Phonological Adoption through Bilingual Borrowing

Comparing Elite Bilinguals and Heritage Bilinguals

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Abstract

In the phonological integration of loanwords, the original structures of the donor language can either be preserved (i.e. adopted) as innovations or altered to fit the existing system of the recipient language (i.e. adapted). This dissertation aims to contribute to a better understanding of adoption as an underresearched integration strategy by investigating how structural (i.e. phonetic, phonological, morpho-phonological) and non-structural (i.e. sociolinguistic and psycholinguistic) factors interact in determining when a particular donor-language structure will be adopted instead of being adapted. Factors that affect the accuracy of the structure's perception and production in the donor language as a result of its acquisition as a second language are also given special consideration. The three studies that are included in the dissertation examine how the same phonological structure from different donor languages is integrated into the same recipient language Turkish by two different types of initial borrowers: elite bilinguals in Turkey and heritage bilinguals in Sweden. The three investigated phonological structures are word-final [l] after back vowels, long segments in word-final closed syllables, and word-initial onset clusters. The hypothesis is that adoption will be more prevalent in heritage bilinguals than in elite bilinguals. Four necessary conditions for adoption are identified in the analysis of the results. Firstly, the donor-language structure must have high perceptual salience. Secondly, the borrowers must have acquired the linguistic competence to produce a structure accurately. Thirdly, the borrowers must have sufficient sociolinguistic incentive to adopt a structure as an innovation. Higher dominance in the donor language as a second language and positive attitudes in the borrowers contribute to the sociolinguistic incentive. Fourthly, prosodic structures require higher incentive to be adopted than segments (and clusters of segments). The hypothesis is only partially confirmed. Two types of counter-examples are found. On the one hand, the reverse of the hypothesis is attested when the structure has high salience in the language from which the elite bilinguals have borrowed it but has low salience in the language from which the heritage bilinguals have borrowed it. On the other hand, no difference is found between elite and heritage bilinguals when the structure has a low degree of acquisition difficulty making it equally likely to be acquired and adopted by elite bilinguals as by heritage bilinguals. In other cases, as predicted, heritage bilinguals display significantly higher adoption rates than elite bilinguals.

Keywords: loanword phonology, language contact, bilingualism, second-language acquisition, perceptual salience, language dominance, linguistic variation, sociolinguistics, Turkish.

Anneme ve babama,
sizin desteğiniz olmadan dilbilimci olamazdım.

For my parents,
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II. Aktürk-Drake, M. (2014). The role of perceptual salience in bilingual speakers' integration of illicit long segments in loanwords. *Lingua*, 143, 162−186.

III. Aktürk-Drake, M. (submitted) Adoption in loanword phonology: Looking beyond linguistic competence.

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1 Introduction

The beginnings of what has today become the field of *loanword phonology* can be traced back to Haugen's (1950) and Weinreich's (1953) first systematic studies on *borrowing* (Kang 2013). From the 1950s until the early 1990s, phonological aspects of borrowing were not singled out as a special focus in research but rather treated alongside other structural and lexical issues regarding borrowing, notwithstanding certain exceptions such as Hyman (1970) and Holden (1976). This broad approach to research on borrowing also encompassed non-structural (i.e. extra-linguistic) aspects such as the sociolinguistic context of borrowing. The breadth of this approach was owed to the fact that most researchers publishing on the subject were more generally interested in linguistic phenomena related to bilingualism and/or language contact (Haugen 1950; Johanson 1992; Poplack, Sankoff & Miller 1988; Thomason & Kaufman 1988; Weinreich 1953). Both *adaptation* (i.e. the alteration of original structures to fit the recipient language) and *adoption* (i.e. the preservation of original structures as contact-induced innovations) were discussed by these authors as possible options in the phonological integration of borrowings. This broad approach to borrowing can also be observed in later research on language contact and language change (Croft 2000; Winford 2003; Matras & Sakel 2007; McMahon 1994).

In bilingualism research, following the influential paper by Poplack (1980), the more rigorous study of *code-switching* also directed more attention towards borrowing in the 1980s and 1990s (Poplack et al. 1988; Myers-Scotton 1993; Poplack, Wheeler & Westwood 1987). As theories of code-switching were being developed, it became more and more important to propose qualified criteria for distinguishing code-switching from borrowing. One of the criteria that were discussed for this purpose was the degree of a word's phonological integration (Di Sciullo, Muysken & Singh 1986; Muysken 2000:70; Myers-Scotton 1993; Poplack 1980; Romaine 1995:153), but these discussions remained rather superficial from the perspective of loanword phonology.

Initially, loanwords did not attract much attention from phoneticians and phonologists. Consequently, the relevance of phonetic details and the role of perception in loanword phonology remained largely unexplored until the

1990s, and no serious attempts were made to formalise and model the loanword integration process. This started changing in the early 1990s with the publication of Silverman's (1992) and Yip's (1993) influential work on the role of perception in loanword adaptation. Around the same time, the advent of constraint-based phonological theories such as Optimality Theory (Prince & Smolensky 1993), for which loanword data offered important opportunities for theoretical advances, increased the interest in loanwords among phonologists (Kang 2011). Thus, loanword phonology emerged as a specialised subfield within phonology in the late 1990s and 2000s.

One effect of this increased specialisation was a narrower focus on structural factors. This meant that ties to the earlier broad approach to borrowing became weaker, and non-structural factors were given minimal attention in studies published during these two decades (e.g. Boersma & Hamann 2009; Jacobs & Gussenhoven 2000; Silverman 1992; Yip 1993). Another consequence of this new approach among phonologists was that adaptation came to be viewed practically as the necessary outcome of loanword integration. Hence, adoption received much less attention as an alternative to adaptation. Studies by Paradis and LaChartité (1997, 2008) constitute the most notable exceptions to this narrow approach while some other studies mention adoption in passing (Davidson & Noyer 1997; Holden 1976; Itô & Mester 1999).

In more recent studies, a renewed interest in a broader approach to loanword phonology can be discerned. New research seems to be paying greater attention to the borrowers' language background and to the sociolinguistic context of borrowing in order to provide explanations that rely on both structural and non-structural factors (e.g. Broselow 2009; Friesner 2009; Kang 2010). The present dissertation follows this new trend towards a broader approach and can be viewed as a further attempt to combine insights from phonetics, phonology, contact linguistics, bilingualism research and second-language acquisition.

2 The objectives and structure of the dissertation

Based on a survey of studies on loanword integration, Kang (2011) identifies five types of "puzzling emergent patterns" that require explanation in loanword phonology. One of these patterns is what she refers to as "differential importation [i.e. adoption]", that is "the fact that only certain structures, but not others, are imported" (Kang 2011:2260). The main objective of this dissertation is to provide a comprehensive explanation to this puzzle that has hitherto not received much attention in loanword phonology. The overarching research question can be reformulated in a broader way as follows: Why are certain sound structures adopted in *some cases* of borrowing while they are adapted in other cases? In keeping with Kang's original formulat-

ion, this dissertation also examines why *some structures* are adopted while others are adapted in the same case of borrowing.

It is investigated under which structural (i.e. phonetic, phonological and morphological) and non-structural (i.e. psycholinguistic and sociolinguistic) conditions adoption is preferred to adaptation in loanword phonology when the borrowing is carried out by bilinguals. Turkish is the recipient language and the first language of the speakers in all investigated cases. The focus is, on the one hand, the integration of established historical loanwords from Arabic, French and English by elite bilinguals in Turkey, and the integration of new elicited borrowings from Swedish by heritage bilinguals in Sweden, on the other. The examined structures are word-final front [l] after back vowels in simplex and suffixed environments (Study I), long segments in the word-final rime (Study II) and word-initial onset clusters (Study III). All three types of structures are illicit in native Turkish phonology, which raises the question if they will be adapted or adopted in borrowing.

The dissertation is based on three papers, in each of which the phonological integration of one specific structure is compared in two different cases: one where the integration is carried out by *elite bilinguals* in Turkey and one where it is carried out by *heritage bilinguals* in Sweden. The most important differences between the contexts where the elite bilinguals and the heritage bilinguals had grown up and still lived was the *socio-political status* of the recipient language Turkish as a majority or minority language, and the *degree of community bilingualism*. Based on earlier language-contact research, which has shown that adoption is more common when the recipient language has minority-language status and when the proportion of bilinguals is great, it is hypothesised in this dissertation that the context of heritage bilingualism in Sweden should be more conducive to adoption than the context of elite bilingualism in Turkey.

The dissertation argues that although heritage bilingualism is generally more conducive to adoption than elite bilingualism, the salience properties of the particular phonological structure in question can give rise to the opposite outcome in some cases. In addition to testing the aforementioned hypothesis, it is also demonstrated in great detail *how* different psycholinguistic, sociolinguistic and structural factors interact with one another in producing different outcomes. This is accomplished with the help of two central concepts: the *linguistic competence* and the *sociolinguistic incentive* to adopt foreign structures. These concepts are first introduced in Study I, included in Study II and more extensively developed in Study III. An important innovation in this dissertation is the incorporation of key psycholinguistic and structural findings from second-language acquisition research as a fundamental component into the field of loanword phonology. It is demonstrated how linguistic competence in donor-language structures is generally influenced by the psycholinguistic and sociolinguistic context of second-language acquisition

(Study III), and more specifically by the degree of acquisition difficulty associated with the phonological structures in question (Study II). This dissertation joins previous research in its observation that the sociolinguistic incentive to adopt is underpinned by several sociolinguistic factors on the societal level (Studies I and II).

The investigation of adoption through bilingual borrowing also enables the dissertation to readdress some issues that have received considerable attention in loanword phonology in the past two decades (Calabrese & Wetzels 2009; Kang 2011). The first such issue is *the nature of the input* into the integration process. This concerns whether the input is phonetic or phonological, and whether this issue depends on the borrowers' status as monolinguals or bilinguals (Studies I and II). The results indicate that the input is phonetic in nature, even when the borrowers are bilinguals who have access to phonological representations. A second related issue is what *the role of perception* is when the borrowers are bilinguals. The analysis in Study II reveals that perceptual filtering is not only relevant when the borrowers (or subsequent users) are monolingual but also when the borrowers are bilingual. However, it is argued that the *type* of perceptual filtering applied can differ depending on the linguistic competence of the borrowers.

