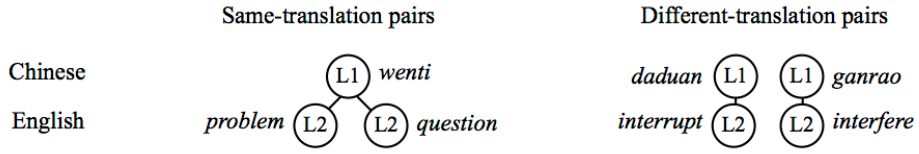


Figure 6. The difference in the degree of semantic overlap between same-translation and different-translation pairs (adapted from Jiang, 2002, p. 621).

To understand the potential implications of the two conditions, one must consider the background processes that occur behind the conceptual activation. Swinney (1979) concluded that the meanings of homographs, such as 'bug' – which, in English, can mean either an insect or a listening device –

are initially activated, regardless of the bias in the context. In his study, the participants performed a lexical decision task and were primed with either "bugs" or "spies" for the word "insect." Both cases of priming use of the two gained a result, but the effect disappeared when a delay of three syllables was inserted, which would mean that the dual activation is only relevant very shortly after being introduced to the word (Ingram, 2007, p. 211). Nevertheless, if one considers the use of, e.g., the word "problem" in English, it can be assumed that due to the fact that the Chinese equivalent *wenti* shares the meanings of both "problem" and "question," both are initially activated. But, since the language learner will be able to account for the non-shared conceptual base of the two words in the target language, production tasks should be avoided. For this reason, the same-translation – different-translation method by Jiang (2002) is adopted in the present study (further outlined in 4.3).

2.4 Psychotypology

As mentioned, already knowing another language is essentially what separates learning a second language from learning a first language. The effect of the already acquired language(s) on the language being acquired, however, depends strongly on the relationship between the (two) languages. To a certain degree, this relationship can be measured in absolute, measurable terms (by typological comparison), but to some extent it is a matter of a belief bias. We assume there to be a certain difference between the two languages we know. How close, or far, the learner of a language assumes the target language to be from the mother tongue, or another language acquired earlier, is important if we assume positive cross-linguistic influence to take place. Kellerman (1986) suggested that what affected transfer is not typology, but rather psychotypology - the learner's perceived distance between the L1 and L2. Kellerman also suggested that when the learner acquires a larger understanding of the target language, the estimate of the psychotypological distance will gradually change. A distinction is also sometimes suggested for perceived, experienced, similarities, and assumed similarity (Falk & Bardel, 2010, 204-206; Ringbom, 2007, pp. 24-26; Sayehli, 2013, pp. 4, 15; Rast, 2008, p. 231).

Kellerman separated the processes of projection and conversion, with the first referring to the process of evaluating whether the feature of the native language could be used in the target language, and the second to the adjusting of the source language structure to the target language's surface structure. The motivation to perform the projections and the conversions is that the language learner can fill gaps he/she perceives to have in the target language (in the case that the learner perceives the two to share the given detail). Much of the perceived suitability of the source

language structures depends on the perceived distance between the two languages (Kellerman, 1982, p. 197).

The effect of the perceived distance can also work in the opposite direction: should the language learner assume that due to the perceived distance the structure of the native language is not likely to have parallel existence in the language the learner is acquiring – regardless whether the feature exists or not in the target language – the language learner will not transfer. There is also a difference that stems from features of languages being classified to those of language-specific and language-neutral (Kellerman, 1982, pp. 197-8). This is particularly interesting given the common division of language features into vocabulary and grammar. The meaning of words could be more easily seen to be language-neutral, where the grammatical features could be seen to be more language-specific. This follows from the idea of seeing vocabulary as world knowledge.

Kellerman also considered a situation, where the learner is avoiding using a certain feature of the target language due to its existence in the source language. In L2 language acquisition, features of the L1 are often inhibited, and the avoidance – which Kellerman calls homoiophobia, causes an existing feature of the L2 to be inhibited. This might be related Schachter's (1974) avoidance, the behaviorist avoidance conditioning, i.e. learning to avoid an aversive stimulus, but avoidance in the L2 learning does not require negative feedback to take place (Holt et al., 2012, p. 256; Kellerman, 2000, p. 4). Due to the nature of psychotypology being a matter of belief, individual learners do not share the same psychotypology – it is individual. This also essentially means that there is no shared initial stage for L2 acquisition (Rast, 2008, p. 231).

Since the bilingual participants in the present study have two potential source languages: Finnish and Swedish, from which cross-linguistic influence to English might take place, psychotypology is an important aspect of consideration to the choice of the source.

2.5 The Finnish and Swedish Languages in Fennoscandia

In order to understand the bilingual situation in Finland and the longstanding integration of the Finnish and Swedish realms, it is important to first understand the context of research conditions in this study. Finland is a bilingual nation. This is more of a political situation rather than a linguistic reality, however. The national languages are Finnish and Swedish. Most of what now constitutes Finland was a part of Sweden until 1809 when Finland became a Grand Duchy of Russia.

The Swedish-speaking minority in Finland has two different origins. One part of that minority derives from the populations that lived in the coastal areas during the period of Swedish

rule, and the other part from the upper class of the Swedish times (Ringbom, 1987, pp. 7-8). The Finns have a system of parallel multilingualism, which aims at the maintenance of the two languages and a monolingual lifestyle for their speakers (Palviainen & Boyd, 2013, p. 230). The Constitution has certain minimum requirements in regards to the services offered by municipalities in both languages (Palmgren, 2007, p. 11). All residents are assigned one mother tongue by their parents, or upon arrival in Finland. One must choose between Finnish and Swedish: dual linguistic affiliation is not allowed. While the population of monolingual Swedish-speakers has decreased to 5.4% in 2011 from roughly 13% at the beginning of the twentieth century, the population of bilingual Finnish- and Swedish-speakers has increased. This has been caused by the increasing proportion of Swedish-speaking people that form households with Finnish-speakers. It is reported that roughly 60% of the children in these families have Swedish as their mother tongue (Palviainen & Boyd, 2013, p. 230; Palviainen, 2013, p. 3). Assignment to monolingual and bilingual municipalities is done based on census. Should the proportion of speakers of both languages be above 8%, the municipality becomes bilingual. In bilingual municipalities, the residents have a right to receive service in the mother tongue. There are 30 bilingual municipalities, 287 monolingual municipalities with Finnish as the sole language, and the Åland islands are monolingually Swedish (Palviainen & Boyd, 2013, p. 230).

Finnish is a compulsory subject at school for those who study at Swedish-medium schools, and Swedish is a compulsory subject at school for those who study at Finnish-medium schools. (Palviainen, 2012b, p. 202). Finnish, which is introduced in third grade at the latest, is the most common first language other than the language of instruction at Swedish-medium schools, while Swedish is most commonly taken as a second or third language beyond the language of instruction in Finnish-medium schools, introduced in the seventh grade. However, students are free to choose which languages they study, and in which order, as long as the Finnish-speakers study Swedish and vice versa. The exception to the rule is Åland, where English is compulsory and Finnish is an elective, though it is widely studied. English is an elective on the mainland, albeit the most common language (taken first at school) beyond the language of instruction chosen by roughly 90% of the students,[37] an increase at the expense of especially German since the 1990s (Kangasvieri et al., 2011; Pohjala and Geber, 2010).

The Finnish language became a compulsory subject at Swedish-medium secondary schools in 1841 and at universities in 1843. Likewise, Swedish became compulsory at Finnish-medium secondary schools in Finland in 1872. Swedish was the de facto schooling language until the twentieth century and even during the early Russian period the only official language. The finnification[38] of the education system started in the late 19th century with language conflicts taking

place in the 1930s. For example, the conversion of the University of Helsinki to Finnish-medium (from Swedish-medium) was demanded alongside debating the bilingual status of the nation. This development continued until the onset of the Second World War (Geber, 2010, pp. 9, 63).

Swedish became compulsory for all students in 1968 having already been compulsory for secondary school students for almost a century (Palviainen, 2012a, p. 10). In new education legislation, it became compulsory to teach two languages other than the medium of instruction, one of which had to be the other national language. English did not become compulsory, but the municipalities were given a choice of which languages would be offered to the students beyond the two national languages (Geber, 2010, pp. 23-24). In the 1994, the minimum amount of hours dedicated to Swedish instruction in compulsory education was cut significantly: the current minimum is 228 classroom hours dedicated to Swedish. As compensation, Swedish was introduced in vocational secondary education and university education (Juurakko-Paavola & Palviainen, 2011, p. 5; Geber, 2010, p. 28). Swedish has not been required on the high school final examination since 2004, but the language is still a compulsory subject with a minimum of 190 classroom hours in high school (Juurakko-Paavola & Palviainen, 2011, p. 5). The compulsory status of the Swedish language at Finnish-medium schools has been debated intensively again in the recent years, and it has often been referred to as “forced Swedish” (Fi. pakkoruotsi, Sw. tvångssvenska). The resulting bilingualism continues to be debated, with about one third of the Finnish-speaking population reporting the ability to speak Swedish (Palviainen, 2013, p. 4; Juurakko-Paavola & Palviainen, 2011, p. 5).

While research often seems to focus on Finland’s Swedes, it is noteworthy that Finns are the largest majority in Sweden, though their status is not as institutionalized. Most Finnish-speakers in Sweden either emigrated there from Finland, or are descendants of immigrants. This migration mostly took place during the 1960s and 1970s and was due to poor economic conditions in Finland. Today, the population of Swedes with a Finnish background is estimated at 675,000, and the number of L1 Finnish-speakers is estimated at 210,000 (Palviainen, 2013, p. 4-5). Torne Valley Finnish is also spoken in Sweden, where it is recognized as a separate minority language, and has about 60,000 speakers. This language developed from Finnish after Finnish-speakers settled in northern Sweden during the 12th century, and it is still mutually intelligible with Finnish (Lewis, Simons & Fennig, 2014).

2.6 Summary

To summarize, despite a later age of onset for English the Finland-Swedish group of learners has been found to perform better in English than the Finnish or Swedish groups. This suggests that bilingualism does not seem to have a detrimental effect on L3 acquisition. There are, however, no generally agreed definitions for bilingualism. The participants in the present study fall into varying categories of bilingualism depending on their background and the present study acquires a function-oriented definition of bilingualism, functional bilingualism, which allows for the existing variation in the Finland-Swedish group. It is essentially this variation that is of interest in this study. As opposed to the Lx based terms, when possible, this thesis acquires the division to source language and target language.

The resulting languages in language acquisition beyond the first language are more than just the sums of the languages: they are systematic. Regarding cross-linguistic influence, the question is how much, when, and why it takes place – which the present study aims to investigate. Finland has been a source for research in cross-linguistic influence due to the two groups, the Finns and the Swedes, sharing similar educational and socioeconomic situations, but differing in the typology of the potential source languages.

The phenomenon of mapping L2 words with existing meaning has been known for quite some time. Most vocabulary items in the L2 fossilize to represent the L1 conceptual information due to constraints imposed on L2 learning. Jiang (2000) has proposed a three-stage model of vocabulary development in the L2, which acts as a starting point for the present study on cross-linguistic influence in L3 vocabulary acquisition. Conceptual development – where the influence from the L2 to the L1 – has been proposed, and the conceptual information is assumed to be separate from the individual languages, but shared between the languages. It has also been suggested, that not only typology, but also perceived typology of the source language(s) affects the quantity and quality of transfer towards the target language.

A same-translation – different-translation method (Jiang, 2002) has been used to research the effect of a source language on conceptual organization and semantic development in the target language, and is adopted in the present study.

Chapter 3

Aim and Predictions

3.1 Aim

The aim of the study is to investigate conceptual transfer in functional bilinguals, which is not only of theoretical value, but it is also beneficial for improving language teaching and instruction. The two research questions in the study are:

RQ1: Does the context and frequency of use of the two languages of functional bilinguals explain similarities with monolinguals with regard to cross-linguistic influence in L3?

RQ2: Does language similarity or perceived language similarity affect the amount of cross-linguistic influence towards an L3?

3.2 Predictions

The method is built on the assumption that when learning an additional language beyond their mother tongue, learners transfer semantic information from their first language to the additional language they are acquiring. It is also assumed in the study design that language-usage patterns and dominance – i.e., in what environments and to what extent the given languages in which a learner has a functional bilingual proficiency are used – might predict the extent of cross-linguistic influence from one of the source languages. Since the learners might perceive Swedish as being more similar to English than what they perceive the relative distance from Finnish and English to be, it is also assumed that psychotypological effects and perceived similarity can create influence that cannot be explained through language dominance in an L1-transfer-based model.

Chapter 4

Method

4.1 Guiding Principles

In order to answer the research questions, information on two levels was required. First, information on the potential background and control variables such as dominance, usage domain of the users' languages, and perceived similarity between the three languages used in the experiment had to be collected. A background questionnaire was administered for this purpose. Secondly, a word pair similarity perception task, where the subjects rated semantic relatedness of item pairs, was chosen for the data collection on the dependent variable, i.e., the conceptual cross-linguistic influence, with word pairs specially crafted for conditions that would present shared conceptual information in one or two of the languages but not all three.

Following Jiang (2000), the method is built on the assumption that when the learners are acquiring a second or a foreign language, they transfer semantic information from their first language to the target language (see 2.3). The present study has three levels of analysis: students with one naturally acquired mother tongue acting as a source language for cross-linguistic influence, students with one naturally acquired mother tongue with two languages acquired in a school environment with the mother tongue and one of the school languages acting as a source language for cross-linguistic influence, and students with two naturally acquired languages acting as a source languages for cross-linguistic influence. The three languages in all three aforementioned combinations are Finnish, Swedish, and English, with English being the target language in the analysis. With expected variation in usage patterns, it is of interest to evaluate whether and to what extent the participants transfer semantic and conceptual information from one or both of the source languages to the target language.

Ringbom has suggested that in order to research cross-linguistic influence, "the best way is to investigate groups of learners with different mother tongues learning the same target language" (1987, p. 2). For methodological rigor, the groups should be comparable as far as their cultural and educational backgrounds are concerned – which would support studying the Finnish- and Swedish-speaking groups in Finland. Possibly due to experimental design discrepancies and incompatibilities, the intensive research in cross-linguistic influence has not to date produced a widely accepted consensus regarding what cross-linguistic influence in language is. However, Jarvis suggests a framework with three effects to study (Jarvis, 2000, p. 253):

1. intra-L1-group homogeneity in learners' IL [interlanguage] performance
2. inter-L1-group heterogeneity in learners' IL performance
3. intra-L1-group congruity between learners L1 [first language] and IL performance

Intra-L1-group homogeneity refers to speakers of the same language behaving uniformly when using the language they are acquiring, and the inter-L1-group heterogeneity refers to the speakers of different languages behaving differently when using the target language. Thus, it should be verified that the variation between the two groups is larger than the variation within the two groups, which would be necessary to rule out general or developmental tendencies. The third effect, intra-L1-group congruity, refers to the similarity in the L1 and the L2 in the studied feature: the behavior in the L2 should be expected due to a feature in the L1 (Jarvis, 2000, pp. 254-255).

There are several possible explanations as to why intra-L1-group homogeneity might not be observable, even when the feature of the L1 has an effect on the interlanguage performance. This can be caused by a variety of inconstant variables such as differences in age, personality, aptitude, L2 proficiency, literacy, and other factors that differ between learners of a language that share a common L1 (Jarvis, 2000, pp. 256-257). These variations between the learners, particularly the interplay between two source languages at the lexical level, is at the heart of this study, which can be seen to contribute to the search of the nature of cross-linguistic influence, its constraints, and its interaction with other factors.

In addition to the three effects that should be taken into account in research on transfer, Jarvis (2000) based on Ellis (1994) suggests some variables that should be controlled in rigorous research:

1. age
2. personality, motivation and language aptitude
3. social, educational, and cultural background
4. language background (all previous L1s and L2s)
5. type and amount of target language exposure
6. target language proficiency
7. language distance between the L1 and the target language
8. task type and area of language use
9. prototypicality and markedness of the linguistic feature

In this thesis – with the exception of personality, some of these details are established through participant selection and the remainder are controlled in the background questionnaire. Age, social and cultural background, language distance, and the linguistic features are controlled through the experimental design and participant selection. Motivation for language learning, educational and language background, and aptitude are self-reported along with exposure and proficiency in the background questionnaire.

4.2 Participants

4.2.1 Participant Groups

A total of seventy-eight learners took place in the study. They were all 14- to 16-year-old junior high school students. Students of this age were chosen because they are in the last year of compulsory education. After the last year in compulsory education, students in Finland split roughly half and half to practically oriented secondary schools and academically oriented secondary schools after which they receive significantly different types and amounts of instruction in English in the school setting (Liekari, 2013). Since the usage settings of their two languages and frequency of their use were expected to vary greatly between predominantly Swedish-speaking areas and predominantly Finnish-speaking areas in Finland, it was deemed beneficial to introduce such usage variation into the subject group by sampling individuals from both areas.

The aim was to find four types of students (for the three participant groups): Finnish speakers with limited knowledge in Swedish, those proficient in both Finnish and Swedish, Swedish speakers with limited knowledge in Finnish, and Swedish speakers with no knowledge in Finnish. In choosing the schools, an effort was made to find schools from areas that would give the

broadest variation in the dominance between Finnish and Swedish as this was to be one of the main variables in the study. Data collection took place at two Swedish-medium schools in Finland, one Finnish-medium school in Finland, and two Swedish-medium schools in Sweden. See Table 3 for background information on participants.

Table 3

Background information on participants in the three participant groups

	Finnish		***Swedish***		***Finland-Swedish***	
Participants	20		17		41	
Age	**mean** 15.38	***SD*** 0.48	**mean** 14.94	***SD*** 0.23	**mean** 15.36	***SD*** 0.48
Gender	**male** 20%	**female** 80%	**male** 20%	**female** 76%	**male** 32%	**female** 66%
Number of known languages	**mean** 3.10	***SD*** 0.23	**mean** 3.24	***SD*** 0.76	**mean** 3.59	***SD*** 0.58
Native speaker of (self-report)	**Finnish** 20	**Swedish** 0	**Finnish** 0	**Swedish** 17	**Finnish** 22	**Swedish** 38
Age of onset (self-report) in years	**Finnish** 0.38	**Swedish** 12.55	**Finnish** n/a	**Swedish** 0.11	**Finnish** 3.46	**Swedish** 0.54
	English 8.33		**English** 8.04		**English** 9.59	

Note. The participants could choose to be native speakers of several languages.

As Table 3 shows, there are a total of 17 participants in the Swedish group, ranging from 14 to 15 in age with the mean age being 14.94. Of the participants, 13 (76%) are female, 3 (20%) male and one participant did not identify gender. The participants in the Swedish group report having knowledge on average in 3.24 languages with answers ranging from two to five. All included participants are native speakers of Swedish and study English as a school subject. None report knowledge of Finnish. Beyond knowledge of Swedish and English, the participants report knowledge in Spanish (7), French (5), German (3), Chinese (2), Dutch (1), Japanese (1), and Danish (1). The average age of onset (self-rated) for Swedish is 0.11 years, and for English 8 years old (ranging from 4 to 10).

There are a total of 20 participants in the Finnish group, ranging from 15 to 16 in age with the mean age being 15.38. Of the participants, 16 (80%) are female and 4 (20%) male. The participants in the Finnish group reported having knowledge on average in 3.10 languages (mean) with answers ranging from three to four. Regarding native languages, all participants are native Finnish speakers. Native speakers of other languages have been excluded from the study. The mean

age of onset (self-rated) for Finnish in the group is 0.38 (ranging from 0 to 2) and for Swedish 12.55 (ranging from 7 to 14). Age of onset for English is reported at 8.33 (mean), with a range from 6 to 13. Beyond knowledge of Finnish, Swedish and English, the participants report knowledge of German (1) and French (1).

There are a total of 41 Finland-Swedish participants in the primary study group, ranging from 15 to 16 in age with the mean age being 15.36. Of the participants, 27 (66%) are female and 13 (32%) male and one participant did not identify gender. The mean (self-evaluated) age of onset for Finnish in the group is 3.46 (ranging from 0 to 9), for Swedish 0.54 (ranging from 0 to 7), and for English 9.59 (ranging from 7 to 12). The participants in the Finland-Swedish group reported having knowledge on average in 3.59 languages (mean) with answers ranging from three to five. Beyond knowledge in Finnish, Swedish and English, the languages reported are French (10), German (8), Spanish (4), Arabic (1) and Hebrew (1). Regarding native languages, 22 participants report being native speakers of Finnish, 38 being native speakers of Swedish, with 15 participants reporting being native speakers of both languages. Native speakers of other languages have been excluded from the study. Age of onset for languages other than Finnish, English and Swedish range from 9 to 15, the mean being 13.82 for the fourth language and 14.50 for the fifth language. The participants were asked to list the languages themselves, which allows us to look at the order of language listed – and thus saliency, or worthiness of noting – and 28 (68%) listed Swedish first, 12 (29%) Finnish first, and 1 (2%) English first.