Finally, two further issues that have received very little attention in the literature are explored. Firstly, with the help of statistical methods Study III presents an attempt to operationalise *individual bilingual speakers'* sociolinguistic incentive to adopt foreign structures. Based on results from all three studies, it is argued that a bilingual speaker's self-reported *language dominance* constitutes a good predictor of her/his sociolinguistic incentive to adopt. Studies I and II offer both a reconstruction of the initial bilingual borrowers' integration pattern in historical loanwords and information on the contemporary norms of loanword use by monolingual speakers. This diachronic perspective facilitates a nuanced discussion of the different roles played by bilinguals and monolinguals in what is referred to here as *bilingually-mediated borrowing*. This concerns cases where the initial borrowers are bilinguals but where most subsequent loanword users are monolinguals who receive their oral input from the bilinguals. The investigation of the mediation process facilitates answering the question as to why *some* bilingual adoptions are faithfully maintained (i.e. adopted) by subsequent monolingual users while others are altered (i.e. adapted) instead.

The remainder of the dissertation is divided into several sections. Section 3 introduces some fundamental concepts and definitions. Section 4 focuses on non-structural factors while Section 5 discusses structural factors that impact phonological adoption. The summaries of the three studies and a complement to Study I are presented in Section 6. Section 7 consists of a discussion of all three studies' findings from different perspectives while Section 8 summarises the conclusions of the dissertation. In Section 9 some

possible directions for future research are mentioned, followed by references in Section 10.

3 Fundamental concepts and definitions

This section consists of sub-sections that are devoted to bilingualism and it types, borrowing versus code-switching, and the prevalence of adoption.

3.1 Bilingualism and its types

There are many different definitions of bilinguals that vary regarding the narrowness of their scope and the criteria they use. What is important to emphasise from this dissertation's perspective is that the investigated initial borrowers were not monolinguals (i.e. speakers with little or no proficiency in the donor language) but rather speakers with substantial proficiency in the donor language, varying from an intermediate to a nativelike level. Therefore, a broad definition of bilingualism seems more appropriate here. The following basic definition provided by Myers-Scotton (2005:44) serves this purpose: "Bilingualism is the ability to use two or more languages sufficiently to carry on a limited casual conversation." Hence, when a borrower is called bilingual in this dissertation he/she fulfils *at least* the above criterion by Myers-Scotton. However, for the specific purposes of Study III, a narrower (or more restrictive) definition of bilingualism is used in that study.

There are also many different socio-political circumstances on the macro and micro levels that give rise to different types of bilingualism, which can make a difference for the outcome of the borrowing. Two distinct types of bilinguals, elite bilinguals and heritage bilinguals, are the focus of this dissertation because adoption was a priori hypothesised to be likely in these groups. Holding the speakers' first language constant as the recipient language, the main socio-political difference between the macro-contexts of these two types of bilingualism is that the donor language is the *majority language* in heritage bilingualism but not in elite bilingualism.

Elite bilinguals are viewed here as speakers who belong to a small socio-economically privileged (hence elite) bilingual minority in their first-language community. Thanks to the opportunities provided by their elite status, these speakers are able to develop bilingualism in their first language, which is the majority language in their socio-political context, and in an additional language of high prestige through education (de Mejía 2002:5; Skutnabb-Kangas 1984:97). In this dissertation, this additional language is either a *classical language* like Arabic or an *international lingua franca* like French or English. In other cases, it can also be a *colonial language*.

The type of *heritage bilinguals* that is included in this dissertation are children of immigrants. Their parents have grown up in Turkey, where their first language Turkish was the majority language, and have later moved to Sweden as adults. The heritage bilinguals have themselves grown up in predominantly Turkish speaking homes in Sweden. Their first language (L1) Turkish is an immigrant heritage language in Sweden, where their second language (L2) Swedish is the majority language. Throughout this dissertation, the term L1 is used for Turkish because it was chronologically the first acquired language for almost all of the participants, who typically acquired their L2s after their L1 (except for two participants in Studies I and II). Although most of these adult heritage bilinguals reported being dominant in Swedish, the fact that the great majority of them indicated that they still used Turkish on a regular basis suggests that their bilingualism was *stable* with no conspicuous signs of language shift. Hence, these young adults are heritage bilinguals because they have acquired one of their languages as part of their family's cultural heritage and the other as the dominant language in the context where they grew up. According to the different types of heritage languages proposed by Fishman (2001), Turkish would be classified as an immigrant heritage language in the Swedish context. Furthermore, the Turkish linguistic heritage is still *vital* due to the recency of immigration and successful maintenance in the second generation.

3.2 Borrowing versus code-switching

When the speakers who use words from another language are bilinguals, it is important to determine that what is being observed is indeed borrowing and not code-switching. Especially when the phonological integration strategy that is being studied is adoption, where the original form of the words is preserved, it becomes crucial to distinguish borrowing from code-switching.

Different *types and degrees of integration* have been established in the bilingualism literature as criteria or guidelines for distinguishing borrowings from code-switches. The traditional view is that *longer stretches of speech* from another language, which are not integrated into the main or recipient language, count as code-switching, whereas *single words or phrases* tend to be borrowings (Park 2004; Poplack & Meechan 1998). The most established criterion for a borrowing is its *morpho-syntactic integration* into the recipient language (Poplack 1980; Sankoff, Poplack & Vanniarajan 1991). Hence, when the word receives affixes from the recipient language and follows the rules of its syntax, it is considered to be a borrowing.

Phonological integration (i.e. adaptation to the recipient language) has also been used as a criterion for borrowings by some researchers (Di Sciullo et al. 1986) and to distinguish between different *types* of borrowing by others (Poplack 1980; Poplack et al. 1987). Many researchers, who view certain

words as borrowings on morpho-syntactic grounds, have commented that these words' degree of phonological integration can be highly *variable* (Muysken 2000:70; Myers-Scotton 1993:180; Romaine 1995:153). This attested variability makes phonological integration rather unreliable as a criterion for distinguishing between borrowing and code-switching. Therefore, the criteria regarding length and morpho-syntactic integration constitute a much sounder base when comparing borrowing and code-switching.

Borrowings can also be divided into sub-types depending on their degree of *lexical conventionalisation*. Foreign words that have been in circulation for a long time and are well established and conventionalised throughout a language community will be referred to as *loanwords* in this dissertation. Foreign words that are *not* used by the larger community can still be used regularly by individual speakers (*non-conventionalised borrowings,* called *idiosyncrasies* in Poplack et al. 1988) or only used by a single speaker on only one occasion (*nonce-borrowings* in Poplack et al. 1988). Both these latter types will henceforth be collectively referred to as borrowings.

There are several good reasons for excluding the possibility that the words investigated in this dissertation are code-switches. The Arabic, French and English words that have been in use for many generations constitute a clear-cut case of loanwords. The case of new Swedish borrowings in Studies I and II deserves more attention. Firstly, all of these Swedish words consist of short stretches of speech as they are either single nouns or short nominal phrases. Secondly, they are always syntactically integrated into Turkish due to the requirements of the elicitation tasks used. Thirdly, in many cases they are also morphologically integrated as they are suffixed with Turkish suffixes. Finally, the results show that the foreign phonological structures featured in them are not necessarily adopted, even when the borrowers have the competence to adopt them. This means that they are sometimes even phonologically integrated into Turkish. The fact that these words largely consist of proper nouns does not make a significant difference, as it has been shown that proper nouns and generic nouns behave the same way in mixed language use (Park 2006). Therefore, it can be claimed with certainty that the cases discussed in this dissertation do not constitute code-switches. There are, however, different *types* of Swedish borrowings. Most of them consist of either non-conventionalised borrowings assumed to be in use among Turkish speakers in Sweden, or of loanwords, that are also in use in Turkey. It is also possible that there are a few cases of nonce-borrowings that the speakers had previously not used.

3.3 The prevalence of adoption

An illicit donor-language structure in a borrowed word can be subjected to two different phonological integration strategies: adaptation and adoption.

Adaptation entails altering the original form of the donor-language structure in a number of different ways. Adoption, on the other hand, entails preserving the original structure as it is in the donor language. In loanword phonology and contact linguistics, the predominant assumption is that adaptation is the more common outcome of the integration process. This is very probably a correct observation, although differences between different contexts of borrowing should still be taken into account before making sweeping claims. Nevertheless, it is important to ask how uncommon adoption really is. Is it so rare that it is almost justified to ignore it altogether as an alternative to adaptation, or is it prevalent enough to merit being taken into account as an alternative to adaptation in models of loanword integration?

Paradis and LaCharité (1997:381) have gathered a large *metacorpus* of loanwords consisting of data from five different corpora with borrowings from French and English in several different recipient languages. Their corpus includes 3,796 borrowings and 15,686 phonological items of analysis, and is one of the biggest of its kind. The phonological integration of the borrowings was analysed with the help of the categories adaptations, deletions and non-adaptations (i.e. adoptions). In this corpus, adaptation is attested in 78.5 percent of all cases, while the rates of adoption and deletion are 17.9 percent and 6.1 percent, respectively.

Another important source of information on the prevalence of adoption is the category *loan segment* in the UCLA Phonological Segment Inventory Database (UPSID). This database includes 768 different types of segment found in the phoneme inventories of 451 languages in the world. The calculations made for this dissertation on the basis of these data show that 19 percent of the UPSID languages have *at least* one loan segment and that 9 percent of the UPSID segments have been borrowed as loan segments into *at least* one UPSID language.

Based on these percentages concerning the prevalence of adoption, it must be concluded that any serious model of loanword integration should be able to account for the preference for adoption over adaptation because adoption is too prevalent to be ignored. However, since adaptation is so much more prevalent, it is equally important that models of loanword integration also have *sufficiently restrictive conditions for adoption* in order to be able to account for its low prevalence.

4 Non-structural factors in phonological adoption through lexical borrowing

Psycholinguistic and sociolinguistic factors that influence the preference for adoption are treated under the joint heading *non-structural factors* in this section. According to Thomason (2001:85), sociolinguistic factors can

"trump" other factors in borrowing given the right social circumstances of contact. The primacy of sociolinguistic factors can be reframed in the following way. The sociolinguistic context that constitutes the background to language contact and to lexical borrowing also *indirectly* influences the borrowers' overall proficiency in the donor language by underpinning the psycholinguistic conditions for their acquisition process. In addition to influencing overall proficiency via psycholinguistic factors, sociolinguistic factors *directly* impact the borrowers' incentive to adopt those foreign structures that they can produce accurately. Nonetheless, this dissertation will argue that sociolinguistic factors cannot override structural factors that can hinder adoption.

4.1 Sociolinguistic factors that make adoption more likely

Even when borrowers have the necessary competence to accurately produce a specific word in the donor language, which is often their L2, they are sometimes known to alter its pronunciation (i.e. adapt it) when they produce the same word as a loanword in their L1, the recipient language (Friesner 2009b). Therefore, several authors have argued that taking sociolinguistic factors into consideration is necessary in loanword phonology (Friesner 2009a, 2009b; Paradis & LaCharité 1997, 2008; Thomason 2001).

The most commonly mentioned sociolinguistic factors include the *degree of community bilingualism* (Croft 2000:201–207; Friesner 2009b; Haugen 1950; Heffernan 2005; Johanson 2002:5–6; Paradis & LaCharité 1997, 2008, 2009; Sakel 2007:19, 25; Thomason 2001:70–71), the *socio-political status* of the recipient language as a minority or majority language (Poplack et al. 1988; Thomason 2001), the *socioeconomic dominance* relationship between donor and recipient language communities (Thomason 2001:66) as well as *attitudes towards language mixing* including borrowing (Friesner 2009b; Poplack et al. 1988; Thomason 2001). This body of research concurs that the socio-political status of the recipient language as a minority (i.e. heritage) language, and a high degree of community bilingualism increases the likelihood of adoption. Therefore, it is expected in this dissertation that the heritage bilinguals in Sweden will have higher sociolinguistic incentive to adopt compared to the elite bilinguals in Turkey. Put differently, the more present the donor language is in the everyday lives of the recipient-language speakers the less conspicuous it will be to borrow structures from it in loanwords. Perhaps, it will even be desirable to do so, especially if most interlocutors have similar bilingual backgrounds.

A useful cover term encompassing different sociolinguistic factors used by Thomason (2001:66) is the *intensity of contact*, which she describes as "the amount of cultural pressure exerted by one group of speakers on another". The intensity of contact is based on the degree of community bi-

lingualism, the "fluency of the borrowers" and "attitudes and other social factors" in the recipient-language community (Thomason 2001:70–71).

Several studies have compared cases of contact with different intensities involving the same donor language, and either the same recipient language or closely related (and structurally comparable) recipient languages. These studies have shown that higher intensity of contact is more conducive to adoption. Poplack et al. (1988) found that adoption in borrowings from English in French was more common in predominantly Anglophone Ottawa than in predominantly Francophone Hull. Sandfeld (1930) and Marioţeanu, Glosu, Ionescu-Ruxandolu and Todoran (1977) examined the phonological integration of the Greek fricatives /θ/, /ð/ and /γ/ in Greek loanwords in two areas with divergent intensities of contact with Greek. In predominantly Slavophone regions, where the recipient language Aromanian was the majority language, the fricatives were adapted as stops, whereas in areas where Greek was the majority language, the fricatives were adopted in the recipient minority languages Macedonian and Arvanitika.

Another type of example for the adoption-boosting effect of higher intensity of contact is the phenomenon of *renorming* in the pronunciation (and sometimes also in the orthography) of established loanwords. In renorming, the old form of the loanword stemming from its initial period of borrowing with low intensity of contact is revised to become closer or identical to its donor-language form in a later period where the intensity of contact is higher. Thomason (2001:135) reports that early Russian loanwords in Siberian Yupik were nativised (i.e. fully adapted) when the degree of bilingualism was low. Later, when the degree of bilingualism and the Yupik speakers' fluency in Russian had increased, the phonological form of some established Russian loanwords was renormed to include more structural adoption. Thomason (2001:73) gives the Russian word *čaj* 'tea' as an example, whose pronunciation was first fully adapted as *saja* but was later changed to the faithful *čaj*. Another example of renorming is mentioned by Weinreich (1953:26) who reports that some Yiddish speakers switched from substituting the English /w/ with /v/ (i.e. adaptation) to adopting it in American place names such as *Washington* after having immigrated to the USA.

4.2 Psycholinguistic factors in L2 acquisition that make adoption more likely

As Thomason (2001:69) states, "since you cannot borrow what you do not know, control of the source language's structure is certainly needed before structural features can be borrowed." Concepts similar to linguistic competence are commonly used as explanatory factors in research concerning contact-induced change (e.g. Matras 2007; McMahon 1994; Johanson 2002; Thomason 2001). Hence, possessing the necessary competence to accurately

produce foreign structures makes adoption more likely because it is a prerequisite for adoption.

In bilingual borrowers, this competence is obtained through the acquisition of the donor language as an L2. However, being bilingual does not necessarily entail having the competence to accurately produce *all* donor-language structures (i.e. having a nativelike accent). Depending on the conditions of L2 acquisition, some bilinguals achieve nativelike accents while others do not. Therefore, it would be useful to know which acquisition conditions typically result in a nativelike accent.

This is why the psycholinguistic factors that have been found in second-language acquisition research (SLA) to have a robust effect on nativelikeness of accent are relevant for loanword phonology. With regard to nativelikeness of accent in L2 pronunciation, Piske, Mackay and Flege (2001) found the following three factors to have the greatest impact: *motivation, age of onset for L2 acquisition* and *foreign-language aptitude*. Since foreign-language aptitude varies considerably in larger populations (Abrahamson & Hyltenstam 2008), significant differences in wide-spread cases of borrowing are not to be expected. Therefore, this factor is not investigated in this dissertation.

Motivation is typically influenced by the prestige and status of the target language. Individual differences notwithstanding, motivation can be expected to be higher concerning the acquisition of an L2 that enjoys majority-language status in comparison to the acquisition of a foreign language that is not the majority language (Oxford 2002:247). It is, therefore, expected that the heritage bilinguals in Sweden will have had higher motivation to acquire their L2 than the elite bilinguals in Turkey.

The age of onset for L2 acquisition has been consistently shown to be a robust predictor of the nativelikeness of L2 pronunciation (Munro & Mann 2005; Piske et al. 2001). However, there is no agreement in the literature as to whether acquisition needs to start within a stipulated *critical period* such as before puberty (for an overview see Abrahamsson & Hyltenstam 2009) or whether the probability of nativelike pronunciation decreases linearly with increasing biological age (Flege 1995; Hyltenstam & Abrahamsson 2003). Different cut-off points for a critical period regarding nativelike pronunciation have been proposed by different researchers. Nonetheless, what all studies on this subject have in common is the claim that phonology is *most sensitive* to age-of-onset effects among all levels of language (Piske et al. 2001:195). Generally, heritage bilinguals tend to have earlier ages of onset for their L2 acquisition due to growing up in an L2-majority context compared to elite bilinguals whose first exposure to another language typically occurs in school. Therefore, this makes it more likely for the heritage bilinguals to achieve nativelike accents (i.e. higher phonological competence) in their L2. Consequently, adoption is more likely in heritage bilinguals than

in elite bilinguals. This relevance of the age factor for adoption was already identified by one of the first modern linguists to study loanwords. Haugen (1950:216–217) indicated that "childhood bilingualism", where L2 acquisition starts already in childhood (often attested already in the second generation in immigrant communities), facilitates the "importation" (i.e. adoption) of completely new donor-language sounds.

Another potentially relevant non-structural factor is the *degree of exposure* to the L2. Although the evidence concerning the effects of the degree of exposure in the SLA literature is not conclusive (Piske et al. 2001:197–201), several studies point to the positive effects of higher degrees of exposure for progressing towards a more nativelike pronunciation (Derwing 2008:350; Flege 1992, 2012). In this dissertation, higher degrees of L2 exposure are expected among the heritage bilinguals in Sweden compared to the elite bilinguals in Turkey due to the fact that the former group has spent most of their lives in an environment where the L2 was the ambient majority language.

In summary, all mentioned psycholinguistic factors related to L2 acquisition make it more likely for the heritage bilinguals to obtain higher phonological competence in their L2 than the elite bilinguals in Turkey, which gives the former group of bilinguals a more advantageous starting point for adopting foreign structures from their L2 in loanwords.

5 Structural factors in phonological adoption through lexical borrowing

The main question regarding structural factors in phonological adoption is which foreign structures are easier to borrow and how the *borrowability* patterns that are observed with reference to structural properties can be explained. These issues will be addressed in this section from the perspective of different fields of research. These fields are discussed in their own subsections and include language contact and language change, loanword phonology, and second-language acquisition.

5.1 Perspectives from language contact and language change

In this sub-section, three different themes in language contact and language change will be discussed in separate sections: the link between lexical borrowing and phonological adoption, Thomason's borrowing scale, and structural gaps and phonemicisation in language change.

5.1.1 The link between lexical borrowing and phonological adoption

The World Loanword Database (WOLD) includes information on the prevalence of lexical borrowing in 41 recipient languages and 1,460 meanings, which are claimed to be the most central meanings in all languages (Haspelmath & Tadmor 2009). The average rate of lexical borrowing among these central meanings is 24.2 percent for a language included in WOLD (Tadmor 2009:55). Although Tadmor (2009) deems this number to have a certain upward bias, it is clear that lexical borrowing is a prevalent phenomenon among the world's languages, so much so that it would probably be difficult to find a single language that has not borrowed lexical items from another.

Although it is clear that lexical borrowing is the *raison d'être* for loanword phonology, very few authors make observations or claims about the relationship between the degree of lexical borrowing and the probability of phonological adoption. Winford (2003:37, 54–56) constitutes a rare exception to this. He mentions a causal chain of contact that makes phonological adoption more likely, which can be summarised as follows.

dominance of donor language	→	substantial lexical borrowing	→	phonological borrowing

Regarding the beginning of the chain, Winford (2003:37) remarks that "the power and prestige differences between the (speakers of the) languages involved play[s] an important role in promoting lexical borrowing from the High to the Low language." Thus, when the donor language and/or its speakers have a clearly *dominant* status, a status that is higher than that of the recipient language (speakers), the degree of lexical borrowing (i.e. the number of borrowed words) is more likely to be high. Winford (2003:37) presents as evidence for this the study by Treffers-Daller (1999) on French-Flemish contact in Brussels and French-Alsatian contact in Strasbourg, two contexts where French was the dominant language.

Further evidence is found in the case of Mandarin Chinese, which has the lowest lexical borrowing rate among the languages in WOLD (Tadmor 2009:57). Two of the main sociolinguistic factors behind this result were the language's regional dominance and the *linguistic purism* of its speakers (Tadmor 2009:58). According to Thomas (1991:12), "[p]urism is the manifestation of a desire on the part of a speech community (or some section of it) to preserve a language form, or rid it of, putative foreign elements or other elements held to be undesirable (including those originating in dialects, sociolects and styles of the same language)." Thomas (1991:68) goes on to remark that "[s]ince loanwords constitute the most readily recognizable element of foreign influence in a language, it is hardly surprising that they should be the most prone to puristic intervention." A relevant question is

what the target of this puristic intervention will be. Based on Ševčik (1974–75:56), Thomas (1991:75–76) points out that theoretically purism can be directed indiscriminately at *all* foreign elements or at structures from a *specific* language. However, it is rarely directed at specific phonological structures in the loanwords (Thomas 1991:63). Accordingly, linguistic purism towards loanwords is treated in this dissertation as a cultural tendency to have negative attitudes towards lexical borrowing in general, regardless of the specific donor language in question. Attitudes towards specific donor languages are treated as a separate factor.