4.2.2 Ethics

Since data collection for the study took place both in Finland and Sweden, ethical considerations were necessary for both research environments. Both the Swedish Research Council and the Finnish Advisory Board on Research Integrity suggest that research projects be reviewed by an ethics board if the project fulfills certain conditions. None of the conditions for the requirement for ethical board review were met in the case of this study. While information about race or ethnic origin was not collected, information about linguistic background is vital for the purposes of the data analysis. Thus, it is very important that the data are handled in a manner where information about linguistic background does not entail race. The Finnish legislation about data management requires a public privacy policy and data management description (see G in the Appendix), which is provided accordingly (FIN-CLARIN, 2013; Finnish Data Protection Ombudsman, 2013a, 2013b).

The guardians of the students were informed about the study beforehand (see F in the Appendix), and also asked to sign an informed consent form. The schools informed the parents via their normal communication channels by handing out a description of the study, data use, and

storage. In accordance with the UN Declaration of the Rights of the Child (1959), the subjects had the right to refuse to participate in the study regardless of the informed consent of their parents (Unicef, 2013). The subjects were also given the right to retract from their participation during the experiment.

Students in the classroom settings with native or early age of onset in a language other than Finnish, Swedish, or English were allowed to take part in the experiment together with their peers to avoid discrimination as a part of the sampling process, but were excluded from the study.

4.3 Experimental Task

4.3.1 Word Pair Similarity Perception Task

The main experiment comprised a word pair similarity perception task featuring 45 word pairs, distributed across three conditions of 15 word pairs each: one in which a single translation equivalent exists in Finnish for two words in English, one in which a single translation equivalent exists in Swedish for two words in English, and one in which a single translation equivalent exists in Finnish and Swedish for two words in English (see Figure 8 in 4.3.2). The word pair similarity perception task was modeled after Jiang (2002), who found that in an evaluation task, Chinese speakers proficient in English rated the similarity of two words significantly higher than native English speakers when the two words in English shared a single translation equivalent in Chinese. Jiang's experiment attempted to answer whether L2 lexical forms would be mapped to existing semantic content of the first language translations, rather than new semantic specifications. The experiment in this study is built on the assumption that the Finnish and Swedish speakers will also attach the L2/L3 lexical forms to existing L1 and potentially L2 semantic content.

The L1 lemma mediation hypothesis suggests that should the L2 semantic entries come from their L1 translations, the items with single translation equivalent in the L1 will be rated differently from matching translation items as a result of the same-translation items having similar or identical semantic content due to the copying from the L1 translation (Jiang, 2002, pp. 620-621). In the present study, a correlation from background variables was tested against an increase in the ratings. As opposed to a production task, Jiang's method should be well-suited for the test so that additional attention to meaning can be avoided. This is required since L2 users of a language often vary in the accuracy of their production depending on attention, which is due to the differences in automatic production and metalinguistic knowledge of the language. The resulting language can be a result of automatic, natural production of the language, or what Krashen (1983, as cited in Jiang, 2002, p.

634) called "pseudo-acquisition," where learned information outside natural language use aid the user in producing a correct answer in some situations (Jiang, 2002, pp. 633-634), for example those where the language learner uses the explicit knowledge of the target language.

An eight-point scale was chosen over Jiang's five-point scale to allow for more variation in the evaluations. Using a scale where there is no middle value should, in a way, require the participant to consider every item instead of just choosing the middle value. A ten-point scale was avoided due to the Finnish primary school grading system that uses a ten-point scale with the middle grade being 7.5, which might cause an negative skew on the participants' evaluations on a ten-point scale. As can be seen in Figure 7 below, the participants were asked to evaluate the similarity from "Not at all similar" to "Very similar."

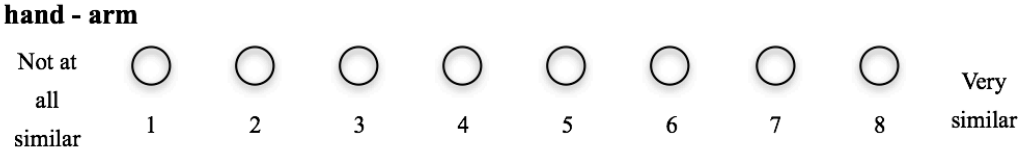


Figure 7. The word pair similarity perception task with 'hand' – 'arm.' The task is to evaluate how alike these two words are in meaning in an eight-point scale, ranging from 1 ("Not at all similar") to 8 ("Very similar").

Since the experiment was of a 'paper and pen' format, complete randomization of the order of the items was not feasible. Randomization, however, is necessary to minimize test fatigue artifacts, learning effects, and priming from previous items. For this reason four different answer sheets were created. Two sets of random orders for the 45 items were produced, completed by their opposite order to create a total of four versions of the answer sheet. The answer sheets contained five pages with nine items on each page. Each word pair was presented as a self-containing unit with the word pair, scale descriptors, and a numbered eight-point scale.

4.3.2 Stimuli

All the items in the word pair similarity perception task consisted of nouns. Due to the different grammatical structures across Finnish, Swedish, and English, function words were ruled out. Out of content words, nouns were chosen because of their more concrete nature and because verbs in Finnish are often coined from nominal and verbal bases with derivational suffixes. Thus, the use of nouns rendered the languages more comparable for this study. There are three experimental conditions which are presented in Figure 8: one condition in which there is a single translation

equivalent in Finnish, one with the same in Swedish, and one in which there is a single translation equivalent in both source languages.

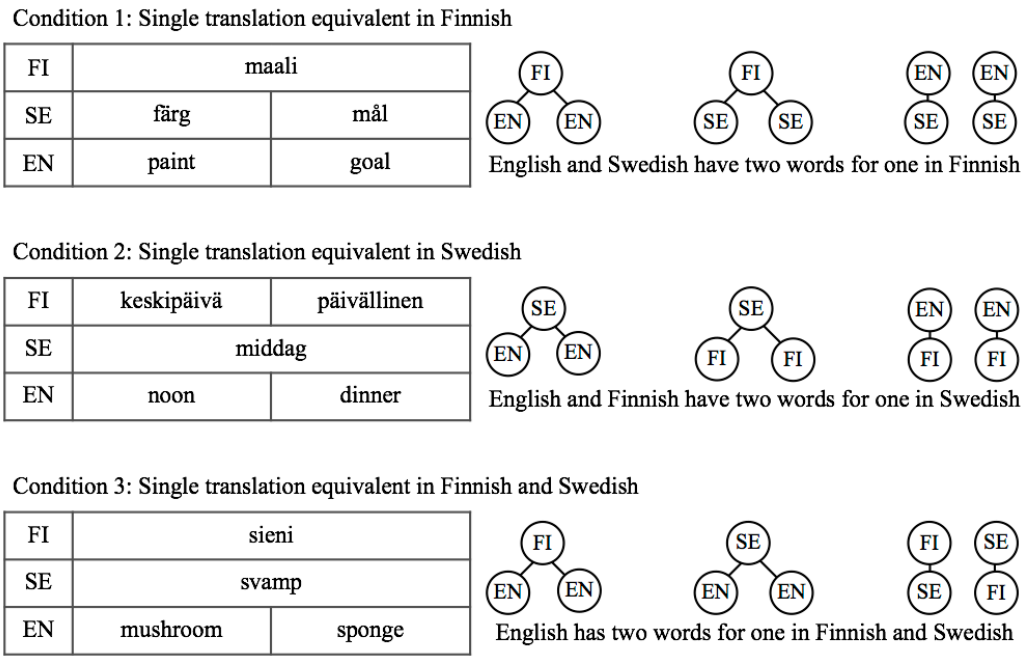


Figure 8. Items in the similarity perception task. Condition 1, with a single word in Finnish having two translation options in Swedish and English; Condition 2, with a single word in Swedish having two translation options in Finnish and in English; and Condition 3, with a single word in Finnish and Swedish having two translation options in English.

For the native Finnish speakers, the situation is either that they have items where a single translation equivalent exists for Finnish or it does not. Items in conditions 1 (Finnish) and 2 (Swedish) will provide these situations. For the native Swedish speakers the opposite applies, but for the bilingual speakers the items in conditions 1 and 2 are essentially the same, except that they provide information on whether they are more likely to transfer from Finnish or Swedish. Henceforth, condition 1 with single translation equivalent in Finnish will be referred to as the Finnish condition and condition 2 with single translation equivalent in Swedish as the Swedish condition.

The stimuli items were created through a process in which frequent nouns were translated[39] to Finnish and Swedish and then back-translated to English noting all possible translations. All the back-translations needed to be nouns, and not formally similar between any language pairs. All potential items were translated to, and analyzed through, all potential directions between the three languages, including secondary translations from the primary translations to the third language. The translations were then compared to make sure that the same semantic similarity would not exist in the other source language. Formal similarity between all three languages was also controlled for.

The word pairs in the three conditions were also controlled for frequency so that the pairs would be comparable. Raw frequencies in the Corpus of Contemporary American English from Davies & Gardner (2010) were used for this purpose.

To ensure that the stimuli would be comparable between the Finnish and Swedish stimuli, native English speakers (n=11) evaluated the potential word pairs for semantic likeness. The participants were advised not to participate if they had any knowledge in Finnish and/or Swedish, or closely related languages. Furthermore, since the word pairs were originally crafted through translations, it was not certain that the expected translation equivalents would be activated in the participants' processing of the stimuli. To test this, the individual words in the potential word pairs were piloted by Finnish (n=27) speakers with no other mother tongue, and with no knowledge of Swedish or related languages beyond what is compulsory in Finland, and Swedish (n=18) speakers with no other mother tongue, and with no knowledge of Finnish or related languages beyond what is normal in Sweden. The participants for both item piloting tasks were recruited via Facebook through snowball sampling. The tasks were designed to be taken online, with SurveyGizmo used as a platform (Widgix, 2015). The order of the translation items and items in the rating tasks were randomized.

Ideally, it would have been optimal for the word pairs to have been comparable across all the three conditions, but condition 3 items had a strong tendency to be evaluated more alike in meaning by the English control group. This tendency is, however, expected since items that share a single translation equivalent in both Finnish and Swedish for the two words in English tended to be of more close synonymous meaning than items in the first two conditions. Since condition 3 items act as fillers, this is not an issue.

Finally, 15 word pairs were chosen for each condition based on the raw frequencies (matched between conditions 1 and 2), formal similarity,[40] native English speaker evaluations (matched between conditions 1 and 2), and the activation piloting task (the majority of the participants in the piloting task should have named the sought-after translation for both words). The final list of experimental items are available in the Appendix (A).

4.3.3 Background Questionnaire

Information for language usage dominance was collected with a background questionnaire, which was designed to 1) identify participants that should not belong to the sample set, 2) collect details on basic background variables, 3) collect data on usage settings and practices, and 4) measure attitude and aptitude towards language learning and the three languages in question.

The questionnaire[41] was designed so that it would not take longer than 10 minutes to complete. By default, the questions were organized such that the questionnaire would start with simple background questions that would give the participant a feeling that the filling would go swiftly. After that, variation in the question types was used to keep the participants interested. Several questions were designed so that the following numeric scores could be derived from them: language dominance score, use domain score, and a psychotypological difference score for Finnish and Swedish. Language knowledge was evaluated for four distinct skills of language use: speaking, writing, reading, and listening.

With the aforementioned variation in the bilinguals' mode of language activation, and to avoid biasing the participants toward either Finnish or Swedish, the background questionnaire was in English. This obviously added constraints to the language of the questions, which would have to be comprehensible to the participants. The participants were allowed to answer in the language of their choice, although answering in English was encouraged. To avoid bias, placement of Finnish and Swedish, (where mentioned or compared) was swapped so that approximately half of the participants received a questionnaire where Finnish was mentioned first and vice versa. Also, the order of the answer options in the variations of the background questionnaires was reversed.

The questionnaire was piloted by volunteers either 16 or 17 years of age (n=5) recruited by dormitory staff at a vocational training college in Finland. The students were asked to complete the background questionnaire and then comment on questions they had difficulty understanding. The participants faced some difficulties in understanding two of the questions. Based on feedback received, these questions were adjusted, and additional instructions were provided in the final version. The background questionnaire is available in Appendix (C).

4.3.4 Procedure

The data for the main experiment was collected at junior high schools. All participants took part in the study in a classroom environment, and with the exception of three participants[42] in the Swedish participant group, the participants took part in the study during classroom hours. The procedure of the data collection was the same in all cases and the experiment leader was the same for all participants. Furthermore, the same script (E in the Appendix) of information about the study was used. In the classroom the participants were first given information about the parts of the study and then given an example of the types of item pairs they would face in the experiment.

Both the background survey (C in the Appendix) and the experiment sheet (B in the Appendix) with the item pair evaluations were handed to the participants at the same time, connected to each other with a paper clip and separated by an instruction sheet (D in the Appendix)

for the item pair evaluations. All these materials were in English, which was deemed preferable due to the potential case of the language in the materials to affect the source of the cross-linguistic influence in the case of the bilinguals. The participants filled out the background questionnaire first. This was deemed preferable so that the participants' perceived performance in the experiment would not affect their answers on the background questionnaire. After the experiment the participants were offered a chance to hear more on the experiment and its purposes.

4.4 Data Analysis

The data from the answer sheets were digitized into a spreadsheet that included each participant's answers from both the background questionnaire and the similarity perception task. Answers from the open questions were coded with factors or numeric values depending on the type of question. The coding manual with grounds for exclusion is available in the Appendix (H). Those participants who had studied or lived abroad for an extended amount of time, and who had another mother tongue than a Scandinavian language or Finnish were excluded from the data set. The statistical analysis was performed in R (R Core Team, 2014).[43]

Chapter 5

Results

5.1 Outline

The purpose of this study and its experiment was to look at the variables that would affect the bilinguals' extent of conceptual cross-linguistic influence from the two source languages to the target language. The original study design was built on the premise that the two comparison groups, the Finnish and the Swedish participant groups, could be used as baseline conditions for the bilingual participant group by deducting the scores from the scores of the other one for the Finnish and the Swedish condition, respectively.

The results section first presents statistics describing the participant groups in terms of attitude, aptitude, language proficiency, and language use. Then, it presents the baseline conditions from the Finnish and Swedish participant groups. Next, it explores the effects of background variables on the results on the Swedish condition. Finally, the results of the functionally bilingual participants on the Finnish condition are presented with a focus on proficiency and usage variables, and psychotypology.

5.2 Participant Groups

5.2.1 Attitude and Aptitude

The participants were asked about their attitude towards learning languages and their own evaluation of whether they are good at learning languages or not. In all three participant groups, the participants were more likely to like learning languages, than to assess themselves as skilled at learning languages.

There are no major differences between the three participant groups in relation to attitude toward language learning: 82 percent of the Swedish participants, 86 percent of the Finnish participants, and 85 percent of the functional bilingual participants reported that they like learning languages. The Finnish group, however, differs from the two other groups in perceived aptitude: 75 percent of the Swedish participants assessed that they are good at learning languages, 52 percent of the Finnish participants assessed that they are good at learning languages, and 72 percent of the bilingual participants assessed that they are good at learning languages.

5.2.2 Proficiency and Language Use

The participants self-evaluated their language skills on an eight-point scale in four major areas – reading, writing, speaking, and listening – in Finnish, Swedish and English. Figure 9 shows the mean scores in the four areas for Finnish for the three groups, with no skills for the Swedish participants – which (considering that the Swedish group does not study Finnish) is expected.

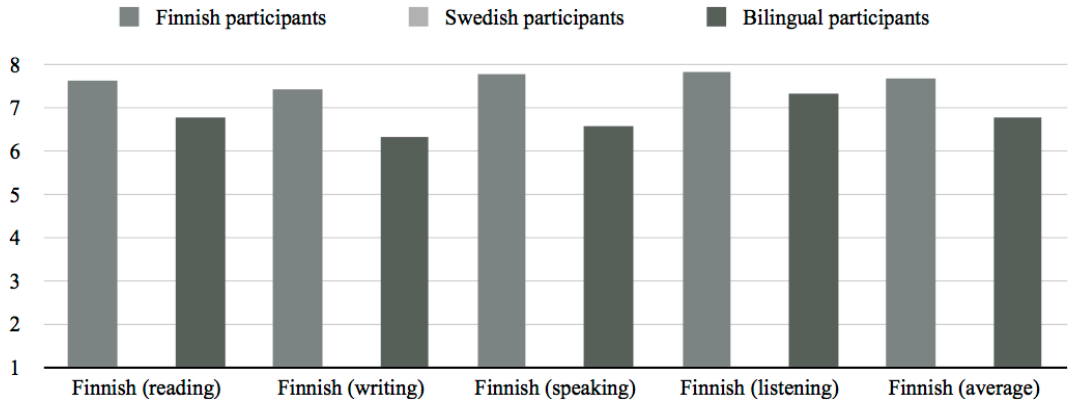


Figure 9. Self-rated knowledge in Finnish. The Swedish participants (in the middle in light grey) have no skills in Finnish, and thus the Swedish bars are not visible. The average in the last column is computed from the evaluations in the four distinct areas.

The mean scores in the Finnish group for Finnish are 7.67 (range: 7-8, *SD*=0.46), 7.42 (range: 6-8, *SD*=0.59), 7.74 (range: 7-8, *SD*=0.44), and 7.84 (range: 7-8, *SD*=0.36) for reading, writing, speaking, and listening, respectively, with the mean score across all four skills being 7.66 (range: 6.75-8, *SD*=0.41). There is little variation; the answers range from 6 to 8, with writing as the lowest reported evaluation. The mean (self-rated) skills in the functional bilingual group for Finnish are 6.76 (range: 2-8, *SD*=1.61), 6.34 (range: 1-8, *SD*=1.95), 6.56 (range: 1-8, *SD*=2.01), and 7.34 (range: 2-8, *SD*=1.20) respectively with the mean score across all four skills being 6.75 (range: 1.5-

8, *SD*=1.59). It is noteworthy that the answers for writing and speaking range from 1 to 8. The difference between the Finnish (*M*=7.67, *SD*=0.41) and the bilingual group (*M*=6.75, *SD*=1.59), is significant (*t*(49)=3.48, *p*=0.001 (two-tailed).

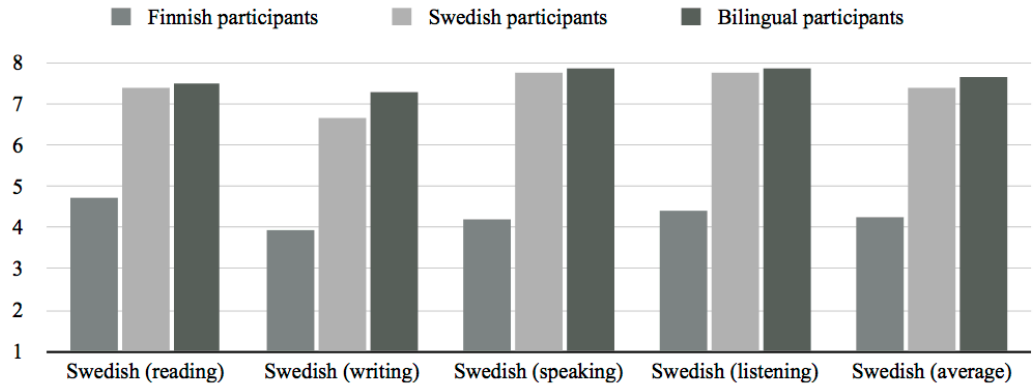


Figure 10. Self-rated knowledge in Swedish. The average in the last column is computed from the evaluations in the four distinct areas.

Figure 10 shows the mean scores in (self-evaluated) skills for Swedish for the three groups with the Finnish group having the lowest evaluations of the three groups for all four skills, which is expected considering that both the Swedish and the bilingual groups consist of mostly native speakers of Swedish. It is noteworthy, that in this respect, the situation for the two conditions, Finnish and Swedish, varies. As for the Finnish condition, the Swedish group has no skills in Finnish, while for the Swedish condition – the Finnish group has some skills in Swedish.

The mean scores in the Swedish group for Swedish are 7.37 (range: 4-8, *SD*=1.04), 6.65 (range: 4-8, *SD*=1.40), 7.77 (range: 6-8, *SD*=0.54), and 7.77 (range: 7-8, *SD*=0.42) for reading, writing, speaking, and listening, respectively, with the mean score across all four skills being 7.39 (range: 6-8, *SD*=0.67). The evaluations vary from 4 to 8, with lowest evaluations in reading and writing. The skills in the Finnish group for Swedish were self-evaluated on average at 4.63 (range: 2-7, *SD*=1.39), 3.89 (range: 1-7, *SD*=1.66), 4.22 (range: 2-7, *SD*=1.62), and 4.34 (range: 2-7, *SD*=1.38), respectively, with the mean across all skills being 4.27 (range: 2-6.75, *SD*=1.41). The evaluations vary from 1 to 7, with the lowest skills reported in writing and the highest in reading. The skills for Swedish by the bilingual group are evaluated at 7.51 (range: 4-8, *SD*=0.89), 7.27 (range: 5-8, *SD*=0.86), 7.85 (range: 7-8, *SD*=0.35), and 7.88 (range: 6-8, *SD*=0.45), with the mean across skills being 7.63 (range: 6.25-8, *SD*=0.48). While the mean scores are somewhat higher for

Swedish than Finnish, what should be noted is that there is much less variation: the answers range from 4 to 8, with the lowest individual self-rating being for reading (4) and the highest individual self-rating in terms of the lowest reported value being for speaking, where no participant rated their skills at lower than 7 out of 8. A one-way, between subjects, ANOVA was conducted to compare Swedish skills between the three participant groups. There was a significant difference at the p=<.05 level for the three conditions [F(2, 75)=99.52, p=<0.01]. Post hoc comparisons using the Tukey HSD test indicated that the Swedish (M=7.39, SD=0.67) and the Finland-Swedish groups (M=7.63, SD=0.48) did not significantly differ from each other (p=0.63), while the Finnish group (M=4.22, SD=1.41) differed significantly from both the Finland-Swedish (p=<0.01) and the Swedish group (p=<0.01).