The fact that lexical borrowing is often linked to the donor language's and its speakers' political, economic and cultural dominance vis-à-vis the recipient language and its speakers, is sometimes also recognised in politics. In political discourse, certain prestigious and popular lingua francas such English, or foreign linguistic influences, can be labelled as threats towards the status of the recipient language. Such perceived threats can consequently trigger puristic intervention. An extreme example of such puristic intervention against loanwords involves the utilisation of laws and legal fines. According to Oakes (2001:159–161), one of the foremost goals of the Bas-Lauriol Law of 1975 (law 75-1349) and the Toubon Law of 1994 (94-665) in France was to protect the French language and to "counteract the *de facto* dominance of English in France." The Toubon law mandates *inter alia* that texts used by public agents in public communication must be available in French and that breeches against it are subject to legal fines. This provision can apparently also be directed towards loanwords that feature in French texts. Finegan (2008:52) reports that "for using the borrowed term *jumbo jet*, Air France received a stiff fine from the French government, which had insisted that *gros porteur* was the proper French name [...]."

Given that linguistic purism towards loanwords is a documented phenomenon, it is only logical, as also implied by Winford's chain, that the recipient community will resist structural borrowing such as phonological adoption if it is generally averse to lexical borrowing. As for the end of the chain, Winford (2003:54) claims that "[o]ne of the conditions under which [the borrowing of phonological features] tends to occur is the substantial importation of foreign lexical items along with foreign phones or phonemic distinctions." Hence, if the lexical borrowing of foreign words containing specific original phonological structures is not substantial (i.e. the number of such loanwords is low), the likelihood that the foreign structures that they contain will be adopted will also be low. Winford (2003:55) also comments that "[o]n the whole, phonological borrowing, even under heavy lexical borrowing, appears to be quite rare and subject to strong constraints." These structural constraints mentioned by Winford (2003:55–56) will be presented later in Section 5.1.3.

5.1.2 Thomason's borrowing scale in language contact

It is not uncommon in contact linguistics to base the discussion of borrowability on the *interaction between structural and non-structural factors*. The foremost example of this is Thomason's *borrowing scale* (Thomason 2001:70–71; Thomason & Kaufman 1988). The central tenet of this scale is that certain types of structural features are more likely to be borrowed if the intensity of contact between donor and recipient languages is high.

Based on a survey of a large number of borrowing cases, Thomason divides the intensity of contact into four ascending *levels* from casual to intense, as summarised in the first column in Table 1. For every level, a range of different structural and lexical features, which were attested as borrowed features, are listed according to the different levels of contact. In the last column of Table 1, the phonetic, phonological and morpho-phonological borrowed features that are mentioned by Thomason (2001:70–71) can be seen.

Haugen (1950:216–217) has a similar approach to the likelihood of adoption based on a three-stage system consisting of a "pre-bilingual period", a subsequent "period of adult bilingualism" and finally a "period of childhood bilingualism" based on a scenario of increasing contact and bilingualism in the recipient community. In terms of its non-structural parameters, Haugen's pre-bilingual period with very few adult bilinguals resembles Thomason's Level 1 in Table 1 with no adoption and irregularities in the adaptation pattern. The period of adult bilingualism with a substantially higher portion of bilingual adults resembles Level 2 and results in greater regularity in adaptation but still lacks adoptions (in contrast to Thomason's Level 2). In Haugen's period of childhood bilingualism, which roughly corresponds to Levels 3 and 4 in Table 1, and where bilingualism is so wide-spread that the donor language is acquired already in childhood, adoption becomes possible in loanwords. An important difference between Haugen's and Thomason's approaches is the importance ascribed to the *age factor* by Haugen.

On the basis of the documented types of phonological borrowing in Table 1, some useful generalisations can be made regarding phonological borrowability. Firstly, phonological borrowing requires Level 2 as its minimum intensity of contact. Secondly, while segmental features (i.e. new phones in Table 1) can be borrowed already on Level 2, supra-segmental features (i.e. prosody in Table 1) and morpho-phonological features (i.e. morphophonemic rules in Table 1) require a higher intensity of at least Level 3. This means that segmental features are more easily borrowable than both supra-segmental and morpho-phonological features. The general explanation provided by Thomason (2001:71) for such patterns of structural borrowability is the structures' "relative degrees of integration into organized grammatical subsystems." In terms of phonological borrowing, this means that segmental borrowing is easier than supra-segmental borrowing because the supra-

Table 1. Phonological borrowing [i.e. adoption] in Thomason's borrowing scale (based on Thomason 2001:70–71).

Level of contact	Degree of community bilingualism and fluency of borrowers	Attitudes and other social factors	Attested borrowing of phonetic, phonological or morpho-phonological structures
1. Casual	Few bilinguals among borrowing-language speakers Borrowers need not be fluent in the source language.	–	1. No structural borrowing of any kind [i.e. no phonological adoption]
2. Slightly more intense	Bilinguals probably a minority among borrowing-language speakers Borrowers must be reasonably fluent bilinguals.	–	2. New phonemes realised as new phones, but in loanwords only
3. More intense	More bilinguals	Favouring borrowing	3a. [Change in] phonetic realisations of native phonemes 3b. Loss of some native phonemes not present in the source language 3c. Addition of new phonemes even in native vocabulary 3d. [Change in] prosodic features such as stress placement, loss or addition of syllable structure constraints 3e. [Change in] morphophonemic rules
4. Intense	Very extensive bilingualism	Strongly favouring borrowing	4a. Loss or addition of entire phonetic and/or phonological categories in native words, 4b. and of all kinds of morphophonemic rules

segmental level involves a higher order of organisation than the segmental level.

Moreover, Thomason (2001:71) links this observation to "the fact that it is easier to introduce borrowings into typologically congruent structures than into typologically divergent structures (so that greater intensity of contact is needed for the borrowing of structure into typologically different langu-

ages.)" She goes on to make the consequent prediction that "languages that are typologically very different are likely to follow the borrowing scale closely, while languages that are typologically very similar are likely not to do so in all respects" (Thomason 2001:71). Thus, unless the donor and recipient languages are typologically similar, it is, in a sense, more *disruptive* for the recipient system to borrow phonological structures that affect higher levels of phonological organisation. Therefore, substantial cultural pressure is needed to *motivate* language change involving higher levels.

What would Thomason's borrowing scale predict about the outcome of the cases investigated in this dissertation? Firstly, because Turkish is typologically quite distant from Arabic, on the one hand, and from English, French and Swedish, on the other, the results of contact should follow the borrowing scale closely. In the case of the historical loanwords from Arabic, Studies I and II provide data on both the initial elite bilingual borrowers' integration pattern and the prescribed norms of loanword use in contemporary Turkey. The latter data reflect the result of a long process of transmission from the bilinguals to monolinguals, and also from monolinguals to monolinguals over a great number of generations. Therefore, the initial elite bilingual borrowers as a subset of the larger Turkish language community, and the entire Turkish language community are analysed in Table 2 as two separate groups of borrowers/users whose intensity of contact with Arabic pertained to different levels. Similarly, in the case of the French and English loanwords in contemporary Turkey, the data comprise both the prescribed norms that are found in dictionaries, and actual usage among elite bilinguals in Turkey and heritage bilinguals in Sweden. These data are also evaluated in separate categories in Table 2.

Thomason (2001:73) provides categorisations for entire language or speech communities. She categorises the case of Arabic-Turkish contact into Level 2 but suggests that a case could be made for Level 3 (Thomason 2001: 73). Based purely on the non-structural factors in Table 2, Level 2 seems like the most appropriate category for the larger community. However, since the elite bilinguals had more intense contact with Arabic in the school context, the Ottoman elites' contact was more intense (i.e. Level 3). Since the situation is quite similar in the historical contact with French as well as in the still on-going contact with English, these cases are also categorised into Level 2 here.

As for the case of the Swedish-Turkish contact, it is necessary to choose between Levels 3 and 4. In Table 2, Level 4 has been preferred, as indicated in Study I. This is due to the fact that the data came only from the second generation. In this generation, extensive bilingualism is attested as all speakers are bilingual, and most of them have advanced, if not nativelike, proficiency in both languages. Level 3 would be appropriate for characterising the entire Turkish-speaking community in Sweden, which is mid-way be-

Table 2. Applying Thomason's borrowing scale to the cases investigated in this dissertation (based on Thomason 2001:70–71).

Level of contact	Degree of community bilingualism and fluency of borrowers	Prediction regarding adoptability by the investigated borrowers/users
2. Slightly more intense *Entire language community in Turkey (prescribed contemporary norm)*	Arabic loanwords (Studies I & II): *small elite bilingual minority with non-nativelike proficiency in Arabic*	Adoption probable: 2. Word-final front [l] after back vowels (Study I) Adoption not probable: 3e. Change in the suffixation rules for [l]-final loanwords (Study I) 3d. Long segments in the word-final rime (Study II)
	French and English loanwords (Study III): *small elite bilingual minority with non-nativelike proficiency in Arabic*	Adoption not probable: 3d. Word-initial onset clusters (Study III)
3. More intense *Elite bilinguals in Turkey (reconstructed norm or actual usage)*	Arabic loanwords (Studies I & II): *most elites bilingual but with varying degrees of non-nativelike proficiency*	Adoption probable: 2. Word-final front [l] after back vowels (Study I) 3e. Change in the suffixation rules for [l]-final loanwords (Study I) 3d. Long segments in the word-final rime (Study II) 3d. Word-initial onset clusters (Study III)
4. Intense *Heritage bilinguals in Sweden (usage only in the second generation)*	Swedish borrowings (Studies I & II), Loanwords that resemble Swedish words (Study III): *extensive bilingualism in the second generation*	Adoption probable: 2. Word-final front [l] after back vowels (Study I) 3e. Change in the suffixation rules for [l]-final loanwords (Study I) 3d. Long segments in the word-final rime (Study II) 3d. Word-initial onset clusters (Study III)

tween the second and third generations, and where there is a considerable group of speakers in the first generation who are not bilingual.

Regarding the categorisation of the structures themselves, the categories to which the structures in the three studies pertain are indicated in the last column of Table 2 by using the same structural types as in the last column of Table 1. Depending on what Table 1 indicates as borrowable under respec-

tive intensity of contact, predictions as to whether the structures investigated in this dissertation are probable to be adopted are included in the last column of Table 2.

5.1.3 Structural gaps and phonemicisation in language change

So-called *structural gaps* in the phonological system are regularly discussed in the language-change literature as one of the driving forces behind language-internal phonological change. Winford (2003:55–56) is one of several authors who emphasise the role of gaps for adoption in the formulation of his *first phonological constraint* for borrowing: "The existence of gaps in the phonemic inventory of the recipient language facilitates the importation of new phonemes or phonemic oppositions that fill such gaps." These gaps often involve *asymmetries* in the phoneme system or in the distribution of the phonemes (Matras 2007:36).

Aitchison (1991:138) remarks that "language has a remarkable instinct for self-preservation. It contains inbuilt self-regulating devices which restore broken patterns and prevent disintegration." One of these self-regulating devices she mentions is the 'neatening of sound patterns'. She claims that "[l]anguage […] seems to have a remarkable preference for neat, formal patterns, particularly in the realm of sounds" (Aitchison 1991:139) and goes on to exemplify this with the emergence of the allophone [ʒ] in English (Aitchison 1991:140–141). [ʒ] first became an allophone of the phoneme /z/ when it was followed by /j/ as in the word 'measure' /ˈmɛzjuɹ/. This development contributed to making the English sound system more symmetrical by providing a voiced counterpart to /ʃ/, thus filling a *gap* in the obstruent series.

This allophone was later reinforced by lexical borrowing from French. When such words as 'genre' containing the word-initial French phoneme /ʒ/ were integrated into English, /ʒ/ was *more easily adopted* because it was already present as an allophone. Thus, this allophone's adoption as a loan phoneme that can occur in more environments than just before /j/ (i.e. its *phonemicisation*) filled the aforementioned gap in the system for good. As Aitchison (1991:117) formulates, "[f]oreign elements make use of existing tendencies, and commonly accelerate changes which are already under way." Adoption through borrowing as an external mechanism can, thus, become a factor that *reinforces* internal changes. As such, phonemicisation can be viewed as a subtype of structural gap-filling.

Another instance of such an internally as well as externally driven phonological change is provided by Danchev (1995). According to Danchev (1995:69), "[t]he marked expansion of /g/ to medial and word-final positions during the Middle and Modern English periods is undoubtedly due to borrowing. […] [T]his can also be taken as a typical instance of the contact-stimulated distributional expansion of an existing segmental phoneme in the

receptor language." Apparently, only very few words of Old English origin had /g/ in the word-final position, which resulted in an asymmetrical gap in the distribution of the voiced plosives, where /b/ and /d/ were commonly featured in the word-final position but not /g/ (Danchev 1995:70). This gap was then filled first by the adoption of /g/ in the word-final position in borrowings and later by the formation of new words of this type. A third example of phonemicisation comes from McMahon (1994:210) who mentions that [v] as a former allophone of /f/ in Old English acquired phonemic status through Norman French loans.

These examples of contact-induced change illustrate that the phonemicisation of an existing allophone through lexical borrowing is a well-attested way of establishing new phonemes. Thus, it is claimed that donor-language sounds, which do not have phonemic status in the recipient language but share several common features with existing recipient-language segments (hence are similar to them in some respects) are *more easily adopted* than donor-language structures that are completely foreign or dissimilar. This is referred to as the *phonemicisation argument* in this dissertation. This argument is also found in Winford's (2003:55–56) *second phonological constraint*: "Borrowing of phonological rules is facilitated when such changes do not affect the basic phonemic inventory, and are restricted to patterns of allophonic distribution." In phonemicisation, what is being borrowed is, then, not the segment itself, which already existed as an allophone, but a *new status* for that segment as a separate phoneme. Hence, the allophonic status of the donor-language phoneme in the recipient language can be said to *facilitate* the borrowing process or, stated differently, make the loan phoneme *more borrowable*.

It should be noted here that the phonemicisation argument does not go further than describing a pattern of language change as no explanation is provided by the aforementioned authors regarding the mechanisms through which phonemic status is borrowed. There are no references to the proficiency of the borrowers in the donor language or to second-language acquisition processes. Since phonological adoption through loanwords is an instance of *externally driven language change*, as opposed to language-internal processes of change, the lack of such references in the language-change literature can be seen a serious deficit.

5.2 Perspectives from loanword phonology

This sub-section comprises different sections that examine different themes in loanword phonology such as models of loanword integration, adoption in loanword phonology, restriction on adoption based on phonological level, and adoption and the stratified phonological lexicon.

Table 3. Overview of three models of loanword integration.

Name of model	Norm-setters in integration	Nature of the input	Role of perception	Locus of integration	Probability of adoption
Phonological Stance Model	bilinguals	phonemic	not relevant *due to always accurate perception*	production	only phonemic adoption, probability increases with higher degrees of community bilingualism
Perceptual Stance Model	monolinguals	phonetic	relevant *due to inaccurate perception* (filtering out)	perception and production	all adoption tacitly treated as improbable
P-map (Filtering-in Stance)	*not mentioned*	phonetic	relevant *in production despite accurate perception*	production	*not mentioned* (but the notion of retention resembles adoption)

5.2.1 Models of loanword integration

Several interrelated issues that have been previously discussed in different models of loanword integration are of special importance for the studies in this dissertation. These issues are the *nature of the input*, the *role of perception*, the *locus of integration*, the *identity of the borrowers and the norm-setters* in loanword integration as well as the *probability of adoption*. With the help of these five issues as parameters, Table 3 provides an overview of three models of loanword integration. The names of the first two models are based on Calabrese and Wetzels (2009).

One of the most debated issues in loanword phonology in the last decades has been the nature of the input (i.e. the underlying form that borrowers store in the phonological lexicon of their L1). Proponents of the *Phonological Stance Model* claim that the input is identical to the loanword's original underlying form in the donor language, hence is *phonemic* in nature (Jacobs & Gussenhoven 2000; LaCharité & Paradis 2005; Paradis & LaCharité 1997, 2008; Paradis & Prunet 2000; Paradis & Tremblay 2009). Paradis and her collaborators base this claim on the assumption that the initial borrowers are necessarily *bilingual*. Thanks to their bilingualism, these borrowers can

accurately perceive the input and, consequently, all integration takes place in production. Furthermore, these bilinguals *set the norms* for loanword use for the entire language community. Paradis and LaCharité (2008, 2009) argue that even in cases where there are few bilinguals in the recipient-language community these bilinguals succeed in propagating phonemic inputs in loanwords throughout the community.

In contrast, the proponents of the *Perceptual Stance Model* maintain that the input is rather how the borrower *perceives* the surface form of a loanword that it is uttered in the donor language, hence is *phonetic* in nature (Adler 2006; Boersma & Hamann 2009; Calabrese 2009; Kim 2009; Peperkamp & Dupoux 2003; Silverman 1992; Vendelin & Peperkamp 2004; Yip 1993, 2002). This perception is, furthermore, likely to be *inaccurate* in some respects (i.e. deviate from the original surface form) because some of the initial borrowers and most of the subsequent users of loanwords are tacitly assumed to be *monolingual*. Therefore, at least the first instance of loanword integration takes place in *perception*, which may or may not be followed by (further) integration in production. There are also some proponents of this model who argue that all adaptation takes place in perception (e.g. Peperkamp & Dupoux 2003; Vendelin & Peperkamp 2004). In this model, it is the monolinguals that *set the norms* for the language community by the sheer force of constituting the majority.

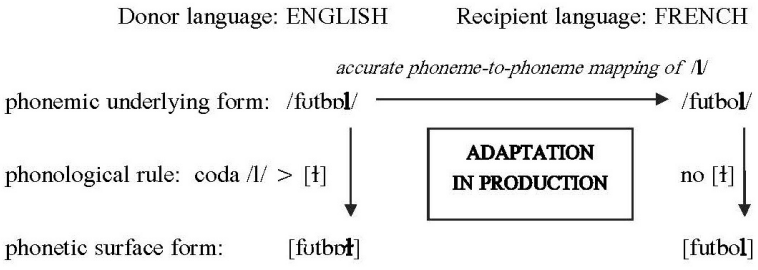
Both these models assume that the input is transmitted through the oral medium, although different groups of borrowers have varying degrees of access to the orthographic representation of the loanwords in the donor and/or recipient language (Dong 2012). In a number of cases (mostly of monolingual borrowing), the main or only input occurs in the written medium instead. Accordingly, some studies have found that also the written form of the loanword is relevant for its oral integration (Dong 2012; Friesner 2009b; Vendelin & Peperkamp 2006).

What is most crucial for the purposes of the present dissertation is that the Phonological Stance Model posits a *phoneme-to-phoneme mapping* that occurs on the underlying level, whereas the mapping is assumed to occur on the surface level in the Perceptual Stance Model. This is illustrated in (1)–(3) with the help of the English word ‘football’, a common loanword in many languages such as French. In English, the surface form of the word-final lateral is velarised as [ɬ] due to a velarisation rule in English phonology that derives the surface form from an underlying /l/, as can be seen on the left-hand side of the examples. The derivations are represented through vertical arrows. Thus, the surface form of the lateral is not identical to its underlying form in the coda position in English. In contrast, French has no velarised [ɬ] but only one type of lateral /l/ where the underlying and surface forms are identical. This difference between the donor language English and the recip-

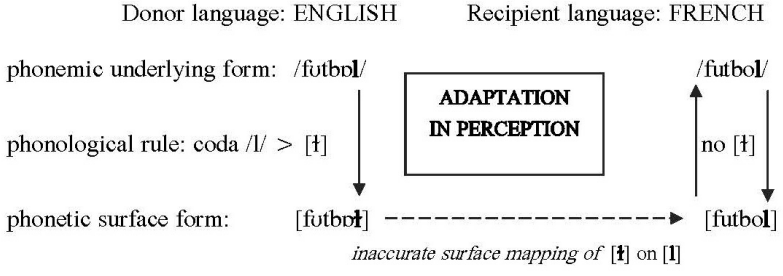
ient language French helps illustrate the different approaches of the two aforementioned models of loanword integration in (1) and (2).

The horizontal arrows show on which level the borrowing process operates. A straight horizontal arrow stands for accurate mapping due to accurate perception whereas a dashed horizontal arrow means inaccurate mapping due to inaccurate perception. It is clearly illustrated in (1) and (2) that one of the main differences between the models is their assumption about *where* the adaptation takes place. According to the Phonological Stance Model in (1), adaptation takes place in production. The underlying form in the donor language is mapped accurately to the recipient language on the phonemic level resulting in an identical underlying form in the recipient language. This form is subsequently subjected to the rules or constraints of the recipient-language phonology, which produce a licit surface form in the recipient language. The fact that [ɬ] is illicit in French does not become relevant because it is not stored as such in the native recipient lexicon to begin with.