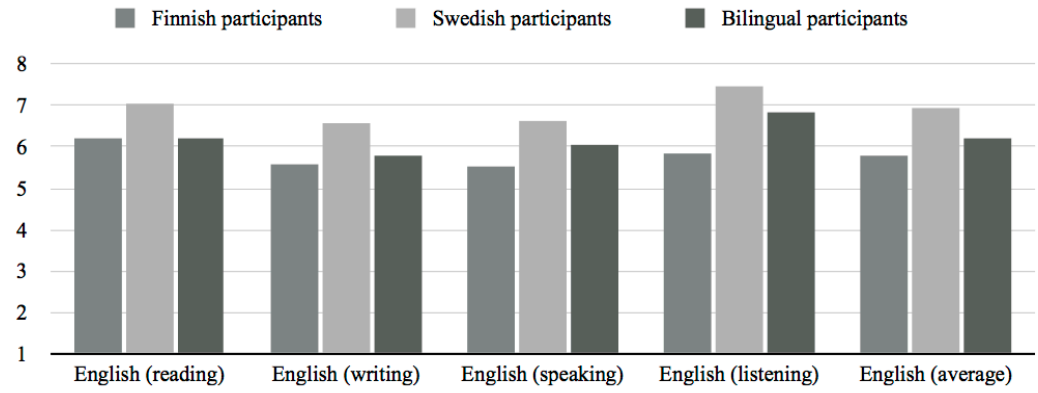


Figure 11. Self-rated knowledge in English. The average in the last column is computed from the evaluations in the four distinct areas.

Figure 10 shows the mean scores in the four areas for English for the three groups with all three groups having evaluated their skills quite comparably. The Swedish group self-evaluates their English skills the highest across the line.

The English skills in the Swedish group are rated on average to 7.06 (range: 6-8, SD=0.82), 6.55 (range: 4-8, SD=1.36), 6.63 (range: 4-8, SD=1.26), and 7.45 (range: 6-8, SD=0.78) for reading, writing, speaking, and listening, respectively, with the mean score across all four skills being 6.92 (range: 5.25-8, SD=0.79). The self-evaluation in the Finnish group for skills in English are higher on average than those for skills in Swedish: the mean scores for the four areas are 6.26 (range: 3-8, SD=1.25), 5.53 (range: 2-8, SD=1.54), 5.56 (range: 2-7, SD=1.54), and 6.00 (range: 3-8, SD=1.34) for reading, writing, speaking, and listening, respectively. The mean across all areas is 5.85 (range: 2.75-7.75, SD=1.32). The lowest mean scores for all three languages is in speaking, and the highest

is in reading. The self-evaluations in the bilingual group for skills in English are lower on average than those for skills in Finnish and Swedish, although there is also less variation for English than Finnish: the mean scores for the four areas are 6.22 (range: 4-8, *SD*=1.20), 5.81 (range: 3-8, *SD*=1.33), 6.07 (range: 3-8, *SD*=1.13), and 6.83 (range: 4-8, *SD*=1.03). The average across all areas is 6.23 (range: 4-8, *SD*=0.99). A one-way, between subjects, ANOVA was conducted to compare English skills between the three participant groups. There was a significant difference at the $p=<.05$ level for the three conditions [$F(2, 74)=4.14$, $p=0.02$]. Post hoc comparisons using the Tukey HSD test indicated that the Swedish (*M*=6.92, *SD*=0.79) and the Finland-Swedish groups (*M*=6.23, *SD*=0.99) marginally differ from each other ($p=0.08$), while the Finnish group (*M*=5.85, *SD*=1.32) differed significantly from the Swedish group ($p=0.02$) but not the Finland-Swedish group ($p=0.51$). The lowest mean scores for all three languages are in writing, and the highest in listening. Across the line, the skills in English reported by the Finnish-speaking participants are lower than those reported by the Finland-Swedish participants, but while the Swedish students rated the lowest mean score for writing and the highest for listening, the Finnish students rated the lowest for speaking and the highest for reading. Thus, both groups rated their skills lower for production than comprehension, but for different mediums of communication.

The bilingual participants were also asked to rate the division of their time speaking Finnish and Swedish during the day. Division of time spent (scale 1-7, with only Swedish being 1 and only Finnish being 7), was reported to 3 (*SD*=1.13) on average, with answers ranging from 1 to 5. This result was expected, since the medium of instruction is Swedish. In order to find out whether the participants resorted to Finnish or Swedish when they could not recall a word in English, they were given two statements with an eight-point scale: one for using (i.e. thinking about a word in the given language) Finnish and one for using Swedish. The mean rating for Finnish was 3.71 (range: 1-8, *SD*=2.09) and, for Swedish, 6.37 (range: 3-8, *SD*=1.53). A higher rating means a higher (self-rated) likelihood of using the given language.

5.3 Baseline Conditions

5.3.1 Comparison Groups

The Finnish and the Swedish conditions, as evaluated by the Finnish and the Swedish participant groups, form the baseline conditions in the original experiment. The results for the two conditions are presented below, with the Finnish condition established first, followed by the Swedish condition.

5.3.2 The Finnish Condition

The purpose of the Finnish condition was to establish the baseline condition for cross-linguistic influence from Finnish towards English. The items in the condition represent word pairs in English that have a single translation equivalent in Finnish. These word pairs are hypothesized to be evaluated to be more alike in meaning to the Finnish participants than to the Swedish participants since the two words have separate translation equivalents in Swedish.

Table 4

Results from the word pair similarity perception tasks for the Finnish condition

Item	*English*	*Finnish*	*Swedish*	*Difference (Finnish - Swedish)*
2 air - weather	4.91	5.42	4.11	1.31
4 arm - hand	5.19	6.63	4.88	1.75
10 flag - ticket	1.91	4.89	2.18	2.71
13 goal - paint	1.19	2.56	1.67	0.89
18 language - tongue	5.46	5.05	4.12	0.94
19 leg - foot	4.09	6.78	4.39	2.39
21 manner - habit	4.27	5.00	3.19	1.81
23 member - limb	4.74	3.40	2.44	0.96
25 part - role	7.27	5.29	5.06	0.24
26 payment - fee	6.64	4.27	4.28	-0.01
28 power - current	6.18	2.88	2.24	0.64
38 supplier - reporter	2.82	3.67	3.00	0.67
40 trade - shop	4.27	3.72	4.94	-1.22
41 voice - sound	5.18	6.68	5.50	1.18
45 wheel - bike	4.55	5.22	4.82	0.40
Finnish condition (Total mean)	**4.65**	**4.83**	**3.79**	**1.03**

Note. The first column has the word pair, the second the mean rating by native English speakers in the pilot (see 4.3.2), the third the mean rating by participants with only Finnish as their mother tongue, and the fourth by the participants with only Swedish as their mother tongue. The final column shows the difference in the mean ratings by the two aforementioned groups, with the Swedish rating deducted from the Finnish rating.

As we can see in Table 4, all but two of the items in the item set with a single translation equivalent for the two English words in Finnish result in a higher similarity rating by the Finnish-speaking participants. One of the two items that did not have an expected result has a near equivalent rating by both participant groups, whereas one of them was rated higher by the Swedish-speaking participant group. On average, the Finnish participants rated the word pairs with a single translation equivalent in Finnish 1.03 points higher than the Swedish participant group.

The 1.03 point difference in the evaluations for the Finnish condition between the Finnish (M=4.83, SD=1.98) and the Swedish groups (M=3.8, SD=2.15), is significant (t(25)=3.55, p=0.02 (two- tailed)) with per-participant, per-condition means across the 15 items.

5.3.3 The Swedish Condition

The purpose of the Swedish condition was to establish the baseline condition for cross-linguistic influence from Swedish towards English. The items in the condition represent word pairs in English that have a single translation equivalent in Swedish. These word pairs are expected be evaluated to be more alike in meaning by the Swedish participants than the Finnish participants since the two words have separate translation equivalents in Finnish.

As we can see in Table 5, ten of the items in the item set with a single translation equivalent for the two English words in Swedish result in a higher similarity rating by the Swedish-speaking participants, while five of the items result in a higher similarity rating by the Finnish participants. On average, the Swedish participants rated the word pairs with a single translation equivalent in Swedish 0.03 points higher than the Finnish participant group.

Table 5

Results from the word pair similarity perception tasks for the Swedish condition

Item	***English***	***Finnish***	***Swedish***	***Difference (Swedish - Finnish)***
1 action - act	6.91	4.72	5.12	0.40
5 choice - election	5.91	3.67	4.53	0.86
7 color - paint	4.73	5.89	6.11	0.22
8 degree - extent	6.73	3.75	3.94	0.19
9 disc - slice	2.73	3.95	3.00	-0.95
17 jump - hope	1.64	1.58	1.94	0.36
20 leg - bone	3.73	4.47	4.65	0.18
22 medicine - medication	7.73	5.56	6.44	0.89
24 noon - dinner	2.36	4.47	2.94	-1.53
27 plant - growth	4.55	4.38	4.67	0.29
30 price - award	2.55	5.59	5.28	-0.31
34 sea - lake	5.19	4.63	5.67	1.04
36 subject - substance	3.00	3.50	2.88	-0.62
39 surface - area	6.09	4.94	5.22	0.28
44 way - road	5.55	5.95	4.82	-1.12
Swedish condition (Total mean)	**4.64**	**4.48**	**4.51**	**0.03**

Note. The first column shows the word pair, the second the mean rating by native English speakers in the pilot, the third the mean rating by participants with only Finnish as their mother tongue, and the fourth by the participants with only Swedish as their mother tongue. The final column shows the difference in the mean ratings by the two aforementioned groups, with the Finnish rating deducted from the Swedish rating.

The 0.03 point difference in the evaluations for the Swedish condition between the Finnish- (M=4.48, SD=1.84) and the Swedish groups (M=4.51, SD=2.27), is not significant (t(28)=-0.25, p=0.80 (two- tailed)) with per-participant, per-condition means across the 15 items.

The assumption was that the Finnish and the Swedish groups could be used to establish the baseline condition for both languages. However, this seems to not be the case. The ratings in the

Finnish condition were possible to use this way, with the two groups perfectly comparable with a binary division in terms of the Swedish group having no knowledge of Finnish and the Finnish group consisting exclusively of native speakers of Finnish. The two groups, however, do not have such strong contrast regarding their skills in Swedish. While the participants in the Finnish group have had more instruction in English than in Swedish, report their skills higher in English than in Swedish, and their age of onset for English is lower, cross-linguistic influence at the conceptual level seems to be taking place between Swedish and English. For this reason, the scores from the Swedish condition will be further explored in order to try to establish whether the Finnish participants with some knowledge in Swedish are guided in their cross-linguistic influence from Swedish to English based on a particular background variable.

5.4 Exploring Cross-Linguistic Influence Beyond the First Language

5.4.1 Items

The results for the Swedish condition (see 5.3.3) were unfit to be used as a baseline for the analysis with the bilinguals. It seems that there is some degree of conceptual cross-linguistic influence taking place from Swedish to English with the Finnish participants. It is possible that some items are more prone to cross-linguistic influence from Swedish to English due to such factors as frequency. If the items are separated – into one group containing the items that were rated higher by the Finnish participants (Table 6) and another group containing the items that were rated higher by the Swedish participants (Table 7) – the two groups can be compared for those items as a set. The evaluations for the items in the two artificially created groups of items where the Finnish participants rated the items in the Swedish condition lower and higher than the Swedish participants seem consistent. We can see from the aforementioned tables that on average, the mean frequencies for the items that the Finnish speakers evaluated higher than the Swedish speakers (Table 6) are on average higher, but they are inflated by the extremely high frequency of the word “way.” However, as we can see in Figure 12, it seems that there is no linear relationship between raw frequency and the difference between the two participant groups.

Table 6

Swedish condition: items with ratings by the Finnish participants higher than those by the Swedish participants

Item	*Finnish Group*	*Swedish Group*	*Difference in ratings*	*RF1*	*RF2*	*Average RF*
9 disc - slice	3.95	3.00	-0.95	7589	8253	7921
24 noon - dinner	4.47	2.94	-1.53	6648	34252	20450
30 price - award	5.59	5.28	-0.31	77951	21634	49793
36 subject - substance	3.50	2.88	-0.62	58051	13828	35940
44 way - road	5.95	4.82	-1.12	433369	74410	253890
Swedish condition	**4.71**	**3.80**	**−0.91**	**116721**	**30475**	**73598**

Note. The difference is calculated by deducting the mean ratings by Finnish speakers from those by the Swedish speakers. RF1 refers to the raw frequency in the Corpus of Contemporary American English for the first word and RF2 for the second word. AVG RF is the average for the two raw frequencies.

Table 7

Swedish condition: items with ratings by the Swedish participants higher than those by the Finnish participants

Item	*Finnish Group*	*Swedish Group*	*Difference in ratings*	*RF1*	*RF2*	*Average RF*
1 action - act	4.72	5.12	0.40	74890	50907	62899
5 choice - election	3.67	4.53	0.86	55581	46982	51282
7 color - paint	5.89	6.11	0.22	88116	11730	49923
8 degree - extent	3.75	3.94	0.19	46923	20356	33640
17 jump - hope	1.58	1.94	0.36	5554	30012	17783
20 leg - bone	4.47	4.65	0.18	43576	24411	33994
22 medicine - medication	5.56	6.44	0.89	23798	9017	16407
27 plant - growth	4.38	4.67	0.29	58750	47841	53296
34 sea - lake	4.63	5.67	1.04	36577	35614	36096
39 surface - area	4.94	5.22	0.28	36864	154416	95640
Swedish condition	**4.37**	**4.85**	**0.48**	**47063**	**43129**	**45096**

Note. The difference is calculated by deducting the mean ratings by Finnish speakers from those by the Swedish speakers. RF1 refers to the raw frequency in the Corpus of Contemporary American English for the first word and RF2 for the second word. Average RF is the average for the two raw frequencies.

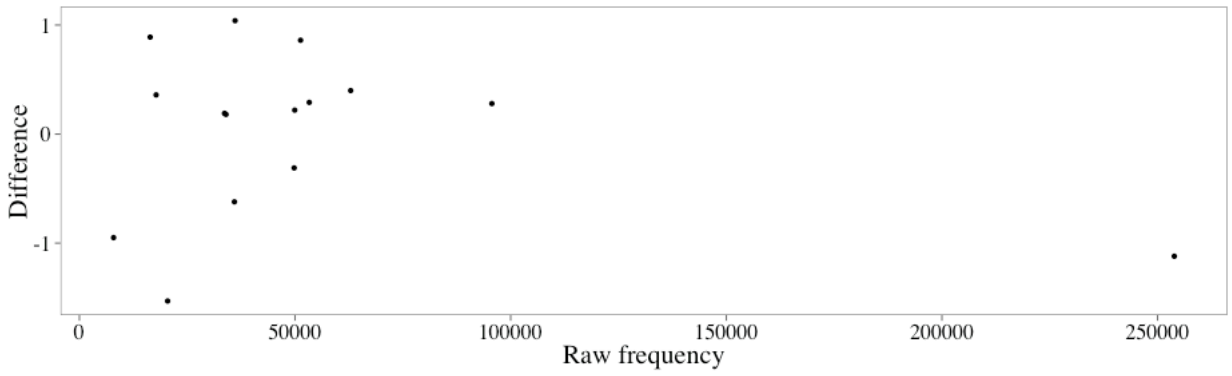


Figure 12. The relationship between raw frequency in the Corpus of Contemporary American English plotted with the difference between the average evaluations between the two participant groups, with the mean ratings of the Finnish participants deducted from the mean ratings by the Swedish participant (r=-0.28, p=0.31).

Extracting those items from the Swedish condition that elicited a higher rating by the Swedish participants to be used as a baseline for the purposes of inferential statistics with the bilingual participant group is problematic due to matching. Since the items in the Finnish and Swedish condition were matched for raw frequency, native speaker ratings in the piloting, and activation percentage by the Finnish and Swedish participants in the activation piloting, removing items from the Swedish condition set would render it non-comparable with the Finnish condition (see 4.3.2).

5.4.2 Exploring Proficiency and Usage Variables

Since the baseline condition cannot be established by splitting the items, one option is to try to establish whether a certain group of the Finnish participants is more prone to cross-linguistic influence from Swedish to English. In the correlation matrix (Table 8) we can note that the mothers' skills in Swedish seem to correlate with the child's skills in Swedish, but there is no significant correlation between the ratings and the background variables for the Finnish participants on cross-linguistic influence from Swedish to English. The four skills in Swedish in the self-evaluations correlate with each other.

Table 8

Correlation matrix with Finnish participants for the Swedish condition together with background variables

	Rating	Activation	Psycho-typology	Swedish (father)	Swedish (mother)	Swedish (speaking)	Swedish (listening)	Swedish (writing)	Swedish (reading)	Swedish (average)
Rating										
Activation	-0.06									
Psycho-typology	-0.22	0.26								
Swedish (father)	0.43	-0.32	-0.32							
Swedish (mother)	-0.16	-0.25	-0.36	0.37						
Swedish (speaking)	-0.07	-0.12	-0.16	0.33	0.77***					
Swedish (listening)	0.00	0.09	-0.08	0.43	0.67**	0.87***				
Swedish (writing)	-0.01	-0.16	-0.22	0.51	0.78***	0.92***	0.86***			
Swedish (reading)	-0.34	-0.16	-0.17	0.38	0.70**	0.78***	0.73**	0.90***		
Swedish (average)	-0.11	-0.10	-0.17	0.44	0.78***	0.96***	0.91***	0.98***	0.91***	
Swedish (onset)	-0.38	-0.34	0.32	0.25	0.08	-0.09	-0.08	0.06	0.26	0.04

Significance values: *** $p = < .001$, ** $p = < .01$, * $p = < .05$

Note. Higher ratings, visible in positive correlation, represent increased cross-linguistic influence from Swedish, and lower ratings, visible in negative correlation, represent decreased cross-linguistic influence from Swedish.

One possibility that could explain the cross-linguistic influence from Swedish to English amongst the Finnish participant group is that when acquiring the two languages at school, the Finnish participants would somehow acquire vocabulary in such a way that they would build on the non-mother language beyond the mother tongue when in doubt of the meaning of the new word or when unable to recall a word in the target language. The is no correlation between increasing ratings in the Swedish condition and the self-reports on the language the participants think about when they cannot remember a word in the target language (r=-0.06, p=0.82).

5.4.3 Exploring Psychotypology

Another background variable that could potentially predict the amount of conceptual cross-linguistic influence from Swedish to English is psychotypology. In that case, higher evaluated similarity between Swedish and English should result in an increased amount of cross-linguistic influence from Swedish to English. The correlation, however, is not significant (r=-0.22, p=0.43).

The Finnish group and the Swedish condition were designed to be a baseline condition established by a homogenous group and the sample size is not particularly suited to inferential analysis on background variables. This constraint might lead to some effects not being visible, even if they could explain some of the cross-linguistic influence from Swedish to English.

5.5 Functionally Bilingual Participants

5.5.1 Ratings

The study with the bilinguals is based on the assumption that both languages of the bilinguals, with varying usage patterns and skills in the two languages, result in varying amount of cross-linguistic influence from the two source languages towards English, the target language. Additionally, psychotypology between the three languages is expected to have an influence. Since the cross-linguistic influence with the items has been established for the Finnish condition by the Finnish- and Swedish-speaking group, the bilingual group is analyzed by the amount of cross-linguistic influence from Finnish to English as the dependent variable. As we can see in Table 9, all but three of the items in the set with a single translation equivalent for the two English words in Finnish result in a higher similarity rating by the bilingual participants when compared to the Swedish participants in the Finnish condition who have no Finnish skills. On average, the bilingual participants rated the word pairs with a single translation equivalent in Finnish 0.66-points higher than the Swedish participant group.

Table 9

Ratings by the Swedish and bilingual participant groups for the Finnish condition

Item	***English (pilot)***	***Swedish Group***	***Bilingual Group***	***Difference (Bilinguals-Swedish)***
2 air - weather	4.91	4.11	4.56	0.45
4 arm - hand	5.19	4.88	5.78	0.90
10 flag - ticket	1.91	2.18	3.54	1.36
13 goal - paint	1.19	1.67	2.02	0.35
18 language - tongue	5.46	4.12	4.76	0.64
19 leg - foot	4.09	4.39	5.46	1.07
21 manner - habit	4.27	3.19	4.69	1.50
23 member - limb	4.74	2.44	3.54	1.10
25 part - role	7.27	5.06	5.83	0.77
26 payment - fee	6.64	4.28	3.95	-0.33
28 power - current	6.18	2.24	3.03	0.79
38 supplier - reporter	2.82	3.00	3.10	0.10
40 trade - shop	4.27	4.94	4.20	-0.74
41 voice - sound	5.18	5.50	6.66	1.16
45 wheel - bike	4.55	4.82	4.05	-0.77
Finnish condition	**4.65**	**3.79**	**4.34**	**0.66**

Note. The first column contains the word pair, the second the mean rating by native English speakers in the pilot, the third the mean rating by participants with only Swedish as their mother tongue, the fourth by the participants with bilingual competence in both Finnish and Swedish. The final column shows the difference in the mean ratings by the two aforementioned groups, with the Swedish rating deducted from the bilingual rating.

Table 10

Correlation matrix with bilingual participants for the Finnish condition together with background variables

	Rating	Activation	Psycho-typology	Swedish (father)	Finnish (mother)	Swedish (mother)	Finnish (mother)	Swedish (average)	Finnish (average)	Division of time
Rating										
Activation	-0.35*									
Psycho-typology	-0.33*	0.32								
Swedish (father)	-0.06	-0.20	-0.19							
Finnish (father)	-0.08	-0.12	0.21	-0.29						
Swedish (mother)	-0.16	-0.18	-0.07	-0.19	0.06					
Finnish (mother)	0.33*	-0.34*	0.02	-0.06	0.05	-0.39*				
Swedish (average)	-0.26	-0.38*	-0.09	0.09	-0.02	0.39*	-0.05			
Finnish (average)	0.11	0.29	0.44**	-0.27	0.01	-0.32	0.46**	-0.01		
Division of time	0.18	0.24	0.40*	-0.43**	0.24	-0.49**	0.49**	-0.30	0.69***	
Usage comparison	0.07	0.23	0.23	-0.30	0.25	-0.56***	0.45**	-0.24	0.61***	0.76***

Significance values: *** $p = < .001$, ** $p = < .01$, * $p = < .05$

Note. Higher ratings, visible in positive correlation, represent increased cross-linguistic influence from Finnish and lower ratings, visible in negative correlation, represent decreased cross-linguistic influence from Finnish.

The correlation matrix (Table 10) shows that the three independent variables that seem to correlate with a larger amount of cross-linguistic influence from Finnish towards English are: the language in which the bilingual tends to think when they cannot recall the desired word in English, psychotypology via the perceived distance from Swedish being very similar to English in comparison to Finnish, and the participants' evaluation of the mother's Finnish skills.

5.5.2 Proficiency and Usage Variables

The Finland-Swedish participants who have functional bilingual competence in both Finnish and Swedish and who are learning English at school self-rated their skills in all three languages for reading, writing, speaking, and listening. Furthermore, they provided an estimation of the age of onset for all three languages. Both age of onset for Swedish and age of onset for Finnish have slight linear relationship with the ratings, with an earlier Finnish onset resulting in a larger amount of cross-linguistic influence from Finnish and an earlier Swedish onset resulting in a smaller amount of cross-linguistic influence from Finnish. Neither is significant with averages per participant, per condition. Finnish skills seem to correlate with usage of the languages (r=0.69, p=<0.01) while Swedish skills do not. This might be explainable with the language of instruction being Swedish, so all the participants should be more or less fluent in Swedish, with more variation in the use of Finnish. Too little variation exists in Swedish onset in the bilingual participants to evaluate the effect of Swedish onset on cross-linguistic influence from Finnish to English, and this lack of variation is visible in the distribution in Figure 13.

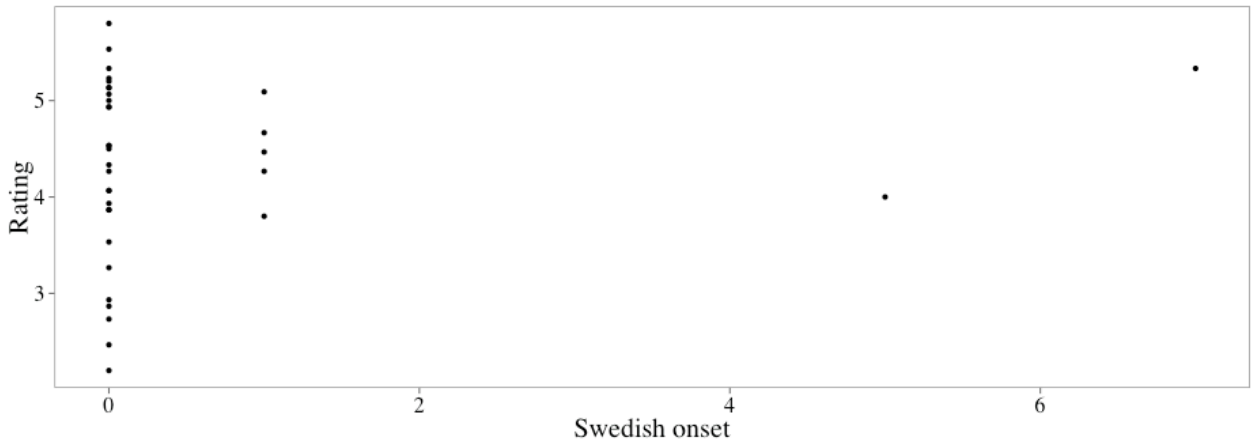
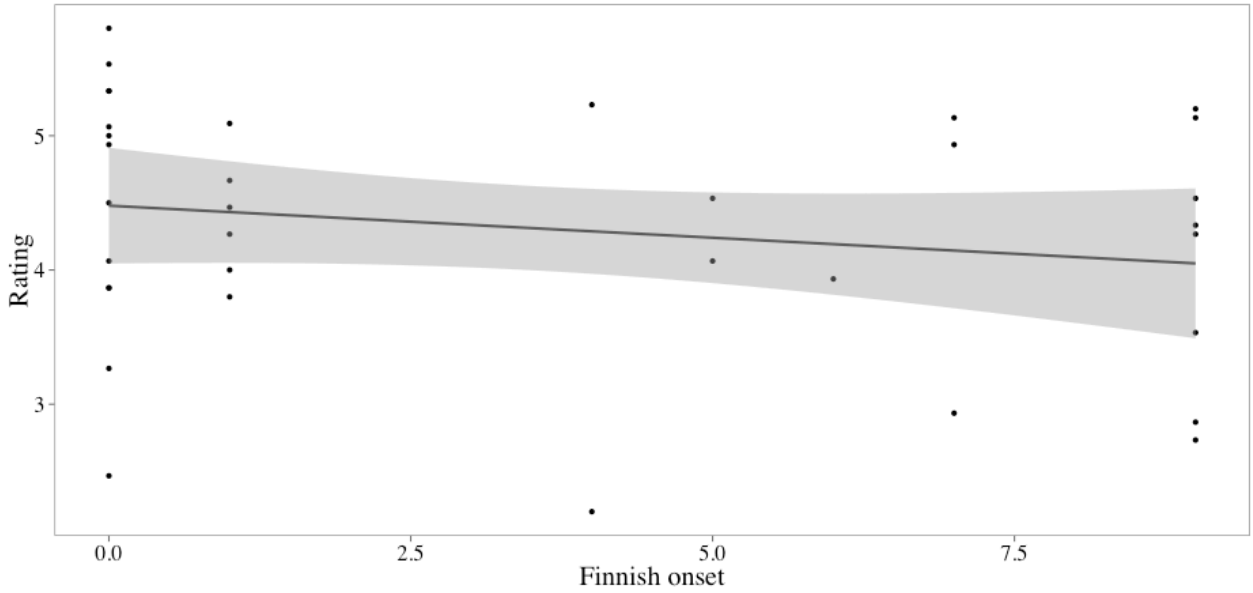


Figure 13. Age of onset for Swedish plotted as the independent variable with averages per participant per condition.

There is more variation in terms of the age of onset in Finnish amongst the bilingual participants, which allows for a better analysis of the effects of the age of onset on cross-linguistic influence. There is a slight linear relationship between Finnish onset and the amount of cross-linguistic influence from Finnish towards English with a 0.05-point increase per one year increase in the age of onset for Finnish which is not significant (p=0.26) when ratings are analyzed as means per condition per participant. The non-significance might be result of statistical power, since there is a 0.4-point decrease per one year increase in the age of onset for Finnish which is marginally significant (p=0.07) when each rating is analyzed independently. The linear least squares regression model with confidence intervals with per participant, per condition means is shown in Figure 14.



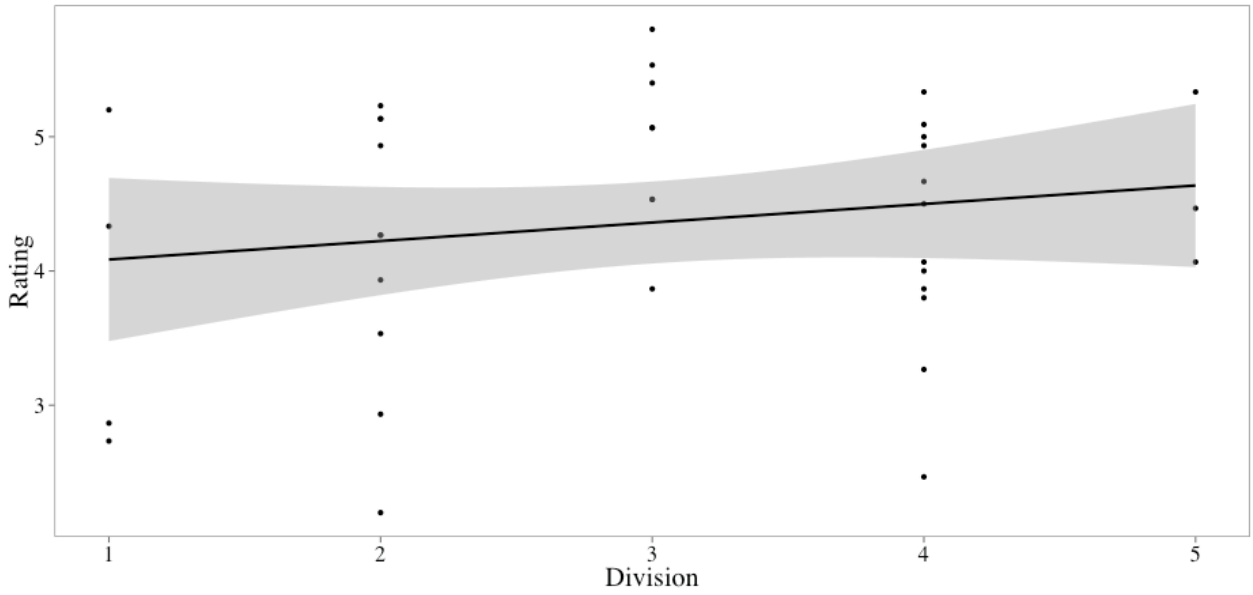
Residuals	-2.0879 (Min)	-0.5640 (1Q)	0.2176 (Mdn)	0.7242 (3Q)	1.3210 (Max)
Coefficients		Estimate	Std. Error	*t*-value	Pr(>|t|)
	Intercept	4.47897	0.21179	21.148	<2e-16
	Finnish onset	-0.04777	0.04133	-1.156	0.256

Residual error: 0.9119 (df=33) | r= 0.0389, r=0.009778(adjusted), F(1,33)=1.336, p=0.2561

Figure 14. Linear least squares regression model with confidence intervals.

Note. Age of onset for Finnish plotted as the independent variable with averages per participant per condition plotted in the x-axis. The dependent variable on the y-axis is the ratings by the bilingual participants on the Finnish condition, with higher rating representing a larger amount of cross-linguistic influence from Finnish towards English. The dots represent per condition averages per participant for the Finnish condition.

There is a linear relationship between the division of time (self-reported) spent speaking Finnish and Swedish during the day and the amount of cross-linguistic influence from Finnish towards English with a 0.14-point increase which is not significant (p=0.29) when each evaluation is analyzed as means per condition per participant. The non-significance might be a result of statistical power, since there is a 0.13-point increase per one point increase which is closer to significant (p=0.11) when each rating is analyzed independently (thus increasing statistical power). The linear least squares regression model with confidence intervals with the means per condition, per participant plotted together with the language used is presented in Figure 15.



Residuals	-2.0322 (Min)	-0.5700 (1Q)	0.1678 (Mdn)	0.7057 (3Q)	1.4390 (Max)
Coefficients		Estimate	Std. Error	*t*-value	Pr(>|t|)
	Intercept	3.9473	0.4161	9.488	3.3e-11
	Division	0.1379	0.1293	1.066	0.294

Residual error: 0.9144 (*df*=35) | r= 0.03146, r=0.003782(adjusted), $F(1,35)$=1.137, p=0.2937

Figure 15. Linear least squares regression model with confidence intervals.

Note. Self-report on the division of time between Finnish and Swedish plotted as an independent variable on the x-axis (scale 1 – 7, with 1 representing Swedish being solely used, 4 representing balanced use, and 7 representing Finnish being the sole language). The dependent variable on the y-axis is the ratings by the bilingual participants on the Finnish condition, with higher rating representing a larger amount of cross-linguistic influence from Finnish towards English. The dots represent per condition averages per participant for the Finnish condition by the bilingual participants.

5.5.3 Psychotypology

Psychotypology might be able to explain some of the cross-linguistic influence that such background factors as usage variables or proficiency cannot. The perceived distance of the source languages and the target language might guide the language learners in their choice of meaning to attach to newly acquired vocabulary in the target language. The perceived distance between Finnish, Swedish, and English correlates (r=-0.33, p=0.04) with the participants' cross-linguistic influence from Finnish to English. Furthermore, the correlation between whether the participant tends to think of a Finnish word or a Swedish word when language learner cannot remember a word in English and the amount of cross-linguistic influence from Finnish towards English is significant (r=-0.35, p=0.03).

5.6 Summary

The research questions for the present study were: 1) whether context and frequency of language usage of functional bilinguals explain similarities with monolinguals with regard to cross-linguistic influence in L3 and 2) whether language similarity or perceived language similarity affect the amount of cross-linguistic influence towards L3. The first research question cannot be fully answered (see 5.3.3 for further information), as the baseline with the Finnish and the Swedish groups could not be established for the Swedish condition. In terms of significantly correlating background variables, no particular explanation could be found for the behavior of the Finnish participants on the Swedish condition. For the Finnish condition alone, the results show a pattern – but not significant correlation – for the effect of context and frequency on cross-linguistic influence. Regarding the second research question, however, the results support the hypothesis of psychotypology guiding cross-linguistic influence in bilinguals.

Furthermore, assumptions were given for the research questions. The first assumption was that when learning an additional language beyond their mother tongue, learners transfer semantic information from their first language to the additional language they are acquiring. Results corroborate this assumption (see sections 6.1 and 6.2). The second assumption was that language-usage patterns and dominance might predict the extent of cross-linguistic influence from one of the source languages. The skills in Finnish were found to correlate significantly with the division of the usage of the two languages, while Swedish skills did not. For the bilingual participants, with regard to cross-linguistic influence from Finnish to English, the mother's language skills in Finnish,

psychotypology, and activation of Finnish have a significant correlation with the amount of cross-linguistic influence. Age of onset and division of time between the two languages did not, in isolation, significantly correlate with the amount of cross-linguistic influence from the source language (see sections 6.1 and 6.2). The third assumption was that psychotypological effects and perceived similarity might create influence that could not be explained through language dominance in an L1-transfer-based model. In line with the assumption, for the bilinguals, perceived similarity between the three languages in the present study correlated significantly with the amount of cross-linguistic influence from the source language (see Section 6.3).

Moreover, the results show that the vast majority of the participants in all three participant groups generally like learning languages, but that the Finnish group differs from the Finland-Swedish and the Swedish groups in terms of its participants' self-evaluations of their aptitude for language learning.

Chapter 6

Discussion

6.1 Experimental Design

The present study looked at cross-linguistic influence at the level of meaning under three different levels of analysis: the effect of the participant's mother tongue, the effect of another language that the participant is learning, and the effect of the two languages of a participant who is functionally bilingual, with a focus on variation on the background variables between the participants. Table 11 presents the various participant groups and conditions, with the associated levels of analysis.

Table 11

Participant groups and conditions, with the associated levels of analysis

Levels of Analysis	*Participant Groups*		*Condition*
1) Baseline	Finnish Swedish	Baseline Treatment	Condition 1: (Finnish) Single translation equivalent in Finnish
2) Two source languages	Swedish Finnish	Baseline Treatment	Condition 2: (Swedish) Single translation equivalent in Swedish
3) Two source languages	Swedish Bilinguals	Baseline Treatment	Condition 1: (Finnish) Single translation equivalent in Finnish

All three levels of analysis included two participant groups. In the first level of analysis, one group consisted of native speakers of Swedish with no skills in Finnish, and the other consisted of native speakers of Finnish – and both evaluated item pairs with a single translation equivalent in Finnish (see Figure 8 in 4.3.2). The current study's results have here replicated the findings of Jiang (2002), in which native speakers of the source language, Chinese, rated items with a single translation equivalent in the target language, English, as being more similar in meaning than those with no knowledge in the source language did.

In the second level of analysis, one group consisted of native speakers of Finnish with varying skills in Swedish, and the other consisted of native speakers of Swedish (with no skills in Finnish) – and both evaluated item pairs with a single translation equivalent in Swedish. The two groups performed inconsistently, and no significant background predictors were found. The ratings by the Finnish and Swedish speakers for the items in the condition were essentially equal, and the two groups did not significantly differ from one another. This result supports the hypothesis that cross-linguistic influence also occurs between languages learned after the mother tongue. Were the mother tongue singlehandedly responsible for cross-linguistic influence on the level of meaning, the Finnish participants would have been unaffected by the single translation equivalent in Swedish that does not exist in Finnish for the items in the Swedish condition. There have been hypotheses (Falk & Bardel, 2010, p. 188) that the L2 is favored over the L1[44] as a source language in L3 acquisition. While the results of the present study cannot verify that hypothesis, they nonetheless suggest that L1 is not singlehandedly responsible for cross-linguistic influence towards the L3.

Finally, in the third level of analysis, one group consisted of native speakers of Swedish with no skills in Finnish, and the other consisted of individuals functionally bilingual in Finnish and Swedish – and both rated items with a single translation equivalent in Finnish. The items that the groups rated with the single translation equivalent in Finnish were the same in level of analysis three as in the level of analysis one. In the third level of analysis, the bilingual speakers, as a group, differed from the comparison group that have no skills in the source language even if the bilingual group consists of participants who are primarily Swedish-dominant. The bilingual speakers, as a group, differed significantly from the comparison group that have no skills in the source language when similarity evaluations were analyzed individually, but not significantly when the analysis was performed for mean ratings per condition, per participant. Though this result is potentially related to statistical power, it might be a result of the prevalent Swedish-dominance of the bilingual group. Thus, the two groups are not comparable, statistically, with the skills in the source language causing in-group variation in the bilingual group that is not present in the comparison group. Both age of onset for Swedish and Finnish have slight linear relationship with the ratings, with an earlier

Finnish onset resulting in a larger amount of cross-linguistic influence from Finnish, and an earlier Swedish onset resulting in a smaller amount of cross-linguistic influence from Finnish. The relationship between Swedish onset and transfer from Finnish is significant, while the relationship between age of onset for Finnish is near significant when each measurement is analyzed independently. Neither is significant with averages per condition, per participant, but Swedish onset is closer to significant. Finnish skills appear to correlate with usage of the languages, while Swedish skills do not. This result might be attributable to the fact that the language of instruction at school is Swedish, so all of the participants should be more or less fluent in Swedish, with more variation in the use of Finnish.

In relation to the results of the data and previous research, three effects will be explored in this discussion section. The first effect is the potential for lexical development in the target language independent of that of the source language. The second effect is the potential inclusion and relation of psychotypology in models of conceptual development. The third effect is the distinction of L1, L2, L3, etc.

6.2 The Results in the Light of Previous Research

Jiang (2002) tested whether a single translation equivalent in the source language (Chinese) for native speakers would cause them to differ in their semantic evaluations of the similarity of two target words in the target language (English). In the present study, the results of the comparison of the Finnish participant group and the Swedish participant group on the Finnish condition have replicated the results from Jiang's study. The native speakers of the source language rated items with a single translation equivalent in the target language to be more similar in meaning than those with no knowledge of the source language. In Jiang's study, the comparison group consisted of native speakers of the target language, while in the current study, all of the groups consisted of non-native speakers of the target language, with the manipulated independent variable being the source language and proficiency in it (binary, native vs. no skills).

Jiang's lemma mediation hypothesis (see 2.3) would predict that two words that share a single translation equivalent in the source language would be perceived as synonymous in the target language. In the present study, the items for the Finnish condition were not rated as synonymous in the target language by native Finnish speakers, and this result corresponds to the results for the Chinese participant group in Jiang's study. Based on his study's results, Jiang hypothesized that

possible reasons for this result would be the involvement of conscious knowledge in off-line tasks, or that this would be a result of the polysemous nature of vocabulary, in which multiple words share one, but not necessarily all, meanings (consider the Distributed Feature Model, presented in Figure 3). Finally, another possibility is that while the meaning is transferred from the L1 item to the acquired L2 item, the semantic development continues separately in the L2 from that of the L1 (Jiang, 2002, pp. 624-5, 632); this would render the lemma mediation as a facilitative process for learning, as opposed to one responsible for continuous production of overt transfer errors.