(1) Adaptation in production with phonemic input according to the Phonological Stance Model



(2) Adaptation in perception due to inaccurate perception of phonetic input according to the Perceptual Stance Model



The Perceptual Stance Model is, instead, based on the assumption that the surface form of the donor language is perceived inaccurately by native speakers of the recipient language because as a foreign structure it is not *perceptually salient*. This possibility was discussed already by Haugen (1950: 215) who mentions it in connection with substitution (i.e. adaptation) when

he writes that "[i]n many cases the speakers are *completely unaware* that they have changed the foreign word (my emphasis)." He goes on to agree with such authors before him as Hermann Paul, who have described the process of adaptation "as one in which the speaker substitutes 'the most nearly related sounds' of his native tongue for those of the other language" (Haugen 1950:215).

Such an adaptation in perception results in an inaccurate surface mapping of the foreign form [ɬ] on a perceptually similar form that already existed in the recipient language [l], as can be seen in (2). This misperceived form is subsequently stored in the native lexicon and surfaces identically because it is a licit form in the recipient language. Thus, the adaptation takes place already in perception instead of in production because the non-salient donor-language form or its non-salient features are *filtered out* in perception. Hence, they never reach the recipient-language lexicon.

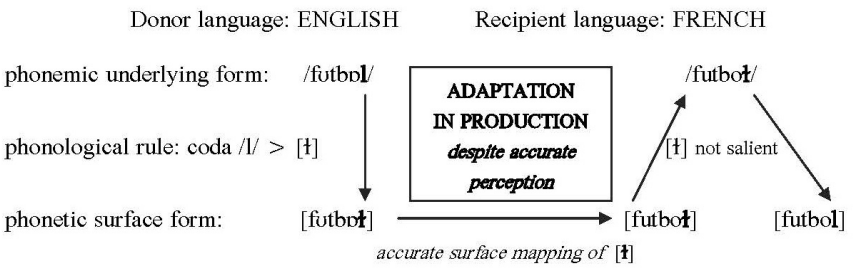
In the loanword-phonology literature, there is also a third stance on perception that is outside of the aforementioned two established models: adaptation in production *despite* accurate perception. This alternative stance is referred to in this dissertation (Study II) as the *filtering-in stance* since structures with low perceptual salience are filtered into the integration process marked with a low priority for retention. Thus, the proponents of this stance (Shinohara 2006; Steriade 2001; Wilson 2001) claim that structures with low salience are not simply filtered out as in the Perceptual Stance Model but can, instead, reach the recipient-language lexicon. The central claim is that the *relative* perceptual salience of the accurately perceived structures sets the priorities for their retention (i.e. non-deletion) in production. Shinohara (2006) proposes that universal perceptibility scales, which are part of the recipient language grammar, underlie these retention priorities. This means that underlying forms with low salience are subjected to a second filter inside the phonology of the recipient language. Retention is, however, not interpreted broadly as potentially extending to cases of adoption, but merely as non-deletion.

This third stance was originally put forward in Steriade's (2001) model *P-map* whose goal is to explain sound change phenomena such as place assimilation with the help of perceptual processes. Steriade (2001:236) defines the P-map as "the repository of speakers' knowledge, rooted in observation and inference, that certain contrasts [i.e. the perceived difference between two strings regardless of phonemic status] are more discriminable than others, and that the same contrast is more salient in some positions than in others." The functions of P-map are the identification of the margins of the speaker's articulatory freedom and the relative salience of morphological alternations as well as the generation of the judgments of similarity needed for rhyming, loanword adaptation, speech disguise and in experimental situations (Steriade 2001:236). Thus, Steriade (2001) posits that there is a range

of different linguistic activities that require similarity judgments, which, therefore, should be considered as an integral part of the phonological grammar. One of the phenomena to which Steriade (2001:238–239) applies the P-map is the integration of loanwords. The incorporation of perceptual information into the production grammar is proposed to be achieved by ranking faithfulness constraints according to the salience of the structures that they involve.

Hence, the filtering-in stance of the P-map has important commonalities with the Perceptual Stance Model. Both models posit that adaptation takes place in production and both ascribe relevance to perception, albeit in different ways. It is illustrated in (3) how the filtering-in stance would operate in the same case as in (1) and (2).

(3) Adaptation in production despite accurate perception of phonetic input according to the filtering-in stance in the P-map



The difference from the Phonological Stance Model in (1) is that the constraint ranking in production that hinders the [ɬ] from surfacing in (3) is not just based on a ban of [ɬ] (i.e. no [ɬ]) in French but rather on the structure's inherent salience properties (in the present case its low salience or lack of salience, hence "[ɬ] not salient"). Therefore, [ɬ] is relatively low ranked based on universal tendencies. This process is discussed extensively in Study II. Thus, the main difference between the Perceptual Stance Model in (2) and (3) is the accuracy of perception, and consequently the accuracy of the surface mapping.

Interestingly, neither stance attempts to relate the accuracy of perception of donor-language structures to the proficiency of the borrowers and to relevant facts from SLA research. Hence, the filtering-out stance (of the Perceptual Stance Model) is seen as *competing* with the filtering-in stance as the stances provide divergent explanations for the same phenomenon. A comparison of (2) and (3) provides a good illustration of this competition. They both provide the correct output form that is attested in the loanword 'football' in French, but the crucial question is which account captures the actual mechanism behind this output.

A further example for this competition (or disagreement) is found in the discussion of English loanwords in Cantonese, where the adaptation of complex syllable margins is explained by Silverman (1992) as adaptation in perception (i.e. filtering out) while Steriade (2001) provides an adaptation in production account (i.e. filtering in) for the same phenomenon. Study II proposes on the basis of SLA facts that filtering out makes more sense when the conditions of donor-language acquisition do not enable the borrower to accurately perceive the donor-language structure in question while filtering in seems more probable when the borrower has accurate perception due to advantageous acquisition conditions. Hence, Study II suggests that the two types of filtering (or perceptual effects) are, in fact, not in competition but *complement* each other in cases that differ in terms of their acquisition conditions.

It should be noted here that not all loanword phonologists agree that the input must be of the one type or the other. Heffernan (2005) suggests a *division of labour* between the two views on the nature of the input. According to this, the input would be phonetic when the borrowers are monolingual but phonemic when the borrowers are bilingual. The results of Studies I and II show that such a division of labour is not attested. Also Kang (2011:2268–2269) rejects this phonetic-phonemic dichotomy and argues, instead, that both types of input are possible according to evidence from several studies and that borrowers can access several input sources and levels of representation.

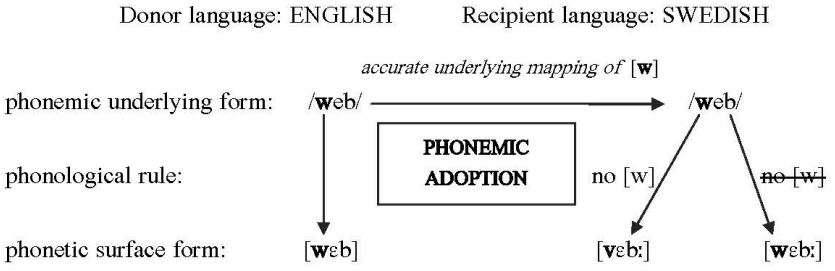
5.2.2 Adoption in loanword phonology

Both the Perceptual Stance Model's filtering-out stance and the P-map's filtering-in stance tacitly discount adoption as a probable alternative to adaptation and seem to assume that adaptation is inevitable (either in perception or in production). In contrast, the Phonological Stance Model allows for the possibility of adoption, at least in cases where the structure in question has *phonemic* status in the donor language. Paradis and LaCharité (2008) explicitly claim that the prevalence of (phonemic) adoption is directly proportional to the degree of community bilingualism in the recipient-language community.

How such adoption would operate according to the Phonological Stance Model is illustrated in (4) with the help of the English word 'web' that commonly features in internet-related loanwords in many languages, such as Swedish. Swedish lacks the segment /w/ altogether. In Swedish, there are two attested pronunciation variants for this loanword: one where the English [w] is adapted through substitution with the native [v], and another variant where it is adopted as a loan phoneme. Hence, there is *interpersonal variation* whereby some speakers opt for adoption and others for adaptation. Both variants are included in (4). The proponents of the Phonological Stance

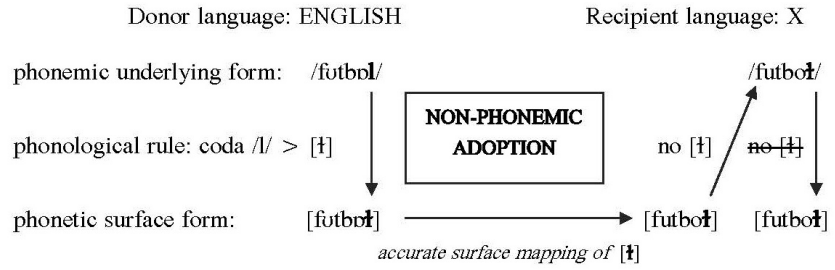
Model do not explicitly discuss the possibility of such variation. However, a plausible extension of the model's view of the interaction between structural and non-structural factors would be to assume that a group within the language community where the degree of bilingualism is higher might opt for adoption while another group with a lower degree of bilingualism would prefer adaptation.

(4) Adoption due to accurate mapping of phonemic input in Swedish according to the Phonological Stance Model



It should also be noted here that the adoption is assumed to take place in production in the Phonological Stance Model because the bilinguals' accurate perception is deemed to render perceptual effects irrelevant. Since all mapping in the Phonological Stance Model takes place on the phonemic (i.e. underlying) level, the adoption of non-phonemic phonetic structures cannot be accounted for. Such a case of non-phonemic adoption is illustrated in (5) with the help of the same case as in (1)–(3) in a hypothetical language X whose native inventory lacks the segment [ɬ] altogether, as in French in (1)–(3).

(5) Adoption due to accurate perception of phonetic input in the hypothetical language X



A case of *adoption* with accurate surface mapping of the phonetic input is exhibited in (5) just as in (3). This faithful input [ɬ] is subsequently stored in the lexicon of the recipient language despite the fact that it is a structure that is otherwise unattested in the recipient language's lexicon. It should be noted that *richness of the base*, which posits as one of the main tenets of Optima-

Table 4. Overview of the status of perception and the locus of integration in different models and examples.

	Locus of integration	
Status of perception	Adaptation	Adoption
accurate BUT irrelevant (Phonological Stance Model)	in production as in (1)	phonemic adoption in production as in (4)
accurate AND relevant (P-map, Filtering-in Stance)	in production as in (3)	*non-phonemic adoption in perception and production as in (5)*
inaccurate AND relevant (Perceptual Stance Model)	in perception as in (2)	–

lity Theory (OT) that there are no language-specific constraints on the input forms stored in the lexicon, would allow such a "deviant" underlying form (Kager 1999:19). Moreover, when this form surfaces, it is not subjected to the usual constraints of the recipient-language phonology, which would not allow the [ɬ] to surface, but to a more "tolerant" set of modified constraints that allow this foreign structure to pass through unaltered to the output form. Thus, the usual "no-[ɬ] constraint" is *by-passed* in production in order for full adoption (i.e. adoption in both perception and production) to take place. Hence, surface mapping based on phonetic input allows the integration process to be faithful to non-phonemic phonetic features (alternatively *phonetic details*) of the donor language. This is a case that none of the aforementioned models of loanword integration can or attempt to account for.