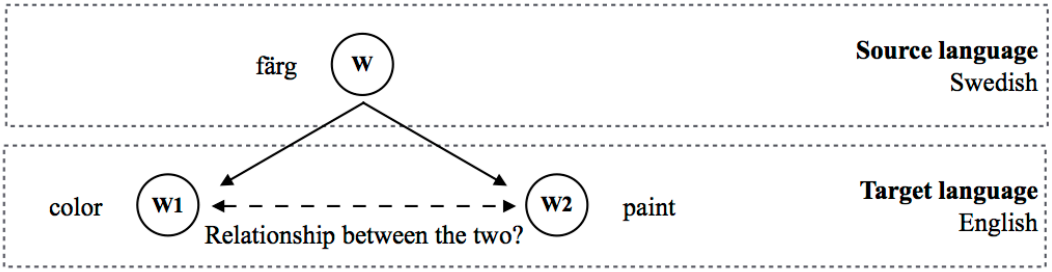


Figure 14. Relationship of the two words in the target language with a single translation in the source language.

The results of the present study show that the meaning in the source language affects the perceived meaning in the target language. The question, though, is whether this is the effect of the meaning having been copied[45] – as in that the meaning from the source language becomes the meaning in the target language – from the source language to the target language or whether the two words in the target language stay inherently connected[46] – as in that the relationship in the two independent words is not fully separate – to each other in meaning via a shared access of meaning either through the source language or because their representation is the same in the target language (see Figure 14). In the event that the words in the target language are mediated via the source language, the meaning of the two items should be evaluated to be essentially almost the same. This, however, was not the case, and thus supports the process of copying. Should the development continue in the target language, the two words no longer share the same meaning.

6.3 Theoretical Considerations

If it is assumed that the semantics of the source language can be copied to the target language, thus allowing subsequent semantic development independent from that of the source language in the target language, the next question to consider is what happens when there are two potential source languages, as in Figure 15.

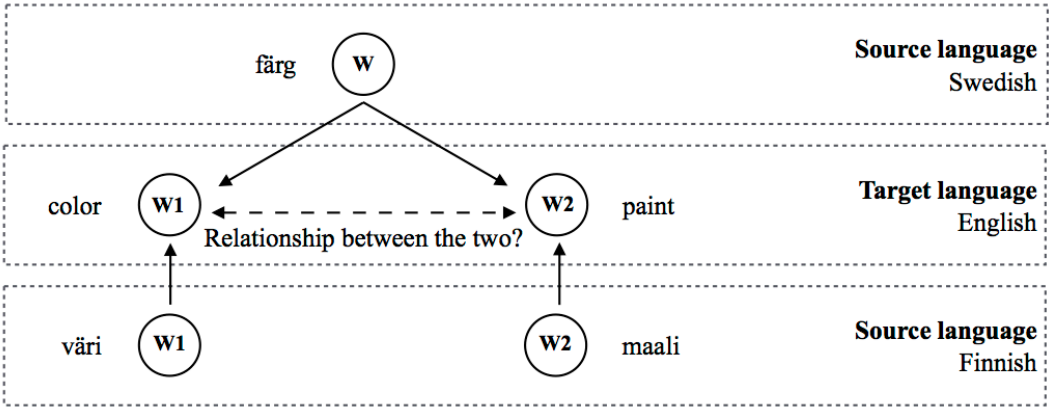


Figure 15. Relationship of the two words in the target language with a single translation in one of the source languages and a symmetrical relationship between the target language and the second source language.

Since the results in this study have established that both the target language is affected by both previously acquired languages (in both the bilinguals and language learners with an additional source language acquired in an instructional setting) we need to consider the effect from both source languages. The data from the two comparison groups in the first level of analysis support the notion that the meaning was copied to the new (target language) vocabulary, but since both languages seem to make a difference the question is whether both meanings (i.e., the ones from source language 1 and source language 2 – or generally any previously acquired languages) are copied. One possibility here is to suggest that the psychotypology, which seemed to play a role at least for the bilinguals, somehow sets the level in which the two meanings have "strength" for the meaning in the target language vocabulary. Now, it is possible that there is not only a single type of meaning negotiating process between the source and the target language. This might follow stages. Consider Jiang's (2000) three stages of lexical development (presented in section 2.3) in the light of these results.

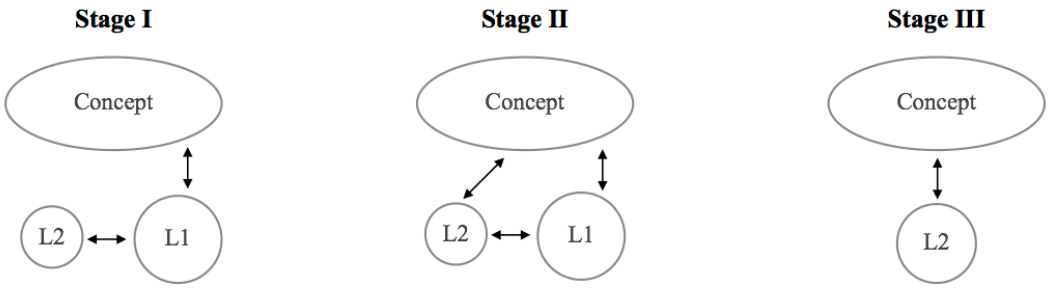


Figure 16. Jiang's three-stage system for vocabulary acquisition in second language learning (2000, pp. 51-54)

Jiang's model (Figure 16) considers acquisition instead of the meaning negotiation process at the conceptual level, which means that it can be combined with the Revised Hierarchical Model (see 2.3 for the presentation of the Revised Hierarchical Model and the Modified Hierarchical Model) at the level of meaning negotiation at different stages of vocabulary acquisition in the target language.

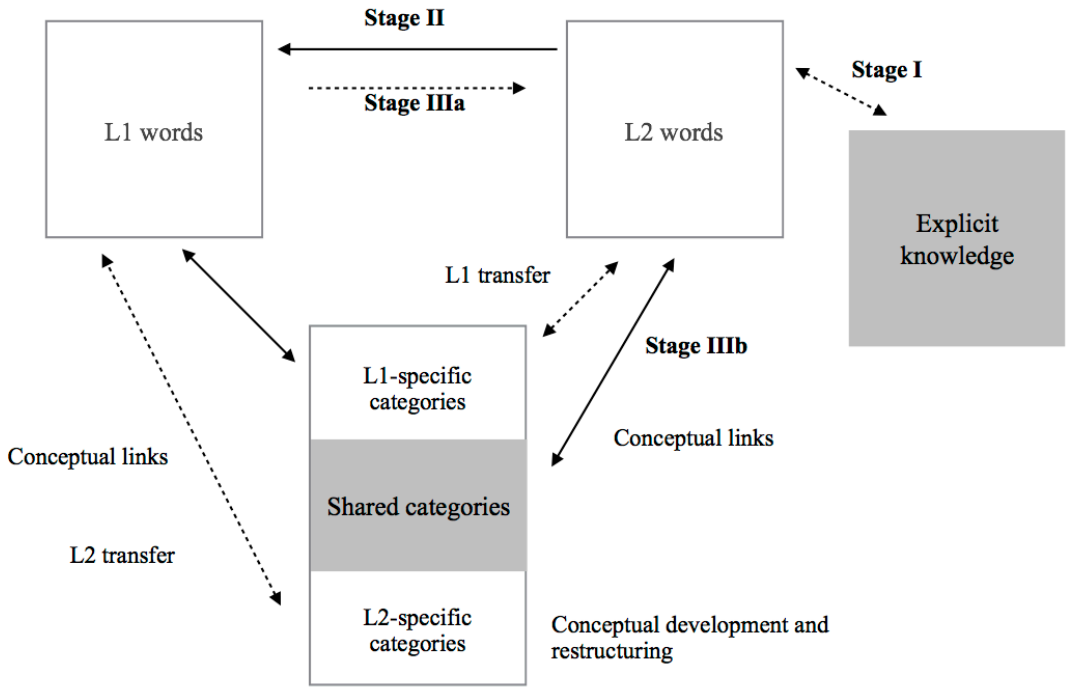


Figure 17. Placing Jiang's three-stage system for vocabulary acquisition in second language learning 2000, pp. 51-54) into the Modified Hierarchical Model (adapted from Pavlenko, 2009, p. 147).

The three stages are mapped onto the Modified Hierarchical Model in Figure 17 with Stage I taking place between explicit knowledge in the target language, Stage II causing the meaning of the lexeme to be mediated via the item in the source language, and Stage III being divided into two

subsequent processes: the copying of the lemma from the source language to the target language, and access to the conceptual level independent from that of the source language. Stage I works well if we consider input from explicit instruction to be a part of the explicit knowledge, and Stage II works well if we assume that this represents the L1 mediation in RHM/MHM. The third, and optional stage (assuming that the learner does not end up with fossilization in relation to the particular item), requires some adaptations if it is to work with the results of the present study and the RHM/MHM model: it is split so that the meaning in the source languages is copied to the target language, after which the node in the target language has emerging connections directly with the conceptual level.

As for the results pertaining to the psychotypological factor, the perceived distance between the three languages Finnish, Swedish, and English correlates significantly with the participants' cross-linguistic influence from Finnish to English. There is a linear relationship between the similarity evaluations for Finnish and English, and Swedish and English, with increasing perceived similarity between Swedish and English resulting in lower similarity ratings for item pairs in English with a shared single translation equivalent in Finnish. This finding supports the assumption that psychotypology affects the source of cross-linguistic influence. The result should not be used to claim that there is a causal relationship from our perceived typology between two languages to the processing of a language learned earlier. It is possible that increasing perceived similarity between Finnish and English causes us to inhibit the characteristics of Finnish less in our processing of English, but the same result can also be explained by a potential learning tactic that integrates Finnish semantics into the learning of English, in turn resulting in a higher amount of perceived similarity between the two languages. This would mean that a functioning model of cross-linguistic influence should aspire to account for the interplay of several languages and should include the effect of psychotypology.

Furthermore, since the results show not only L1 to L2 effect but also L3 to L2 effect, the model should be able to account for multidirectional cross-linguistic influence between the potential source languages and the target language rather than at the level of a single first language and a single target language. It should also account for potential cross-linguistic influence towards the first language. Thus it would be better to abandon the L1 – L2 – L3 trichotomy and discuss source languages and target language instead. Furthermore, the Lx-type terminology and the way it is used in the language acquisition literature makes it very hard to map the different types of usage between different paradigms. We have already established that the target language is affected by both previously acquired languages in both the bilinguals, and language learners with an additional source language acquired in an instructional setting. This is in line with the Cumulative-

Enhancement Model, CEM (Flynn, Foley & Vinnitskaya, 2004), which hypothesizes that language learning is cumulative and that previously acquired languages can be drawn upon in subsequent acquisition (p. 13).[47] An additional layer is suggested by the Typological Primacy Model (TPM) in that the choice of the source of the cross-linguistic influence is constrained by actual typological proximity or psychotypological proximity (Rothmann & Amaro, 2010, p. 192). Consider the placement of the two source languages and the psychotypology as a guiding factor in Figure 18.

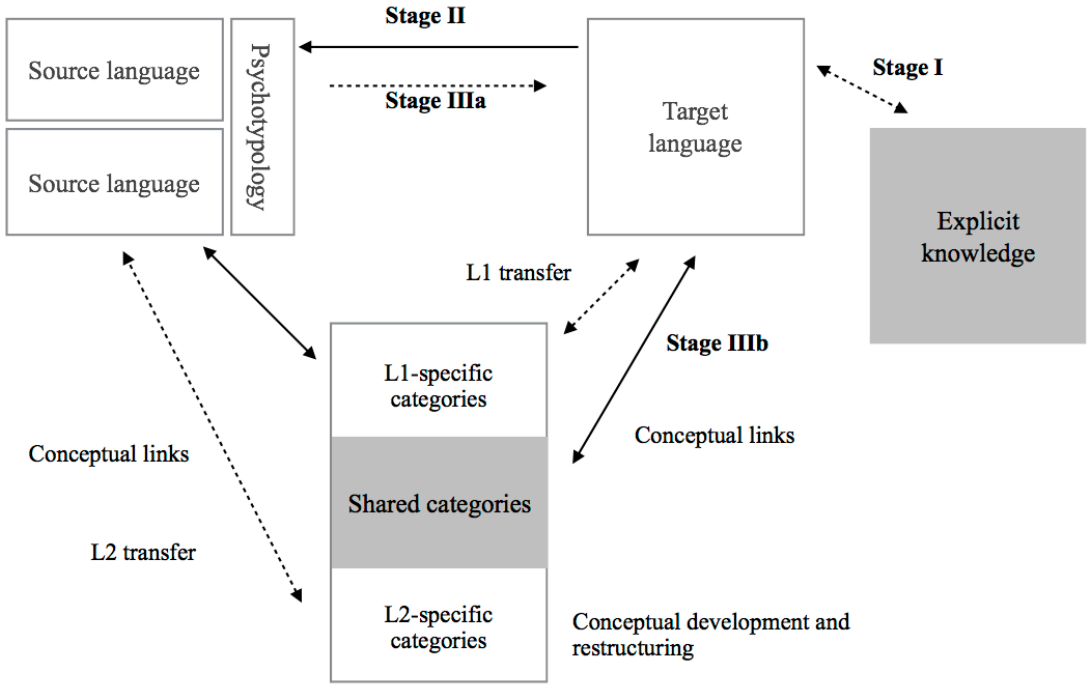


Figure 18. Locating psychotypology – via the predictions of CEM (Flynn, Foley & Vinnitskaya, 2004) and TPM (Rothmann & Amaro, 2010) – in the Modified Hierarchical Model (adapted from Pavlenko, 2009, p. 147).

The results of the present study imply that a model of conceptual development in a third language should account for psychotypology for both stages II and III in Jiang's acquisition stages. To account for stage II, psychotypology acts as a barrier causing attenuation with regard to source language activation, and routing through the source language to the conceptual level. For level III, since this will also cause the activations from the target language to conceptual level to follow the effect of the barrier, it will affect the target language. If one is to attempt to account for some learners never acquiring certain items in the target language correctly, in Jiang's three-stage model, the fossilization takes place at stages II and III. Should a language learner never make it past the

stage of II, i.e. L1-mediation, the language learner would then rely on explicit knowledge – rather than processing – for the difference between the varying overlaps of meaning between the source and the target language. However, this is not the only explanation, and based on the results in the present study, not the more likely explanation considering that the relationship in the target language for the items sharing a single translation equivalent in the source language was not rated as synonymous. Another potential source of the continuing source language-like behavior in the target language lies at the conceptual level. The MHM suggests that conceptual development and restructuring continues at the conceptual level, separate from the development in the source or the target language. Now consider the items from Figure 15 in Figure 18: if the conceptual development and restructuring takes place at the conceptual level, rather than at the source language and target language level, not only do the target language items "color" and "paint" not eternally share the same meaning due to the Swedish *färg*, but also the subsequent use of the items in the target language causes conceptual development at the conceptual level, which, then in its turn, causes cross-linguistic influence towards the source language.

The meaning mapping process in vocabulary is partly one of making associations in our memory between the new information we take in, and information that already exists in (the) memory. The Associative Networks Theory proposes that we can represent semantic memory as a network of associated ideas and concepts (Collins and Loftus, 1975). In the network (see Figure 19), each concept, e.g., 'fire engine' – is represented by a node in what resembles a fishing net. The strings in the net represent associations. The theory proposes that when we think about a concept, such as the aforementioned 'fire engine' we also partially activate related concepts, such as 'truck,' and 'red.' This would explain priming – the activation of one concept by another (Collins & Loftus, 1975, pp. 407 - 427; Holt et al., 2012, p. 290).

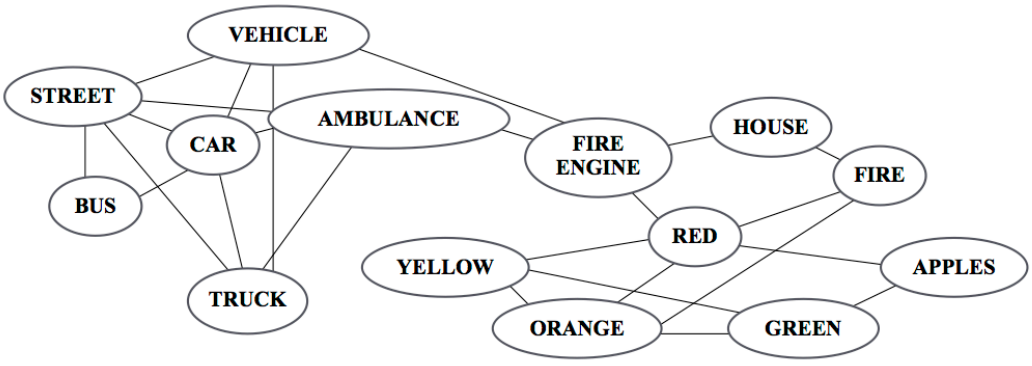


Figure 19. Associative Networks Model (adapted from Collins & Loftus, 1975, p. 412).

Another network theory, the Neural Network Theory (Chappel & Humphreys, 1994), suggests that the network nodes, like in the Associative Networks Theory, are linked to each other, but the nodes do not hold individual concepts. Instead the network is a small information-processing unit, and the nodes have connections with multiple nodes. Through time, the connections between individual nodes become stronger or weaker, in relation to the frequency of stimuli. Individual concepts are then processed through parallel firing of multiple nodes in the network to produce one unified concept (Chappel & Humphreys, 1994, pp. 103-104; Holt et al., 2012, p. 290-291). The Associative Network Model cannot account for the varying conceptual usage in the source and the target languages and also has difficulties with the transfer of meaning from the source language to the target language if one is to consider that the L2 lexical development continues independently of the L1. The Neural Network Model accounts better for the demands of potential individual lexical development in the target language. An additional advantage that the Neural Network Model has is that it allows the individual concepts (red, fire engine, loud sound) to be copied from the source language to the target language in a dissectible form.

Since in the Neural Networks Model the relationship between concepts at the conceptual level is in relation to frequency effects of simultaneous activations, the model can account for age of acquisition effects, usage based effects, and proficiency based variation due to effects to do with simultaneous activation with concepts. This can also account for adult learners having a harder time to reach strong connections from target language to conceptual level, and creating new strong connections between concepts at the conceptual level since the previously created connections have such frequencies that new ones cannot compete in strength. This could also account for production errors that cannot be explained by proficiency. Since the strength of the connections is inherited from the source language and the conceptual base for both languages is the same, the strength of the connections (in terms of prototypes and concepts) can cause the target language to have vocabulary that has no strong conceptual base (e.g. *arm* in Finnish). Despite explicit knowledge of the difference between the two, the automatic activation in the target language from the conceptual level is with the word “hand.” Thus, errors with high frequency vocabulary like “he” and “she” – which both have a single translation equivalent *hän* in Finnish – can be expected even in the target language, English, because of the strong connection between the two concepts that is based on their simultaneous activation from Finnish, which lacks such gender distinction. In terms of falsifiability, research on this matter should take place in relation to early language attrition.

Considering that the models of conceptual organization, vocabulary acquisition, and cross-linguistic influence represent language processing and acquisition at different levels, much of their projections to the process of conceptual cross-linguistic influence can be unified into a single

model. Such a model could look something like Figure 20, which, in comparison to the one in Figure 18, has seen the addition of the processes at the conceptual level based on the Neural Networks Model and an additional external source of world knowledge, which accounts for non-language-related input and restructuring of the conceptual knowledge.

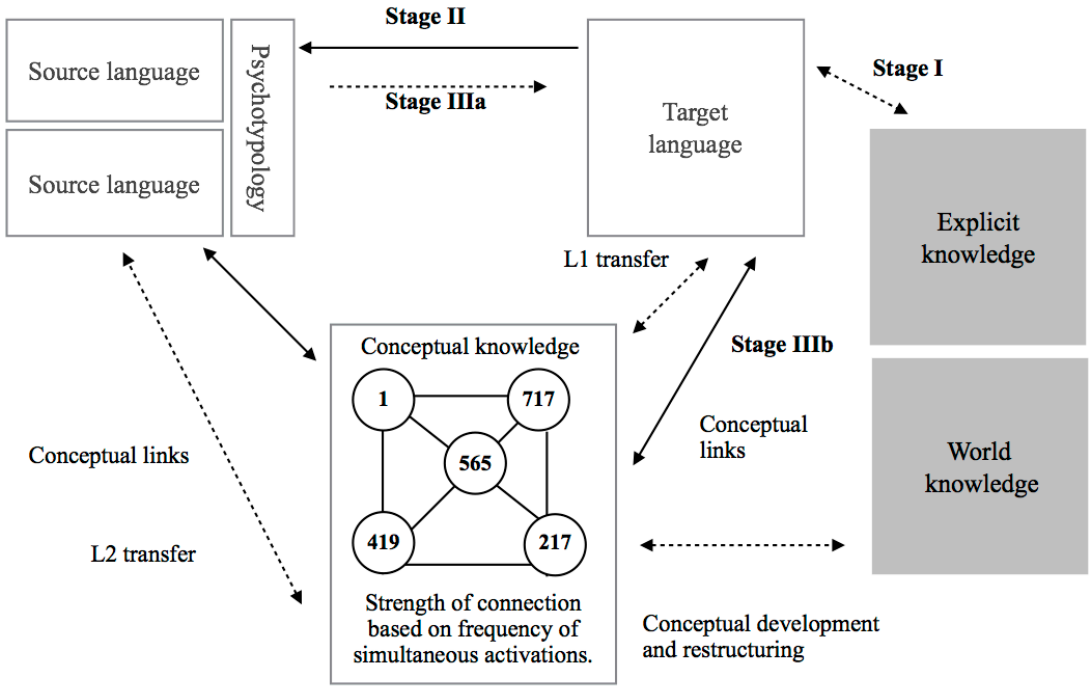


Figure 20. Placing the Neural Networks Model (adapted from Chappel & Humphreys, 1994, pp. 103-104) together with psychotypology – via the predictions of CEM (Flynn, Foley & Vinnitskaya, 2004) and TPM (Rothmann & Amaro, 2010) – in the Modified Hierarchical Model (adapted from Pavlenko, 2009, p. 147)**.**

Note. The numbers in the box for Conceptual knowledge do not have any other function than to outline that they do not refer to a particular concept that itself can be named, as opposed to the Associative Networks Model.

Furthermore, if one considers the hypothesis in the Neural Network Model that the strength of the connections between the nodes in the language and the concepts, as well as the strength of the connections between the concepts, is based on frequency effects, then the simultaneous activation frequency effect might, at least partially, be a potential explanation for age of acquisition effects via the amount of times a certain word/concept has been used. The same applies for proficiency, since it usually equals amount of time spent on using the language. Unlike in the Associative Networks Model, since there are no individual concepts, per se, the named concepts presented in Figure 19 have been replaced with nodes. Such a model would increase ecological validity as a result of taking further non-linguistic effects into account, while losing some of the internal validity and testability due to being more complex.

6.4 Evaluation of the Method

The method in this study can be evaluated based on the methodological points of studying L1 influence in the interlanguage presented in section 4.1. First, Jarvis (2000) suggested three different effects were to be studied. The first, intra-L1 group homogeneity, was established through the Finnish and Swedish control groups by evaluating the items based on control group behavior; the second, inter-L1 group heterogeneity, was likewise established through the Finnish and Swedish control groups, by making sure that the effects are L1-group-specific; and finally, the intra-L1 group congruity was established through the study design as the word pairs were crafted on existing L1 features and were piloted for activation by L1-speakers. Furthermore, in section 4.1, nine categories of background variables were suggested by Jarvis that should be taken into account in the evaluation of the study design. In relation to these, the fact that the participants were tested collectively as school classes, probably had the most impact on the control for the effects of the study design. Many of the variables were collected through self-ratings, and in terms of further research – measuring these variables, as opposed to relying on the participants' self-ratings, should be preferable. Swedish is typologically close to English, while Finnish is not. However, this is a part of the study design, and psychotypology is taken into account. Furthermore, in the stimuli creation phase, the amount of similarity in pronunciation or form between the L1 and the target language items was minimized within constraints. One strength that the study design has, was the control for prototypicality and the markedness of the linguistic feature. The stimuli were piloted with a group of native speakers in an activation test in order to ensure that the expected feature exists.

Jarvis (2000) reports a significant amount of variation in the results of L1 influence-research toward target language, which likely is an effect of variation in experimental design. Influence from the L1 "has been treated largely as a you-know-when-you-see-it phenomenon" (p. 246). The strength of the chosen method for this study lies in its rigor in choosing items of potential transfer, which does not have to be left to the judgement of the researcher afterwards when analyzing the data. This is particularly important since the study contains two source languages. Running a quantifiable, deductive study built upon expected behavior based on earlier literature can also lead to falsification of the study, which given the large variation in the results of the earlier studies, is preferred (Rasinger, 2010, p. 52).

Potential alternative methods for answering the research questions can be divided into on-line and off-line methods. Off-line methods would include analysis of existing corpus data or

analysis of student essays. However, it would be complicated to find a representative sample, and measurement of the relation between the background variables to the organization of concepts would be impossible unless the required information was collected beforehand. Another alternative off-line method would be to require the subjects to make choices from a free set of choices nonetheless limited by the design. This would involve filling blanks in a sentence according to visual stimuli where a clear target word would be expected. The items, would, however, be chosen in such a way that the subjects would potentially transfer under or overextension of meaning based on their first or second language. The issue with this method is that fill-in-the-blanks allows for sufficient time for processing and retrieval from explicit memory (Pavlenko, 2009, p. 151). Another off-line method would be to ask bilingual speakers to evaluate two translations, one in each of the L1s in comparison to the target language. This similarity judgment task involves metalinguistic evaluation and might not represent the actual use of language from a processing aspect in the test takers (Pavlenko, 2009, p. 128). Potential on-line methods would include semantic judgments together with reaction times. This would, however, be problematic in regards to using complete school classes as subjects. In addition to reaction times, eye-tracking could also be used, in which case the subjects' gaze at the items in context would be measured. The subjects would need to have some reason – perhaps a question to answer – that would cause them to evaluate the meaning of the given lexeme.

6.5 Implications and Further Research

The results of the study show compelling evidence for the interplay between all the language learner's languages, meaning that research on cross-linguistic influence should take the language learner's languages beyond the first language into account as source languages – including those that the learner is less proficient in than the target language. It also shows compelling evidence for the role of psychotypology in guiding the effect of multiple source languages on the target language. Considering this, models along the lines of the suggestions presented in Figures 17, 18, and 20 that can account for the effects of multidirectional cross-linguistic influence, L1-independent conceptual development, and psychotypology should be developed.

Some questions remain unanswered, for example the aspect of why some language learners keep producing incorrect forms in the target language despite not only having been exposed to the correct form, but also having explicit knowledge of the vocabulary item in the target language. Jiang (2000) takes this as support for fossilization, but what exactly causes some learners not to go

beyond Jiang's proposed second acquisition stage cannot be answered based on the data or the results in this study. One potential explanation is a lacking concept at the conceptual level, or the possibility of having such a strong connection between the two concepts or a prototypical relation of one of them, causing the incorrect form to always be activated. Another option is that the learner has not developed past the stage of L1 guiding the production. Finally, this might be a result of the higher activation frequency caused by the source language or the L1, which might or might not be the same language. If one is to consider for example the Finnish word *käsi* "hand" and its English translation equivalents 'hand' and 'arm,' the activation of 'hand' from both uses of the Finnish word makes the neural connection stronger than the one for 'arm.'

Method-wise, it would be beneficial to introduce on-line-based experimental methods to supplement the off-line method. While it seems that the word pair similarity perception task can tap into the language learner's semantic knowledge, on-line methods could potentially tell us more about the processing aspect of the meaning negotiating process. Methods that can show results of processing cost would be able to further show information regarding the processing aspect of potentially complex vocabulary in the target language, even in the case when the language learner has acquired a target language-like competence in using the item in the language learned. Furthermore, eye-tracking methods would be one beneficial way of adding context to the research, with a possibility to study the processing of the meaning negotiating process while reading for example. Finally, non-invasive neuro-imaging methods could further assist in research of conceptual cross-linguistic influence. Providing the language learners with vocabulary items in a context where for example the direct translation equivalent in the source language allows the use of the particular meaning in the context but the item in the target language does not, could help in separating stages of L1-lemma mediation and lexical development in the target language independent of that of the source language.

Perhaps the most beneficial opportunity for further research would be replicating the study with a fourth participant group that has similar skills in English and takes part in a similar education system, but whose native language is neither Indo-European nor Finno-Ugric. This would allow the comparison to be equal for both Swedish and Finnish so that the direction from Swedish to English could be tested as well. For a truly representational study with the least amount of confounds, the optimal participant groups would include two comparison groups with languages unrelated to each other and a target language unrelated to either of the source languages: with a bilingual speaker group that is learning one of these languages, and has bilingual competence in two of these languages.

Regarding study of the acquisition of English by the Finland-Swedish group and/or other minority and immigrant groups in the Nordic countries, a longitudinal study regarding the benefits of taking semantic cross-linguistic influence into account could be performed. Since it seems that the variation in the background variables between even the functionally bilingual students seems to affect their acquisition of the target language, Finnish-dominant and Swedish-dominant students – and certainly students with other language combinations – might benefit from taking their individual situations into account (for example, by providing the translation equivalents for words to be acquired in both of their source languages). Whether this would benefit the students should be studied more extensively. Considering that the Finland-Swedish group of students has, allegedly, benefited from sharing the same combination of languages with their teachers, they might be privileged in their situation compared to speakers of other languages in the Nordic countries going through their schooling in a language that is other than their mother tongue. While studying these students would introduce more confounds to the study setup, the results might be beneficial in developing the way a third language is taught to speakers of two languages – an increasing situation in the Nordic school systems. Potential groups of students would, for example, include the Russian-speaking minority of students in Eastern Finland and the Assyrian and Serbo-Croatian-speaking groups in Sweden.

Chapter 7

Conclusion

The aim of this thesis has been to investigate conceptual cross-linguistic influence in functional bilinguals with a focus on investigating whether the context and frequency of the use of the two source languages of the bilingual explain cross-linguistic influence towards L3. Another target was to consider whether variation in acquisition could be explained by linguistic similarity – either factual or perceived. In terms of similarity evaluations, the present study replicated the results of Jiang (2002) on the effect of the L1 on the lexis of the L2, the addition being that this effect is also observable with two groups of language learners. Furthermore, the analysis presented findings that indicate that the lexical development in the target language is not guided merely by the mother tongue, but also by other previously acquired languages.

If the acquisition of a new language elicits information from all previously acquired languages, it might make sense to use source language and target language instead of L1 and L2 when discussing cross-linguistic influence. Such a change would make it easier to include all the potential languages in the discussion, but also to leave the subtle differences in terms of the characteristics of the types of L2 to a separate discussion. Another observation is that psychotypology deserves a place in models of conceptual cross-linguistic influence. Certainly, further research is required in this area – particularly within acquisition of lexis since much of the research to date has considered grammatical constructions. Finally, based on the reviewed literature and the data in the present study, the possibility of lexical development in the target language independent of that of the source language needs to be considered. It is likely that conflicting data has been and will be found from various groups of learners. Several potential variables (e.g., age of acquisition, plasticity, amount of input, typological distance, style of acquisition, etc.) might affect whether a learner will advance from source language lemma mediation to target language-independent lexical development, and these variables deserve further research.

Endnotes

1 The terms cross-linguistic influence and transfer are used synonymously in this thesis.

2 Both words “tongue” and “language” have a single translation equivalent *kieli* in Finnish.

3 Also referred to as implicit or nondeclarative, with the memory processes taking place without conscious recall.

4 Also referred to as explicit, with the memory processes taking place with conscious recall.

5 For further reading on research on applied linguistics with a focus on Finland and Sweden, Ringbom (2012) provides an excellent overview of the major studies done within the last decade or so. For a broader time perspective see Chapter 6 in Ringbom (2007) and Ringbom (2001). Moreover, Meriläinen (2010) is a good source to start with acquainting oneself with the potential cross-linguistic influence from Finnish and Swedish to English, considering both syntactic and semantic effects.

6 This is to a degree related to the similarity (particularly, historical similarity) between Swedish and English, with Swedish being seen as a gate to the Germanic languages. What we now call English, was brought to the British Isles by Germanic speakers from the coastal areas of what, today, accounts for parts of Denmark and Netherlands. Thus, English belongs to the Germanic branch of Indo-European languages (Denison & Hogg, 2006, p. 3). In the 9th century, the Danish settled and occupied parts of the British isles - the Danelaw, most notably East Anglia, along with parts occupied by the Norwegians who had a base in Dublin. At the time, English, Danish and Norse were close to each other, to a degree mutually intelligible, and thus Norse and Danish have contributed to the English language. After the Norman Conquest in the 11th century, French has also had an impact on the English language (Denison & Hogg, 2006, p. 11-12). After the global expansion, English has taken loanwords both globally and locally from the languages it has been in contact with (Crystal, 2003, pp. 158-159).

7 Swedish is a member of the Germanic branch of the Indo-European language family. It is the most widely spoken language in the Nordic countries as well as the most widely spoken Scandinavian language. There are roughly nine million speakers of Swedish in Sweden with an additional 300,000 native speakers in Finland (Katzner, 2002, p. 79).

8 Finnish belongs to the Uralic language family, together with from the major European languages Estonian with about one million speakers and Hungarian with some fourteen million speakers, which is the best known Uralic

language. Also Samic languages spoken in both northern Sweden and Finland alongside Norway and Russia belong to the Uralic language family. The Uralic languages can be roughly divided to two branches, Finno-Ugric and Samoyedic. Most Uralic languages are spoken in the Russian federation, with the exception of the aforementioned Finnish, Estonian and Hungarian. However, Russian is an Indo-European language, and thus more closer to Swedish and English than Finnish (Comrie, 2009, p. 10; Austerlitz, 2009, p. 477). Some Baltic-Finnic languages spoken in Sweden, Republic of Karelia, and areas of Russia, and Latvia are to a degree mutually intelligible with Finnish (Branch, 2009, p. 497). As one of the four "major" Finno-Ugric languages spoken outside modern day Russia, Finnish "is quite different from the Indo-European [language] family," which English and Swedish are members of. Languages that are linguistically closest to Finnish are all spoken around the eastern side of the Gulf of Finland; "Estonian, Karelian, Vepsian, Ludian, Votian and Livonian" (Karlsson, 1999, p.1). While Finnish is related to Hungarian, the most widely spoken language in the Finno-Ugric language group, the relation is quite distant, comparatively as far as English is from Persian (Karlsson, 1999, p. 1).

9 It should be noted that the Swedish spoken in Sweden and Finland differs to some degree: for example Swedish also has two tonal accents, which have minimal pairs. Finland-Swedish, however, lacks this distinction (Thoren, 1997; Schaeffler, 2005).

10 Since Finland was a part of the Swedish and Russian Empires, it naturally follows that loanwords exist from both. There is, however, a large number of words for which there does not seem to be an equivalent. These likely date back to before the divide of the Baltic-Finnish languages. Prior to the Russian era, Slavonic vocabulary had entered Finnish via Finland's historic neighbor Karelia, which was under Russian rule long before Finland's own Russian period. Swedish was the primary source for loan words from the early Middle Ages until English has rivaled it after the Second World War (Branch, 2009, p. 512-3).

11 Fennoscandia here is used to refer to the Scandinavian peninsula and Finland.

12 The reference origins from the original text (Skutnabb-Kangas, 1981) and is only available in German. Furthermore the work is not available electronically or via Libris as an interlibrary loan.

13 The reference origins from the original text (Skutnabb-Kangas, 1981) and is only available in German. Furthermore the work is not available electronically or via Libris as an interlibrary loan.

14 The use of minimalist refers to the degree of functional bilingualism, with the minimalist approach assuming a quite limited set of skills as a requirement for being considered bilingual, which can include for example being able to use task-specific language only (Beardsmore, 1986, p. 15).

15 The use of maximalist refers to the degree of functional bilingualism, with the maximalist approach assuming a perhaps more generally accepted notion of bilingualism requiring ability to cover a wide range of activities in the language. Norm, or accuracy, is not of direct importance, though, as the focus is on functional bilingualism. The speaker may very well use forms that are alien to monoglot speakers as long as it does not impede communication (Bearsmore, 1986, pp. 15-16).

16 Compound bilingual is used to refer to "someone whose two languages are learnt at the same time, often in the same context" (Li Wei, 2000, p. 6). For example, those who grow up in an OPOL, one person-one language, families, speaking Finnish with one of their parents and Swedish with the other.

17 Simultaneous bilingual can be used to refer to "someone whose two languages are present from the onset of speech" (Li Wei, 2000, p. 7).

18 Successive bilingual is used to refer to "someone whose second language is added at some stage after the first has begun to develop" (Li Wei, 2000, p. 7).

19 Secondary bilingual can be used to refer to "someone whose second language has been added to a first language via instruction" (Li Wei, 2000, p. 7).

20 Functional bilingual can be used to refer to a person "who can operate in two languages with or without full fluency for the task in hand" (Li Wei, 2000, p. 6).

21 For a further discussion in terminology and grouping in bilingualism, see Li Wei (2000), Hammarberg (2010), and Skutnabb-Kangas (1981).

22 New words in Finnish are often formed by means of morphological derivation. The derivational suffixes that Finnish has, allow for a large amount of productivity when it comes to coining new words. Consider kirja [a book], kirje [a letter], kirjasto [library], kirjallinen [literary], kirjallisuus [literature], kirjoittaa [to write], and kirjoittaja [a writer] (Karlsson, 1999, p. 5). There are nominal and verbal base forms, and 85 suffixes allow for creation of nominals and 21 verbs from nominal forms; 44 suffixes allow for creation of nominals and 34 verbs from verb forms (Branch, 2009, p. 513). When comparing vocabulary knowledge across languages, one should notice the difference in terms of the sizes of vocabulary and word families brought in by the different morphosyntactic realms.

23 The use of monolingual here refers to the participant having only a single mother tongue. The participants are to a degree proficient in other languages than Finnish.

24 In the behaviourist framework transfer refers to what is often called positive transfer.

25 In the behaviourist framework interference refers to what is often called negative transfer.

26 Skinner proposed that environmental factors select behaviors since events act as rewards and in the case that a particular response is rewarded (with for example food or social approval), it is more likely that similar responses will occur again (Goldstein, 2011, p. 10).

27 Forward transfer refers to the cross-linguistic influence from a previously acquired language towards one acquired later, i.e. for example from L1 to L2 (Jarvis & Pavlenko, 2008, p. 21).

28 Lateral transfer refers to the cross-linguistic influence from a subsequently acquired language towards one acquired earlier, i.e. for example from L2 to L1 (Jarvis & Pavlenko, 2008, p. 21).

29 The terms meaning, semantic(s) and concept have partially overlapping meaning, but their meaning also differs in different areas of research. In while in linguistics semantics refers to the meaning that is encoded in linguistic signs (McGregor, 2009, p. 350) in psychology the meaning of 'semantic' is not specific to language: the semantic memory holds our factual knowledge (Goldstein, 2011, p. 156). The meaning for "concept," and conceptual knowledge tends to refer to the same processes in both areas of research (Goldstein, 2011, p. 394). Meaning, then refers to the content conveyed, or the message (McGregor, 2009, p. 129). In the present thesis, unless guided differently by a cited source, the use of "semantic" and "concept" is guided by the division to semantic memory (i.e. not limited to language per se) and conceptual knowledge, which is a part of the semantic

memory, while "meaning" is used in general reference to the component of what is the underlying informative content.

30 The lemma is the syntactic entity of the word (see next endnote).

31 The lexeme holds the form properties of the word. The lexeme connects to the conceptual level via the lemma. The interconnected lexical network is presented in Altman (2002) with one based on Collins & Loftus (1975) presented on p. 412 illustrating the spreading activation from the level of the lexeme to the conceptual level.

32 Under-extension refers to assigning a narrower meaning to a word than it has in the target use (McGregor, 2009, p. 354).

33 Over-extension refers to assigning a broader meaning to a word than it has in the target language (McGregor, 2009, p. 346).

34 Early models of monolingual and bilingual word recognition include those of Weinreich (1953) and Foster (1976). Weinreich discussed an example from Russian and English to point out that the English word 'book' and the Russian word kniga do not share the same meanings. Foster's model of word recognition then suggested that the information about meaning and the form are stored separately, thus potentially also allowing a shared conceptual knowledge. In the theory, each communication medium, such as speech or writing, has its own access file, and that file contains the form and connection to a separate master file that contains the meaning (Pavlenko, 2009, p. 142; Holt et al., 2012, p. 329). Later models of word recognition tend to be connectionist, such as the Interactive Activation and Competition (IAC) model by Rumelhart and McClelland. The IAC model assumes both bottom-up and top-down processing and consists of three levels: the feature level, where the visual features of the stimuli are analyzed; the letter level, where the letters are recognized; and the word level, where the word is recognized (Rumelhart & McClelland, 1982, p. 61).

35 The Revised Hierarchical Model builds upon the Hierarchical Model by Potter, So, Eckardt & Feldman (1984).

36 Non-isomorphic refers to the word pairs having translation ambiguity (Gathercole & Moawad, 2010, p. 2).

37 English is the most commonly studied foreign language in Finland most likely due to the global impact: English is estimated to have about 400 million native speakers, with total of up to 1.5 billion users with some degree of proficiency (Crystal, 2006, p. 424). Considering that at the end of the reign of Queen Elizabeth I in 1603 English had between five and seven million speakers, this is quite remarkable (Crystal, 2003, p. 30).

38 Finnification refers to the transformation from the use of Swedish to Finnish for public matters.

39 The following dictionaries were used in the process of controlling the meaning (in addition to native-speaker translations) WSOY Englanti-Suomi Suursanakirja (Hurme, Pesonen & Syväoja, 2001), Nordstedts Finska Ordbok (Cantell, Martola, Romppanen, Sundström, Sarantola & Sarantola, 2008), WSOY Suuri Suomi-Ruotsi-Sanakirja A-O (Romppanen, Cantell & Sundström, 1997), WSOY Suuri Suomi-Ruotsi-Sanakirja P-Ö (Romppanen, Cantell & Sundström, 1997), and Nordsteds Stora Engelska Ordbok (Berglund, 2011).

40 An attempt was to make to reduce formal similarity in the item sets to minimum. The items were scored for their formal similarity. However, since the items had to match between the conditions in relation to raw frequency and native speaker activation in the translation task in the pilot, some items have more than optimal amount of formal similarity.