Table 4 provides an overview of the status of perception and the locus of integration in the different models and examples that have hitherto been discussed. Perception is categorised according to relevance and accuracy while integration is grouped under the headings adaptation an adoption.

At least one of the discussed stances can account for the patterns attested in (1)–(4). Therefore, these examples are rendered in regular style while (5), which cannot be accounted for by any stance, is rendered in italic style in Table 4. In contrast, the new model proposed in this dissertation in Figure 1 in Section 7.1.5 provides a fully formalised account of all these cases of adoption.

5.2.3 Restrictions on adoption based on phonological level

In Section 5.1.2, Thomason's (2001:70–71) observation that higher intensity of contact is needed for supra-segmental than segmental adoption was presented. This claim that the level on which a phonological structure is situated impacts its borrowability will henceforth be referred to as the *level hypothesis*. Some studies on loanword phonology confirm this hypothesis in that

prosodic properties such as syllable structure are shown to resist adoption (e.g. Itô & Mester 1999:72–76). However, other studies provide counter-examples. Yip (2006:969) found that prosodic properties such as tone, syllable structure and syllable count resist change (i.e. adaptation). Davidson and Noyer (1997) showed that another prosodic property, stress position, was adopted while segmental features were adapted. Hence, the limited amount of empirical evidence that is available is inconsistent. One possible interpretation for such contradictory findings is that it is not appropriate to make generalisations that do not take the precise organisation of specific recipient languages' phonological systems into account. Nevertheless, as will be argued later in Section 7.2.2 on the basis of the findings in this dissertation, the level hypothesis should not be discarded too hastily as some version of it may still prove useful.

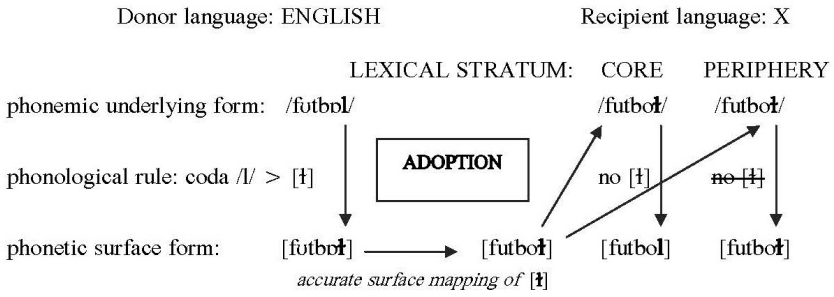
5.2.4 Adoption and the stratified phonological lexicon

A theoretical construct proposed in previous studies that helps address a range of exceptional phenomena in phonology is the *stratified phonological lexicon*. One type of phonological phenomenon this construct is particularly suited for is the adoption of foreign structures in loanword forms only. In fact, the stratified lexicon is crucial for formalising accounts of adoption in loanword phonology.

A stratified phonological lexicon consists of a core stratum and peripheral strata. All phonological constraints in a language apply fully, that is without exception, in the core stratum, while some of them are allowed to be *violated* in the peripheral strata through a slightly modified constraint ranking (Itô & Mester 1999; Paradis & LaCharité 1997; Yip 2006). As in concentric circles, the closer a peripheral stratum is to the core the fewer core constraints are violated and the farther it is from the core the more constraints can be violated.

Hence, nativised (i.e. fully adapted) loanwords that are stored in the core stratum follow the language's core constraint ranking fully and become indistinguishable in their phonological shape from native words. In contrast, those loanwords that contain adopted foreign structures are stored in the peripheral strata whose "more tolerant" constraint ranking allows some underlying foreign structures to be realised in surface forms. Thus, peripheral strata (collectively *the periphery*) give the phonological lexicon the kind of flexibility that is necessary to address *inter alia* contact-induced language change. A detailed account of the possibilities afforded by a stratified phonological lexicon is provided in Studies I and II. A slightly modified version of (5) can be seen in (6), where the main difference is that the lexical strata have been included on an additional tier.

(6) Adoption due to accurate perception of phonetic input in the hypothetical language X



When the faithfully surface-mapped input form is stored in the core stratum of the recipient language, the core constraint ranking, which does not allow [ɬ] to surface (hence "no [ɬ]"), does not enable the borrower to adopt the phonetic structure in production, as can be seen under CORE in (6). If the same input form were to be stored in the periphery, where a slightly modified constraint ranking allows the [ɬ] to surface (hence the violated "~~no [ɬ]~~", meaning that "no [ɬ]" is ranked relatively lower), the borrower could, instead, adopt it in production, as can be seen under PERIPHERY in (6).

Itô and Mester (1999) advocate a re-ranking of *existing faithfulness constraints* such as MAX, DEP and IDENT, which operate between the input and output of the recipient language. Through re-ranking, these constraints come to dominate relevant markedness constraints that are otherwise undominated in the core stratum. Other authors have postulated loanword-specific constraints such as MATCH (Davidson & Noyer 1997) and MIMIC (Yip 2006) that are only used in loanword forms and have no use in phonological processes regarding native words. Since this latter solution proposes extra machinery that is loanword-specific, the solution proposed by Itô and Mester (1999) is preferred in this dissertation because it makes use of existing constraints.

5.3 Perspectives from SLA regarding acquisition difficulty

Due to the prevalent dichotomous view of the borrowers either as monolinguals with little or no proficiency in the donor language (according to the Perceptual Stance Model) or as nativelike bilinguals with nativelike proficiency in the donor language (according to the Phonological Stance Model), discussions on the relevance of the acquisition of the donor language and the acquisition difficulty of particular structures are rarely found in the loanword-phonology literature. There are, however, a few notable exceptions where certain aspects of L2 acquisition are mentioned or the medium of input is evaluated as an interlanguage variety of the donor language (e.g. Broselow 2009; Dong 2012; Friesner 2009; Yip 2006). However, no study

has hitherto incorporated key findings from SLA into a model of loanword integration in a central and systematic way, as is attempted in this dissertation.

In cases of borrowing where the borrowers are non-nativelike bilinguals with imperfect phonological competence in the donor language (such as the elite bilinguals in this dissertation), the *acquisition difficulty* of specific structures in the loanwords becomes highly relevant. The reason for this is that non-nativelike bilinguals may have acquired the competence to accurately produce *some* donor-language structures while they may still lack the necessary competence in accurately producing others. Hence, such speakers' phonological competence tends to be *differentiated* on the basis of specific L2 structures' degree of acquisition difficulty. Therefore, it would be useful to consult what SLA findings about acquisition difficulty.

There are two established L2 acquisition models where the concept *similarity*, which is intimately connected to perception, plays a central role: Best's (1995) Perceptual Assimilation Model (PAM) and Flege's (1992, 1995) Speech Learning Model (SLM). The discussions regarding L2 acquisition in this dissertation are based on the SLM. This model was preferred to the PAM here because it was deemed to have greater compatibility with the current thinking in the loanword-phonology literature. Compared to the PAM, the SLM has a more explicit focus on the factors age of onset and speaker experience (i.e. degree of exposure), which make it easier to apply to loanword phonology.

The SLM categorises L2 sounds into three general categories on an ascending continuous scale of acquisition difficulty:

1. L2 sounds that are *identical* to L1 sounds and are therefore perceived accurately.
2. L2 sounds that are *new* (i.e. *dissimilar* to existing L1 sounds) and are therefore likely to be perceived accurately.
3. L2 sounds that are *similar* to existing L1 sounds and are therefore not likely to be perceived accurately and are instead *classified as equivalent* to the similar L1 sounds.

Three types of criteria are used for the classification of L2 sounds into the above categories in the SLM (Flege 1992:179–185): IPA symbols, acoustic measurements, and listeners' perceptual judgments of sounds in L1 and L2. Identical sounds are those sounds that are represented by the same IPA symbol and display no significant acoustic differences. Therefore, they pose no acquisition difficulty and do not require experience with the L2 for accurate production. However, for identical consonants this ease of acquisition may not extend to new syllable positions (Flege 1992:180). This means that an identical consonant can pose some acquisition difficulty if it occurs in an "unusual" position compared to its distribution in the L1.

One of the most important findings of the SLM is that the perception of one and the same phoneme can differ according to the *syllabic position* and precise phonetic environment, in which it occurs. This is due to the fact that an L2 sound's *acoustic cue robustness* is lower in certain positions. Henke, Kaisse and Wright (2012:72) define acoustic cue robustness as "the degree to which the presence of a segment, and that segment's contrastive information, is likely to be apprehended by a listener under normal listening conditions." Acoustic cue robustness is a universal phonetic property of sounds and in this dissertation it is viewed as the sound's *absolute salience*. Thus, absolute salience depends on the *type* of sound and the precise *environment* where it occurs (called objective salience in Study II). It can be determined through acoustic measurements (or on the basis of cross-linguistic observations) and is independent of a speaker's L1.

New sounds are those sounds that are represented by an IPA symbol that is not found as a segment in the L1, and display acoustic and perceptual differences from the L1 sound that resembles them most closely. They can be difficult to produce accurately in early stages of acquisition but experience with the L2 results in significant improvement in production accuracy. Therefore, new sounds pose a relatively low degree of acquisition difficulty. Upon L2 experience, a new *phonetic category*, which does not exist in the L1, can be established for a new sound.

Similar sounds are those sounds that are represented by the same IPA symbol as an existing L1 segment but display significant and audible acoustic differences from that L1 segment. Usually, experience with the L2 does not result in any significant improvement in the production accuracy of similar sounds. Hence, no difference is found between inexperienced and experienced L2 speakers. This is due to the fact that a similar L2 sound receives an *equivalence classification* whereby it is classified into the same phonetic category as the similar L1 sound.

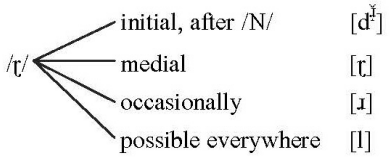
A similar L2 sound is *misperceived*, which means that not all of its properties are perceived accurately. Since the accuracy of an L2 sound's perception is *relative* to the particular sounds that already exist in the L1, in this dissertation this is referred to as an L2 sound's *relative salience*. As mentioned earlier, the SLM views the issue of similarity not in discrete categories such as dissimilar vs. similar but as graded on a continuum. Consequently, it can be said that the acquisition difficulty of an L2 sound depends both on its universal acoustic cue robustness (referred to as absolute salience here) and on its similarity with existing L1 sounds (referred to as relative salience here). The more dissimilar the L2 sound is to existing L1 sounds the less difficult it will be to acquire and vice versa.