41 The questions in the questionnaire were based on the list of variables by Jarvis presented on page 24 and inspired by those in Li, P., Zhang, F., Tsai, E., Puls, B. (2013) Language history questionnaire (LHQ 2.0): A new dynamic web-based research tool. *Bilingualism: Language and Cognition*. Furthermore, the questions regarding psychotypology were inspired by those in Sayehli, 2013, p. 143. I would also like to thank Tanja Kupish for feedback and improvement suggestions.

42 Three of the participants in the Swedish group took part in the study in a classroom at school, but after hours. This was due to their willingness to participate in the study, but the inability to perform the test during teaching hours. All other participants took part in the study during scheduled classroom hours with the procedure being so that those students who did not want to participate in the study being assigned alternative tasks to do.

43 The analysis and data management has been performed using R, version 3.1.0 using R Studio version 0.98.953 with the following packages: car (John Fox & Sanford Weisberg, 2011), ggplot2 (Wickham, 2009), knitr (Yihui Xie, 2014), gtable (Wickham, 2012), lattice (Sarkar, 2008), plyr (Wickham, 2011), bear (Hsin-ya Lee and Yung-jin Lee, 2014), psych (Revelle, 2014), xtable (Dahl, 2014), and Hmisc (Harrell, 2014).

44 The L2 Status Factor suggests that there is a ”general tendency of the language learner to activate other foreign languages when using a non-native language” (Falk & Bardel, 2010, p. 188).

45 The use of “copying” here refers to the hypothesis that the meaning (or semantic and conceptual representation), in the process of learning a new word in the target language, is copied from the source language to become the meaning of the newly acquired word in the target language.

46 The use of “inherently connected” refers to the possibility that (since the two words are the same in the source language) the representation of the two independent words in the target language is not fully separate. This can be caused either because the meaning is accessed via the source language word or because the two words in the target language share the same connection to the conceptual level.

47 Both the Typological Primacy Model and the Cumulative-Enhancement Model consider mostly morpho-syntactical effects in language acquisition.

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Appendix

A Experimental Items

B Answer Sheet

C Background Questionnaire

D Instruction Sheet

E Instruction Script

F Permission Sheets

G Privacy Description

H Coding Plan (with grounds for exclusion)

A Experimental Items

Condition 1

Item 1

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	language	*kieli*	51,892	100	5.5	2.0
2	tongue		10,729	100		

Item 2

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	manner	*tapa*	18,618	67	4.3	2.1
2	habit		13,294	89		

Item 3

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	leg	*jalka*	43,576	100	4.1	2.4
2	foot		25,912	89		

Item 4

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	voice	*ääni*	81,800	100	5.2	1.8
2	sound		52,792	100		

Item 5

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	air	*ilma*	98,647	100	4.9	1.6
2	weather		20,802	12		

Item 6

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	member	*jäsen*	124,985	83	4.7	1.7
2	limb		7,457	13		

Item 7

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	arm	*käsi*	78,121	100	5.2	2.2
2	hand		207,369	100		

Item 8

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	trade	*kauppa*	13,565	41	4.3	2.1
2	shop		26,227	100		

Item 9

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	part	*osa*	192,302	100	7.3	1.0
2	role		81,660	17		

Item 10

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	power	*virta*	131,566	30	6.2	1.7
2	current		52,724	6		

Item 11

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	payment	*maksu*	15,296	94	6.6	2.2
2	fee		91,465	47		

Item 12

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	goal	*maali*	54,097	94	1.2	0.4
2	paint		11,730	89		

Item 13

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	flag	*lippu*	12,486	100	1.9	1.2
2	ticket		21,802	100		

Item 14

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	wheel	*pyörä*	17,020	76	4.5	2.0
2	bike		15,763	100		

Item 15

	English	Finnish	Raw Frequency	Activation (Finnish)	Native English speakers Mean	*SD*
1	supplier	*toimittaja*	5,687	76	2.8	1.8
2	reporter		28,429	88		

Condition 2

Item 1

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	disc	*skiva*	7,598	89	2.7	1.8
2	slice		8,253	75		

Item 2

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	price	*pris*	77,951	100	2.5	2.1
2	award		21,634	100		

Item 3

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	subject	*ämne*	58,051	78	3.0	2.1
2	substance		13,828	63		

Item 4

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	leg	*ben*	43,576	100	3.7	2.1
2	bone		24,411	100		

Item 5

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	noon	*middag*	6,648	75	2.4	2.2
2	dinner		34,252	100		

Item 6

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	way	*väg*	433,369	100	5.5	1.1
2	road		74,410	100		

Item 7

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	choice	*val*	55,581	100	5.9	1.6
2	election		46,982	100		

Item 8

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	surface	*yta*	36,864	100	6.3	1.7
2	area		154,416	25		

Item 9

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	color	*färg*	88,116	100	4.7	2.6
2	paint		11,730	78		

Item 10

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	jump	*hopp*	5,554	100	1.6	1.0
2	hope		30,012	100		

Item 11

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	medicine	*medicin*	23,798	100	7.7	0.6
2	medication		9,017	100		

Item 12

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	plant	*växt*	58,750	63	4.5	1.9
2	growth		47,841	100		

Item 13

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	action	*handling*	74,890	56	6.9	1.1
2	act		50,907	33		

Item 14

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	sea	*sjö*	36,577	13	5.2	1.7
2	lake		35,614	100		

Item 15

	English	Swedish	Raw Frequency	Activation (Swedish)	Native English speakers Mean	*SD*
1	degree	*grad*	46,923	89	6.7	1.8
2	extent		20,356	33		

Condition 3

Item 1

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	recipe	*resepti*	*recept*	12,416	100	63	3.9	2.2
2	prescription			8,071	63	89		

Item 2

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	heaven	*taivas*	*himmel*	11,462	100	100	5.9	1.8
2	sky			32,630	100	100		

Item 3

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	salary	*palkka*	*lön*	13,068	71	100	4.2	1.9
2	reward			8,010	89	100		

Item 4

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	roof	*katto*	*tak*	15,230	78	100	6.5	1.8
2	ceiling			11,717	78	100		

Item 5

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	habit	*tapa*	*vana*	8,817	100	100	6.1	1.9
2	custom			9,695	22	44		

Item 6

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	force	*voima*	*styrka*	102,504	100	100	6.7	1.2
2	strength			27,335	67	100		

Item 7

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Swe	Native English speakers Mean	*SD*
1	side	*sivu*	*sida*	140,622	44	100	3.7	1.8
2	page			51,595	100	100		

Item 8

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	suit	*puku*	*dräkt*	25,245	89	100	5.0	1.8
2	costume			5,887	33	33		

Item 9

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	wait	*odotus*	*väntan*	94,249	100	100	4.0	1.8
2	expectation			18,000	89	100		

Item 10

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	clock	*kello*	*klocka*	11,496	100	88	3.4	2.0
2	bell			11,089	100	100		

Item 11

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	angle	*kulma*	vinkel/	14,342	75	13	4.7	2.3
2	corner		hörn	32,607	56	100		

Item 12

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	game	*peli*	*spel*	132,554	100	100	4.9	2.4
2	play			38,270	89	100		

Item 13

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	power	*voima/*	*kraft*	131,566	100	100	6.8	1.3
2	force	*teho*		102,504	100	100		

Item 14

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	voice	*ääni*	*röst*	81,800	100	100	3.4	2.2
2	vote			36,477	100	100		

Item 15

	English	Finnish	Swedish	Raw Frequency	Activation Fin	Activation Swe	Native English speakers Mean	Native English speakers *SD*
1	ground	*maa*	*jord*	69,175	89	13	7.2	1.3
2	earth			45,048	100	50		

B Answer Sheet (Variant A, page 1 of 5)

plant - growth

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

part - role

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

suit - costume

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

power - force

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

subject - substance

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

side - page

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

color - paint

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

flag - ticket

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

angle - corner

Not at all similar ○ ○ ○ ○ ○ ○ ○ ○ Very similar

1 2 3 4 5 6 7 8

C Background Questionnaire (Variant A)

Answers in this form are confidential

Anonymous participant identifier Revision

1. How old are you? I am ____ years old

2. I am [ ] a girl [ ] a boy *(tick the box next to your answer)*

3. Do you feel that you are good at learning languages? [ ] Yes [ ] No

4. Do you like learning languages? [ ] Yes [ ] No

5a. I know the following languages *(include your mother tongue/s)*:

Language *(write under)*	Mother tongue	I started learning this language
_____	[ ] Yes [ ] No	when I was ___ years old
_____	[ ] Yes [ ] No	when I was ___ years old
_____	[ ] Yes [ ] No	when I was ___ years old
_____	[ ] Yes [ ] No	when I was ___ years old
_____	[ ] Yes [ ] No	when I was ___ years old

5b. How much of your day do you spend speaking Finnish and Swedish? *(circle your answer)*
(1 = I speak only Finnish 4 = I speak the same amount of Finnish and Swedish 7 = I speak only Swedish)

Only Finnish 1 2 3 4 5 6 7 **Only Swedish**

6. Circle how good you are in the following languages.
(1 = Not good at all 8 = Very good)

	Reading	**Writing**	**Speaking**	**Listening**
Finnish	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
Swedish	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
English	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8

7a. Have you visited or lived in a country where one of the languages you are learning is spoken?
(Write the country (or countries) and how long time you spent there.)

_____

7b. Did you speak the language there? [ ] Yes [ ] Yes, a bit [ ] Not at all

8. How easy is it for you to communicate with people from other countries? *(circle your answer)*

Very hard 1 2 3 4 5 6 7 8 **Very easy**

9. Do you do any of the following? *(tick the right box)*	No	Sometimes	Often	Very often
I use Finnish words when I speak or write Swedish	[ ]	[ ]	[ ]	[ ]
I use Swedish words when I speak or write Finnish	[ ]	[ ]	[ ]	[ ]

10. Have you attended school or language school in another country than Finland?
(A language school can be for example a two week trip to Malta to learn English)

[ ] Yes [ ] No What school did you go to and where? _____
(You can write in Finnish or Swedish if you want)

11. Do you stay in contact with friends who live in an another country?

[ ] Yes [ ] No If yes, what language(s) do you usually use: _____

12. Do you have a hobby? *(for example sports, music or collecting Japanese cartoons)*

[ ] Yes [ ] No If yes, what language(s) do you usually use: _____

PLEASE TURN TO NEXT PAGE

Answers in this form are confidential

13. **How well do you think your parents speak ... ? Use 'M' for mother and 'F' for father.**

Finnish	Not at all	___ 1	___ 2	___ 3	___ 4	___ 5	___ 6	___ 7	___ 8	Very well
Swedish	Not at all	___ 1	___ 2	___ 3	___ 4	___ 5	___ 6	___ 7	___ 8	Very well
English	Not at all	___ 1	___ 2	___ 3	___ 4	___ 5	___ 6	___ 7	___ 8	Very well

14. Which language do you usually speak with your ... ? *(if more than one language, write all)*

Father _____ **Friends** _____

Mother _____ **Sisters and brothers** _____

If this family situation does not fit to you, write in your own words.

_____

_____

(You can write in Finnish or Swedish if you want)

15. How much do you agree with the following statements? *(circle your answer)*

a. English and Swedish have a lot of similar words.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

b. I think Finnish and English are very similar to each other.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

c. If you know Finnish, learning English is easy.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

d. English sounds a lot like Swedish.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

e. English and Finnish have a lot of similar words.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

f. If you know Swedish, learning English is easy.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

g. When I cannot remember a word in English I usually think about a Swedish word.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

h. I think Swedish and English are very similar to each other.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

i. English sounds a lot like Finnish.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

j. When I cannot remember a word in English I usually think about a Finnish word.

I strongly disagree 1 2 3 4 5 6 7 8 I strongly agree

THANK YOU!

D Instruction Sheet

Instructions

Please read through these instructions carefully!

You will be asked to evaluate how similar two words are in *meaning* in the scale below. By *meaning* it is meant what the word stands for. You should **not** rate how similar the words are in spelling. **Circle your choice.**

Not at all similar								Very similar
	1	2	3	4	5	6	7	8

Note

You should not stop to think about a word pair for a long time. Answer with the first thought that comes to your mind.

In case you have any questions, raise your hand and someone will come to help you individually.

Time

You have about 10 minutes.

E Instruction Script

Verbal Instructions

I am a student at Lund University in Sweden and I work with vocabulary learning.

I would like to say **thank you** for your help with the study.

There are two parts: a background questionnaire and a paper and pen test where you will be rating similarity of word pairs in English.

You will receive the papers soon. I will first explain a bit what you will be doing.

In the test you will have an option to give the word pairs a rating from 1 to 8.
1 means that they are not at all similar in meaning and 8 means they mean pretty much the same thing.

By meaning, it is meant what the word stands for. For example this is a smartphone, and the meaning of it is a device that I can use to call, text, and surf the internet.

You could have for example a pair like “center” and “middle” which you could think mean almost the same thing and give them a 7 or 8, or a pair like “stone” and “computer” that I personally don’t think are very similar - you could give those 1 or 2.

Most of the words have something in similar. You could for example get a pair like “house” and “kitchen,” that have some similarity. Most houses have a kitchen and you could give them for example a 4.

We will now hand out the papers. Please wait until everyone has received them.

[hand out the experiment sheets]

You can now see that you have two sets of papers and one paper with instructions. You should first start with the questionnaire that is the first set of papers.

When you are done with the questionnaire, you can continue to the test. Please read the instructions for the test before doing to it.

Do **not** write your name to the test papers and remember that there are no right or wrong answers.

If you have any questions, please raise your hand and someone will come to help you individually. You don’t have to ask your question in English.

F Permission Sheets

Hyvä vanhempi,

Olen kielitieteen maisteriopiskelija Lundin Yliopistossa ja tavoitteenani on tutkia miten kieltenopiskelijan äidinkielet vaikuttavat koulussa opeteltavaan, kolmanteen kieleen.

{time, place}

Testissä on kaksi osaa: taustakysely, jota käytetään taustatietojen selvittämiseen, sekä kynällä ja paperilla suoritettava koe, jossa oppilaat arvioivat englanninkielisiä sanoja.

Teoreettisen tiedon lisäksi eri kielitaustoista tulevien oppilaiden määrän kasvaessa ja taustojen vaihtelevuuden lisääntyessä kolmanteen kieleen kohdistuvan siirtovaikutuksen tutkimuksesta on hyötyä myös oppimateriaalien sekä kieltenopetuksen kehittämisessä.

Kerättävät tiedot ja tietojen säilytys
Taustakyselyssä kerätään tietoa oppilaiden kielitaidosta, sekä kielenkäyttötottumuksista. Taustatietokyselyn avoimia vastauksia ei käsitellä itse tutkimuksessa tai tuloksissa sellaisenaan, vaan niille koodataan numeerinen arvo tilastotieteellistä analyysiä varten. Julkinen rekisteriseloste sekä kuvaus henkilötietojen käsittelystä löytyy osoitteesta http://suhonen.me/progradu/rekisteriseloste/ henkilötietolain mukaisesti. Vastauksia ei yhdistetä henkilötietoihin.

Vapaaehtoisuus
Tutkimukseen osallistuminen on vapaaehtoista. Oppilaalla on oikeus päättää olla osallistumatta tutkimukseen myös testaustilanteen aikana riippumatta huoltajan päätöksestä.

Ymmärrän, että tutkimukseen osallistuminen on vapaaehtoista. Olen lukenut oheisen tutkimuskuvauksen ja annan lapselleni luvan osallistua tutkimukseen:

☐ **Kyllä** ☐ **Ei** **Paikka ja aika** _____

_____ _____
Oppilaan allekirjoitus **Huoltajan allekirjoitus**

_____ _____
Oppilaan nimenselvennys **Huoltajan nimenselvennys**

Mikäli haluatte vastaanottaa kopion valmiista pro gradu- tutkielmasta sen valmistuttua voitte kirjoittaa alle sähköpostiosoitteenne.

_____
(vapaaehtoinen)

Palautattehan tutkimuslupalomakkeen myös siinä tapauksessa, että oppilas ei saa lupaa osallistua tutkimukseen. Mikäli teille tulee kysyttävää tutkimukseen liittyen, voitte ottaa yhteyttä Lari-Valtteri Suhoseen.

Opiskelija
Lari-Valtteri Suhonen
Maisteriopiskelija
{email}
{tel.}

Työnohjaaja
Henrik Gyllstad
Filosofian tohtori, Yliopistolehtori
{email}
{tel.}

Yliopisto
Lunds Universitet
Språk- och litteraturcentrum
Paradisgatan 2
SE-221 00 Lund, Sweden

Forskningstillstånd

DENNA SIDA SKALL BEHÅLLAS AV VÅRDNADSHAVAREN

Bästa förälder,

Jag är masterstudent i engelsk språkvetenskap vid Lunds Universitet, och arbetar med en pro gradu-avhandling om betydelseöverföring mot ett tredje språk när språkeleven har två modersmål.

{place, date}

Studien består av två delar: en bakgrundsenkät som används för att mäta bakgrundsvariabler, och ett experiment med papper och penna där studenterna utvärderar engelska ord.

Förutom teoretiskt värde, har forskningen om betydelseöverföring mot ett tredje språk, med det ökande antalet elever med olika språklig bakgrund, fördelar för utveckling av läromedel och språkundervisning.

Datainsamling
Som en del av studien kommer eleven fylla i en bakgrundsenkät där information om deltagarens ålder (i ettårs-steg), kön, språkkunskaper, inställning till språkinlärning och självutvärdering om färdigheter och förmågor hos eleven samlas in. Eleverna kommer även att utvärdera sina egna och sina familjers typiska språkanvändning, och ombes att svara på frågor om sitt potentiella utlandsboende, såsom längre tider eller studier utomlands och om idéer om likheter mellan språken. Studien är av kvantitativ art och svar i öppna frågor kommer inte att behandlas i studien eller resultaten som de är, utan de kodas med numeriska värden för statistisk analys.

Lagring av information
Informationen lagras och analyseras i Sverige och insamlingen och lagringen av data kommer att utföras i enlighet med Svenska Forskningsrådets etiska riktlinjer och personuppgiftslagen (PUL). En offentlig sekretesspolicy och beskrivning av datahanteringen finns på http://suhonen.me/progradu/rekisteriseloste/ i enlighet med den finska lagen om skydd av personuppgifter. Svaren från bakgrundsfrågeformuläret och testformuläret kommer att analyseras under en enda anonym identifierare och separerat från personlig information i blanketten för medgivande, och individuella data om den som utför testet kopplas inte till någon personlig information.

Frivilligt deltagande
Deltagandet är helt frivilligt. Eleven har också rätt att dra tillbaka sitt deltagande under experimentet oavsett sina föräldrars samtycke.

Ni är varmt välkomna att kontakta Lari-Valtteri Suhonen vid eventuella frågor angående studien eller detta forskningstillstånd. Kontaktuppgifter finns nedan.

Vänligen returnera blanketten för undersökningen även om eleven inte tillåts delta i studien.

Student
Lari-Valtteri Suhonen
Masterstudent
{email}
{tel.}

Handledare
Henrik Gyllstad
Filosofie doktor, Universitetslektor
{email}
{tel.}

Universitet
Lunds Universitet
Språk- och litteraturcentrum
Paradisgatan 2
SE-221 00 Lund, Sweden

Forskningstillstånd

DENNA SIDA KOMMER ATT SAMLAS IN I SKOLAN VID STUDIETILLFÄLLE

Med denna blankett du ger ditt barn tillstånd att delta i en studie om tvåspråkighet och språkinlärning.

Hantering av informationen i denna blankett
- Denna blankett skall ifyllas i hemmet och insamlingen av personuppgifter begränsas till denna blankett.
- Blanketten ska tas med till skolan av eleven.
- Blanketten kommer att granskas vid insamlingen av elevens test. Blanketten kommer att samlas in och lagras separat. Informationen i blanketten kommer inte att kopplas ihop med elevens svar.
- Beskrivning av datahanteringen finns på http://suhonen.me/progradu/rekisteriseloste/

Jag är införstådd med att deltagandet är frivilligt. Jag har läst den bifogade beskrivningen av undersökningen och ger mitt barn tillstånd att delta:

☐ **Ja** ☐ **Nej**

Ort och datum

_____

_____ _____

Elevens underskrift **Vårdnadshavarens underskrift**

_____ _____

Elevens namnförtydligande **Vårdnadshavarens namnförtydligande**

Om du vill ha en kopia av det färdiga examensarbetet när det är klart, kan du lämna din e-postadress nedan.

_____

(frivilligt)

Vänligen returnera blanketten för undersökningen även om eleven inte tillåts delta i studien.

Student
Lari-Valtteri Suhonen
Masterstudent
{email}
{tel.}

Handledare
Henrik Gyllstad
Filosofie doktor, Universitetslektor
{email}
{tel.}

Universitet
Lunds Universitet
Språk- och litteraturcentrum
Paradisgatan 2
SE-221 00 Lund, Sweden

G Privacy Description (in accordance with the Personal Data Act (523/1999) 10 § and 14 §)

1

TIETEELLISEN TUTKIMUKSEN REKISTERISELOSTE

Henkilötietolaki (523/1999) 10 § ja 14 §

Lue täyttöohjeet ennen rekisteriselosteen täyttämistä. Käytä tarvittaessa liitettä.

Laatimispäivä
31.3.2014

1a Tutkimus-rekisterin-pitäjä	Nimi Lari-Valtteri Suhonen
	Osoite Ulrikedalsvägen 12 B LGH 1103, 22458 Lund, Sweden
	Muut yhteystiedot (esim. puhelin virka-aikana, sähköpostiosoite) sas12lsu [at] student.lu.se
1b Yhteistyö-hankkeena tehtävän tut-kimuksen osapuolet ja vastuunjako	-
1c Tutkimuksen vastuullinen johtaja tai siitä vastaava ryhmä	-
1d Tutkimuksen suorittajat	Kaikki henkilöt, joilla on tutkimuksen kuluessa oikeus käsitellä rekisteritietoja Lari-Valtteri Suhonen
2 Yhteyshenki-lö rekisteriä koskevissa asioissa	Nimi Lari-Valtteri Suhonen
	Osoite Ulrikedalsvägen 12 B LGH 1103, 22458 Lund, Sweden
	Muut yhteystiedot (esim. puhelin virka-aikana, sähköpostiosoite) sas12lsu [at] student.lu.se
3 Tutkimus-rekisteri	Rekisterin nimi Semantic transfer towards a foreign language among functional bilinguals
	X kertatutkimus
	Tutkimuksen kesto 20.1.2014 - 30.8.2014
4 Henkilötieto-jen käsittelyn tarkoitus	Tavoitteena on tutkia konseptuaalista siirtovaikutusta kolmanteen kieleen kun kielenoppijalla on kaksi äidinkieltä. Teoreettisen tiedon lisäksi eri kielitaustoista tulevien oppilaiden määrän kasvaessa ja taustojen vaihtelevuuden lisääntyessä kolmanteen kieleen kohdistuvan siirtovaikutuksen tutkimuksesta on hyötyä myös oppimateriaalien sekä kieltenopetuksen kehittämisessä. Tutkimusmateriaalia varten ei kerätä henkilötietoja. Huoltajilta ja osallistujilta kerättävissä lupalomakkeissa kerätään huoltajan sekä osallistujien nimet sekä allekirkoitus. Lisäksi kerätään muita tietoja (lista kohdan 5 yhteydessä. Tietojen keräämisen tarkoituksena on varmistaa, että osallistujat sekä heidän huoltajansa ovat saaneet tarpeelliset tiedot tutkimuksesta sekä siihen osallistumisesta.

TIETEELLISEN TUTKIMUKSEN REKISTERISELOSTE

5 Rekisterin tietosisältö	Säilytettävissä lupalomakkeissa, joiden tietoja ei käytetä itse tutkimuksessa jää rekisteriin huoltaja, sekä osallistujan nimi. Taustakyselyssä kerätään tietoja vastaajista. Nämä tiedot säilytetään erillään lupalomakkeessa kerätyistä henkilötiedoista. Kyselyssä kerätään tieto oppilaan iästä yhden vuoden tarkkuudella, oppilaan sukupuoli, kielitaito, halu ja asenne kielten oppimiseen sekä oma arvio oppilaan kyvyistä ja taidoista. Tämän lisäksi oppilaat arvioivat omia ja perheensä kielenkäyttötottumuksia. Vastaajilta kartoitetaan myös mahdollinen ulkomailla asuminen, pidempi oleskelu tai opiskelu, sekä ajatuksia kielten välisistä samankaltaisuuksista. Tutkimus on luonteeltaan kvantitatiivinen, eikä avoimia vastauksia käsitellä itse tutkimuksessa tai tuloksissa sellaisenaan, vaan niille koodataan numeerinen arvo tilastotieteellistä analyysiä varten.
6 Säännönmukaiset tietolähteet	Tiedot kerätään tutkimukseen osallistujilta sekä heidän huoltajiltaan. Tietojen keräämiseen kysytään suostumus sekä tutkimukseen osallistuvilta, sekä heidän huoltajiltaan.
7 Tietojen säännönmukaiset luovutukset	-
8 Tietojen siirto EU:n tai ETA:n ulkopuolelle	Tietoja ei siirretä EU:n tai ETA:n ulkopuolelle.
9 Rekisterin suojauksen periaatteet	**Tiedot ovat salassapidettäviä.** Manuaalinen aineisto: Lupalomakkeet (joissa osallistujien ja huoltajien nimet ja allekirjoitukset). ATK:lla käsiteltävät tiedot: tiedot säilytetään ja analysoidaan tutkijan tietokoneella joka on suojattu käyttäjätunnuksella sekä salasanalla. **X** käyttäjätunnus **X** salasana muu, mikä: Tunnistetiedot poistetaan tiedonkeräysvaiheessa. Vastaajien vastaukset anonymisoidaan tarkastamalla lupalomakkeet vastausten keräysksen yhdeydessä, ja tämän jälkeen keräämällä lomakkeet erikseen jonka jälkeen niitä ei voi yhdistää.
10 Tutkimusaineiston hävittäminen tai arkistointi	Tutkimusrekisteri arkistoidaan ilman **tunnistetietoja** Mihin: Rekisteri jää tutkijan käyttöön. Vastaajien henkilöllisyyksiä ei voi yhdistää tutkimustietoon.

H Coding Plan (with grounds for exclusion)

Q	Table	Variable name	Option	Description
0	A	participant	num	Participant Identification Number
	B	item	num	Item in the experiment
			1-45	Item number
	C	rating	scale	Rating in the experiment
			1	Not at all alike
			8	Very much alike
	D	medium	factor	Medium of instruction
			FI	Finnish
			FS	Finnish | Swedish
			SE	Swedish
			EN	English native
	E	exp.revision	factor	Randomization revision of experiment
			1	
			2	
			3	
			4	
			5	Exclusive for EN piloting (online)
	F	condition	factor	Language condition in the experiment
			fi	Finnish
			fs	Finnish | Swedish [dual condition]
			se	Swedish
	G	bc.rev	factor	Randomization revision of questionnaire
			A	Finnish first
			B	Swedish first
			C	Swedish only
	H	included	binary	Status in the experiment
			0	Excluded
			1	Included
1	I	age	num	Age of participant
			0-99	Self-reported age
2	J	gender	1	Girl
			2	Boy
			3	No value
3	K	aptitude	binary	Do you feel that you are good at learning languages?
			0	No
			1	Yes
4	L	attitude	binary	Do you like learning languages?
			0	
			1	
5a	M	lng.no	num	Amount of known languages
			1-5	Calculation of amount of listed languages
	N	fi.native	binary	Native speaker of Finnish
			0	No [self-report]
			1	Yes [self-report]

Q	Table	Variable name	Option	Description
	O	se.native	binary	Native speaker of Swedish
			0	No [self-report]
			1	Yes [self-report]
	P	en.native	binary	Native speaker of English
			0	No [self-report]
			1	Yes [self-report]
	Q	oth.native	binary	Native speaker of an another language
			0	No [self-report]
			1	Yes [self-report] [exclude participant] [null all values]
	R	elective	factor	Listed language other than fi, se, or en
			xx	ISO 639-1 (two digit)
	S	oth.language	factor	2. listed language other than fi, se, en
			xx	ISO 639-1 (two digit)
	T	fi.onset	num	Finnish onset
			0-99	Age of onset [self-report]
	U	se.onset	num	Swedish onset
			0-99	Age of onset [self-report]
	V	en.onset	num	English onset
			0-99	Age of onset [self-report]
	W	el.onset	num	Elective [table R] language onset
			0-99	Age of onset [self-report]
	X	oth.onset	num	Other [table S] language onset
			0-99	Age of onset [self-report]
	Y	first.list	factor	Which language listed first [self report]
			fi	Finnish
			se	Swedish
			en	English
			oth	Other
5b	Z	division	scale	Division of use between Finnish and Swedish
			1	Only Swedish
			7	Only Finnish
	AA	fs.native	factor	Native speaker, language combinations [combined info]
			fi	Only Finnish [self-report]
			fs	Finnish and Swedish [self-report]
			se	Only Swedish [self-report]
			en	English native (piloting) [self-report]
			oth	Other combination
6	AB	fi.reading	scale	Skills in reading Finnish [self-report]
			1	Not good at all
			8	Very good
	AC	fi.writing	scale	Skills in writing Finnish [self-report]
			1	Not good at all
			8	Very good
	AD	fi.speaking	scale	Skills in listening Finnish [self-report]
			1	Not good at all

Q	Table	Variable name	Option	Description
			8	Very good
	AE	fi.listening	scale	Skills in speaking Finnish [self-report]
			1	Not good at all
			8	Very good
	AF	fi.average	scale	Skills in Finnish [(AB+AC+AD+AF)/4]
			1	Not good at all
			8	Very good
	AG	se.reading	scale	Skills in reading Swedish [self-report]
			1	Not good at all
			8	Very good
	AH	se.writing	scale	Skills in writing Swedish [self-report]
			1	Not good at all
			8	Very good
	AI	se.speaking	scale	Skills in listening Swedish [self-report]
			1	Not good at all
			8	Very good
	AJ	se.listening	scale	Skills in speaking Swedish [self-report]
			1	Not good at all
			8	Very good
	AK	se.average		Skills in Swedish [(AG+AH+AI+AJ)/4]
			1	Not good at all
			8	Very good
	AL	en.reading	scale	Skills in reading English [self-report]
			1	Not good at all
			8	Very good
	AM	en.writing	scale	Skills in writing English [self-report]
			1	Not good at all
			8	Very good
	AN	en.speaking	scale	Skills in listening English [self-report]
			1	Not good at all
			8	Very good
	AO	en.listening	scale	Skills in speaking English [self-report]
			1	Not good at all
			8	Very good
	AP	en.average		Skills in English [(AL+AM+AN+AO)/4]
			1	Not good at all
			8	Very good
7a	AQ	holiday.qv	open	Have you visited or lived in a country where one of the languages you are learning is spoken? [open question]
			text	Text the participant has written [omitted]
	AR	holiday.length	num	Length of mentioned holiday(s) or time lived abroad
			0-inf.	The amount of weeks from zero to in infinite. Null is none.
	AS	holiday.eng	binary	Whether visited/lived in an English-speaking country. English-speaking classified according to CIA factbook.
			0	No [self-report]
			1	Yes [self-report]

Q	Table	Variable name	Option	Description
	AT	holiday.swe	binary	Whether visited or lived in an Sweden country
			0	No [self-report]
			1	Yes [self-report]
7b	AU	holiday.use	scale	Did you speak the language there?
			0	No [self-report]
			1	A bit [self-report]
			2	Yes [self-report]
	AV	holiday.answered	binary	Whether the participant wrote something in the open question
			0	No
			1	Yes
	AW	eng.spent	num	Time spent in English-speaking country
			0-inf.	Reported answer converted to weeks from zero to infinite.
	AX	se.spent	num	Time spent in Sweden country
			0-inf.	Reported answer converted to weeks from zero to infinite.
8	AY	com.easy	scale	How easy is it for you to communicate with people from other countries?
			1	Very hard
			8	Very easy
9	AZ	fi2se	scale	I use Finnish words when I speak or write Swedish
			0	No [self-report]
			1	Sometimes
			2	Often
			3	Very often
	BA	se2fi	binary	I use Swedish words when I speak or write Finnish
			0	No [self-report]
			1	Sometimes
			2	Often
			3	Very often
10	BB	school.abroad	binary	Have you attended school or language school in another country than Finland | Sweden [depending on country]
			0	No [self-report]
			1	Yes [self-report]
	BC	school.abroad.open	open	What school did you go to and where?
			text	Text the participant has written [omitted]
	BD	language.school	binary	Participant attended language school
			0	No [self-report]
			1	Yes [self-report]
	BE	language.school.en	binary	Participant attended English language school
			0	No [self-report]
			1	Yes [self-report]
	BF	language.school.oth	binary	Participant attended other language school
			0	No [self-report]
			1	Yes [self-report]
	BG	school.se	binary	Participant attended school in Sweden [Finnish participants]
			0	No [self-report]
			1	Yes [self-report]
	BH	schoo.fi	binary	Participant attended school in Finland [Swedish participants]

Q	Table	Variable name	Option	Description
			0	No [self-report]
			1	Yes [self-report]
	BI	school.en	binary	Participant attended school in an English-speaking country
			0	No [self-report]
			1	Yes [self-report]
	BJ	school.oth	binary	Participant attended school in other country than above
			0	No [self-report]
			1	Yes [self-report] [exclude participant] [null all values]
11	BK	friends.abroad	binary	Do you stay in contact with friends who live in an another country?
			0	No [self-report]
			1	Yes [self-report]
	BL	friends.abroad.open	open	If yes, what language(s) do you usually use
			text	Text the participant has written [omitted]
	BM	friends.abroad.fi	binary	Finnish listed
			0	No [self-report]
			1	Yes [self-report]
	BN	friends.abroad.se	binary	Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	BO	friends.abroad.en	binary	English listed
			0	No [self-report]
			1	Yes [self-report]
12	BP	hobby	binary	Do you have a hobby?
			0	No [self-report]
			1	Yes [self-report]
	BQ	hobby.language	open	If yes, what language(s) do you usually use
			text	Text the participant has written [omitted]
	BR	hobby.language.fi	binary	Finnish listed
			0	No [self-report]
			1	Yes [self-report]
	BS	hobby.language.se	binary	Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	BT	hobby.language.en	binary	English listed
			0	No [self-report]
			1	Yes [self-report]
13	BU	mother.fi	scale	How well does your mother speak Finnish?
			1	Not at all [participant perception]
			8	Very well [participant perception]
	BV	mother.se	scale	How well does your mother speak Swedish?
			1	Not at all [participant perception]
			8	Very well [participant perception]
	BW	mother.en	scale	How well does your mother speak English?
			1	Not at all [participant perception]
			8	Very well [participant perception]

Q	Table	Variable name	Option	Description
	BX	father.fi	scale	How well does your mother speak Finnish?
			1	Not at all [participant perception]
			8	Very well [participant perception]
	BY	father.se	scale	How well does your mother speak Swedish?
			1	Not at all [participant perception]
			8	Very well [participant perception]
	BZ	father.en	scale	How well does your mother speak English?
			1	Not at all [participant perception]
			8	Very well [participant perception]
14	CA	p2father.open	open	Which language do you usually speak with your father?
			text	Text the participant has written [omitted]
	CB	p2father	factor	Language spoken with father
			fi	Finnish
			se	Swedish
			en	English
			fs	Finnish and Swedish
			fi.oth	Finnish and other
			se.oth	Swedish and other
			fs.oth	Finnish, Swedish and other
			oth	Other [exclude participant] [null all values]
	CC	p2father.fi	binary	Finnish listed
			0	No [self-report]
			1	Yes [self-report]
	CD	p2father.se	binary	Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	CE	p2father.en	binary	English listed
			0	No [self-report]
			1	Yes [self-report]
	CF	p2father.oth	binary	Other language listed
			0	No [self-report]
			1	Yes [self-report]
	CG	p2father.fs	binary	Finnish and Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	CH	p2father.first	factor	Which language is listed first
			fi	Finnish
			se	Swedish
			en	English
			oth	Other
	CI	p2mother.open	open	Which language do you usually speak with your mother?
			text	Text the participant has written [omitted]
	CJ	p2mother	factor	Language spoken with mother
			fi	Finnish
			se	Swedish

Q	Table	Variable name	Option	Description
			en	English
			fs	Finnish and Swedish
			fi.oth	Finnish and other
			se.oth	Swedish and other
			fs.oth	Finnish, Swedish and other
			oth	Other [exclude participant] [null all values]
	CK	p2mother.fi	binary	Finnish listed
			0	No [self-report]
			1	Yes [self-report]
	CL	p2mother.se	binary	Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	CM	p2mother.en	binary	English listed
			0	No [self-report]
			1	Yes [self-report]
	CN	p2mother.oth	binary	Other language listed
			0	No [self-report]
			1	Yes [self-report]
	CO	p2mother.fs	binary	Finnish and Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	CP	p2mother.first	factor	Which language is listed first
			fi	Finnish
			se	Swedish
			en	English
			oth	Other
	CQ	p2friends.open	open	Which language do you usually speak with your friends?
			text	Text the participant has written [omitted]
	CR	p2friends	factor	Language spoken with friends
			fi	Finnish
			se	Swedish
			en	English
			fs	Finnish and Swedish
			fi.oth	Finnish and other
			se.oth	Swedish and other
			fs.oth	Finnish, Swedish and other
			oth	Other
	CS	p2friends.fi	binary	Finnish listed
			0	No [self-report]
			1	Yes [self-report]
	CT	p2friends.se	binary	Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	CU	p2friends.en	binary	English listed
			0	No [self-report]

Q	Table	Variable name	Option	Description
			1	Yes [self-report]
	CV	p2friends.oth	binary	Other language listed
			0	No [self-report]
			1	Yes [self-report]
	CW	p2friends.fs	binary	Finnish and Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	CX	p2friends.first	factor	Which language is listed first
			fi	Finnish
			se	Swedish
			en	English
			oth	Other
	CY	p2siblings.open	open	Which language do you usually speak with your siblings?
			text	Text the participant has written [omitted]
	CZ	p2siblings	factor	Language spoken with siblings
			fi	Finnish
			se	Swedish
			en	English
			fs	Finnish and Swedish
			fi.oth	Finnish and other
			se.oth	Swedish and other
			fs.oth	Finnish, Swedish and other
			oth	Other [exclude participant] [null all values]
	DA	p2siblings.fi	binary	Finnish listed
			0	No [self-report]
			1	Yes [self-report]
	DB	p2siblings.se	binary	Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	DC	p2siblings.en	binary	English listed
			0	No [self-report]
			1	Yes [self-report]
	DD	p2siblings.oth	binary	Other language listed
			0	No [self-report]
			1	Yes [self-report]
	DE	p2siblings.fs	binary	Finnish and Swedish listed
			0	No [self-report]
			1	Yes [self-report]
	DF	p2siblings.first	factor	Which language is listed first
			fi	Finnish
			se	Swedish
			en	English
			oth	Other
	DG	family	open	If this family situation does not fit to you, write in your own words.
			text	Text the participant has written [omitted]

Q	Table	Variable name	Option	Description
15	DH	seen.vocab	scale	English and Swedish have a lot of similar words
			1	I strongly disagree
			8	I strongly agree
	DI	fien.similar	scale	I think Finnish and English are very similar to each other
			1	I strongly disagree
			8	I strongly agree
	DJ	fien.easy	scale	If you know Finnish, learning English is easy
			1	I strongly disagree
			8	I strongly agree
	DK	seen.sound	scale	English sounds a lot like Swedish
			1	I strongly disagree
			8	I strongly agree
	DL	fien.vocab	scale	English and Finnish have a lot of similar words
			1	I strongly disagree
			8	I strongly agree
	DM	seen.easy	scale	If you know Swedish, learning English is easy
			1	I strongly disagree
			8	I strongly agree
	DN	seen.similar	scale	I think Swedish and English are very similar to each other
			1	I strongly disagree
			8	I strongly agree
	DO	fien.sound	scale	English sounds a lot like Finnish
			1	I strongly disagree
			8	I strongly agree
	DP	seen.average	scale	Mean for pair Swedish and English
			1	Very different
			8	Very similar
	DQ	fien.average	scale	Mean for pair Finnish and English
			1	Very different
			8	Very similar
	DR	fise.dist	value	Differense between DP and DQ
			0-7	The distance between the two average ratings
	DS	fise.score.sound	value	Perceived distance difference, sound [DO minus DK]
			-7	Swedish is extremely similar to English compared to Finnish
			0	Swedish and Finnish are as similar to English
			7	Finnish is extremely similar to English compared to Finnish
	DT	fise.score.similar	value	Perceived distance difference, similar [DI minus DN]
			-7	Swedish is extremely similar to English compared to Finnish
			0	Swedish and Finnish are as similar to English
			7	Finnish is extremely similar to English compared to Finnish
	DU	fise.score.easy	value	Perceived distance difference, easy [DJ minus DM]
			-7	Swedish is extremely similar to English compared to Finnish
			0	Swedish and Finnish are as similar to English
			7	Finnish is extremely similar to English compared to Finnish
	DV	fise.score.vocab	value	Perceived distance difference, vocabulary [DL minus DH]

Q	Table	Variable name	Option	Description
			-7	Swedish is extremely similar to English compared to Finnish
			0	Swedish and Finnish are as similar to English
			7	Finnish is extremely similar to English compared to Finnish
	DW	fise.score	value	Perceived distance difference, average [(DS+DT+DU+DV)/4]
			-7	Swedish is extremely similar to English compared to Finnish
			0	Swedish and Finnish are as similar to English
			7	Finnish is extremely similar to English compared to Finnish
	DX	lost.fi	scale	When I cannot remember a word in English I usually think about a Finnish word.
			1	I strongly disagree
			8	I strongly agree
	DY	lost.se	scale	When I cannot remember a word in English I usually think about a Swedish word.
			1	I strongly disagree
			8	I strongly agree
	DZ	lost.balance	value	The difference between thinking Finnish and Swedish words. Calculated [DX-DY].
			-7	Swedish dominance
			0	Balanced
			7	Finnish dominance
N/A	EB	fill.lng	factor	Language used to fill the background questionnaire
			en	English
			fi	Finnish
			se	Swedish
			enfi	English and Finnish
			ense	English and Swedish
			ensefi	English, Swedish and Finnish