Experience with the L2 (i.e. the *degree of exposure* to L2 input) is seen in the SLM as a prerequisite for changes in perception and for proceeding towards more nativelike production (Flege 1995:263; Flege 2012). Thus, the

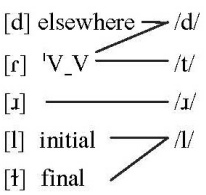
model operates with the fundamental assumption that accurate perception is *necessary* but not automatically *sufficient* for accurate production (Flege 1995:238). Furthermore, the SLM maintains that the greater the acquisition difficulty is the earlier the age of onset for L2 acquisition has to be in order for the learner to overcome that difficulty. Hence, if the age of onset is not low, new sounds are more likely to be acquired than similar sounds, but only provided there is sufficient exposure to L2 input.

A well-known case in point is the acquisition of English liquids by L1 speakers of Japanese. Japanese has one liquid phoneme that has rhotic/rhoticised allophones as well as a lateral allophone (Okada 1999:117–118), as summarised in (7a). English, on the other hand, has *separate* lateral and rhotic phonemes as well two additional phonemes with another rhotic allophone, as summarised in (7b). The relevant IPA symbols for the segments of the two languages are organised in (7) in a way that illustrates the complexity of potential correspondences. As can be seen in this comparison, two allophones of the single Japanese liquid phoneme, [ɹ] and [l], are identical to the realisations of two separate English phonemes but their distributions in the two languages differ. A further Japanese allophone [d$^{\text{ɻ}}$] is similar to a third English phoneme [d]. Such a case in L2 acquisition, where the allophones of an L1 phoneme correspond to L2 segments that are realisation of several L2 phonemes, is referred to as an *allophonic split*.

(7) a. L1: Japanese



b. L2: English



Based on the comparisons of the IPA symbols and their distributions, the SLM would predict considerable difficulty in the acquisition of English liquids by L1 speakers of Japanese. Furthermore, perceptual tests based on listener judgments show that English /l/ is judged to be perceptually more similar to the Japanese liquid than to English /ɹ/ (Zampini 2008:229). Hence, English /l/ should be more difficult to acquire. Therefore, the SLM would expect lower ages of onset and experience with English to improve the production accuracy of the English [ɹ] but not of [l]. This expectation is confirmed by Aoyama, Flege, Guion, Akahane-Yamada and Yamada (2004) who found that neither child learners nor adult learners acquired /l/ and that only child learners improved their production accuracy of /ɹ/ over time (i.e. upon experience).

Interestingly, the Japanese learners' accuracy has also been shown to vary according to syllabic position. Strange (1992) reports that Japanese speakers

had *greater* difficulty in perceiving and producing the similar English liquids /l/ and /ɹ/ as distinct from one another in the word-final position than they occur in the word-initial position. This can be explained by Sheldon and Strange's (1982) claim the universal cue robustness of liquids is greater in the word-initial position. Consequently, the English liquids' acquisition difficulty is greater in the word-final position than in the word-initial position for learners with Japanese as their L1.

As already implied by the use of the terms absolute and relative salience in this dissertation, the SLM's use of cue robustness and similarity as explanatory factors in L2 acquisition bears a striking resemblance to the notion of perceptual salience in the Perceptual Stance Model in loanword phonology. What happens to similar sounds in the SLM corresponds directly to the process of filtering out in loanword phonology. This is one of the reasons why the SLM constitutes an SLA model that is particularly compatible with the current thinking in loanword phonology and can be easily incorporated into models of loanword integration.

Applying these key findings from SLA to cases of borrowing in this dissertation the following predictions can be made. Since the heritage bilinguals in Sweden are quite likely to be nativelike bilinguals, the acquisition difficulty of the specific structures at hand should not make a difference for this group of speakers, since their acquisition background is expected to enable them to produce all L2 structures accurately. Hence, the heritage bilinguals' competence to adopt is not expected to be constrained by the acquisition difficulty of specific structures. In contrast, donor-language structures with high acquisition difficulty are expected to constrain the competence of the non-nativelike elite bilinguals in Turkey to adopt those donor-language structures that are difficult to acquire. This issue is discussed at length in Study II.

Finally, it should be noted here that the *similarity-as-difficulty argument* in the SLM seems on the surface to contradict the *phonemicisation argument* in the language-change literature, which states that similarity in phonological features should, instead, facilitate adoption. This issue will be addressed later in Section 6.2.2.

6 Summaries of the three studies

This subsection consists of the summaries of Studies I and II, followed by a complement to Study I and the summary of Study III.

6.1 Study I

This study (Aktürk-Drake 2011) concerns the phonological and morpho-phonological integration of the lateral segment [l] in the word-final coda

position of words borrowed from Arabic and Swedish into Turkish. More specifically, the focus is on words where this coda [l] occurs after vowels that are classified as *back* in Turkish phonology. The segment [l] is the *front* allophone of the palatally underspecified phoneme /L/ and occurs only after front vowels in native Turkish words, as in (8). Therefore, foreign words that violate this *lateral allophony rule* constitute an interesting case when they are borrowed into Turkish.

(8)	After front vowels			After back vowels		
a.	*kül*	'ash'	[kyl]	b. *kul*	'slave'	[kuɬ]
	göl	'lake'	[gœl]	*kol*	'arm'	[koɬ]
c.	*kil*	'clay'	[kil]	d. *kıl*	'body hair'	[kɯɬ]
	kel	'bald (person)'	[kel]	*dal*	'branch'	[daɬ]

Consequently, the first question of interest is if the front segment [l] will be adopted as an innovation in borrowings or if it will be adapted by being *velarised* (i.e. realised with its back allophone [ɬ]) as in native Turkish words. The second question regards how the adoption of [l] after a back vowel will affect the morpho-phonological integration of the word (i.e. its suffixation). The last question regards whether it will make a difference that the recipient language Turkish was the majority language in one context of borrowing but a minority language in the other.

In Turkish, different harmony processes between a stem's final syllable and the following suffixes play a crucial role in suffixation. This is illustrated in (9) with the help of the case of accusative suffixation, where the suffix has an underspecified high vowel whose frontness as well as roundness depends on the stem's final vowel.

(9)	Front suffixation			Back suffixation		
a.	*kül-ü* 'ash-ACC'	[kyly]	b.	*kul-u* 'slave-ACC'	[kuɬu]
	göl-ü 'lake-ACC'	[gœly]		*kol-u* 'arm-ACC'	[koɬu]
c.	*kil-i* 'clay-ACC'	[kili]	d.	*kıl-ı* 'body hair-ACC'	[kɯɬɯ]
	kel-i 'bald (person)-ACC'	[keli]		*dal-ı* 'branch-ACC'	[daɬɯ]

Thus, in the suffixation of /l/-final native words, there is an *unbroken string* of either front or back segments across the morpheme boundary, as the stem's vowel determines the frontness of both the underspecified coda /L/ and the underspecified accusative vowel /I/. The relevant question is, then, what will happen in suffixation when this string is broken in the stem by the adoption of a front [l] after a back vowel. Since this leaves two segments with different frontness classifications in the stem's final rime, which one of

them will ultimately determine the frontness of the suffix vowel: the back vowel or the front coda [l]?

These two structural questions are investigated in two cases of borrowing that are attested in two sociolinguistically different contexts. The first case is the integration of historical loanwords borrowed from Classical Arabic mainly after the 15th century by the educated elite among Ottoman Turkish speakers. In this context, Turkish was the majority language and Arabic was a highly prestigious classical language that was an integral part of the education system for Muslims. The second case is the elicited integration of new borrowings from Swedish into the Turkish of heritage speakers in Sweden. These speakers were members of the second generation of Turks in Sweden where Swedish is the majority language and Turkish is an immigrant minority language. The central sociolinguistic question is if the difference in the *socio-political status* of the recipient language Turkish, as the majority language in the first case and a minority language in the second case, will influence how foreign words with an illicit final [l] are integrated phonologically and morpho-phonologically.

The data concerning the historical Arabic loanwords were extracted from an etymological dictionary of contemporary Turkish, which is used as a corpus in order to identify all Arabic loanwords of the relevant type. A total of 92 relevant Arabic loanwords were identified corresponding to 0.6 percent of the entire etymological dictionary. A further dictionary of Modern Standard Turkish was used in order to establish the prescribed norms for the pronunciation and suffixation of these Arabic loanwords. These data from contemporary dictionaries reflect the modern Turkish norms, and not necessarily the usage of the initial Ottoman borrowers and later speakers of Ottoman Turkish. Therefore, a so-called transcription text from the 18th century was used in order to *reconstruct* earlier usage and to shed light on potential *diachronic changes*. Based on further sources, it was also inferred that most educated Ottomans, who were the likely initial borrowers and users of the Arabic loanwords, must have had low-to-intermediate proficiency in Arabic and *non-nativelike accents*, as Arabic was mainly used receptively as a classical language.

The data on new borrowings from Swedish were collected through an elicitation task (referred to as an experiment in the study) that involved the oral translation of a Swedish text into Turkish by Swedish-Turkish bilinguals in Sweden. The text contained Swedish proper names with an [l] in their final coda preceded by a back vowel. The idea was that the bilinguals would not translate the proper names, while translating the rest of the text into Turkish. Furthermore, the proper names' placement in the narrative of the text was strategically planned to result in both suffixed and unsuffixed usage in the Turkish translation.

The participants were twelve adult bilinguals, who had started acquiring the standard varieties of the two languages before puberty and had resided in Sweden for a long time. They were also living in Sweden at the time of data collection. They were all identified as native speakers of Turkish by a Turkish linguist based on a short recorded sample of natural speech in Turkish. In order to evaluate the participants' Swedish, both a natural speech sample and the recitation of the translation text in Swedish were submitted to a panel of three Swedish first-year phonetics students. Nine of the bilingual participants could pass as native speakers of Swedish in at least one sample according to at least one panellist. All participants received nativelikeness scores above seven out of ten. Hence, all twelve bilinguals can be considered as *nativelike* speakers of their two languages. Furthermore, most of them reported that they were dominant in Swedish in the written and oral media but that they still used Turkish on a regular basis.

The results regarding the prescribed usage of Arabic loanwords in the consulted Turkish dictionaries showed that the word-final [l] was adopted with its original front quality in 86 percent of all examined words while it was adapted through velarisation in the remaining 14 percent of the historical loanwords. The adoption of the word-final [l] after back vowels in Arabic loanwords thus resulted in the *phonemicisation* of the underspecified phoneme /L/'s allophone [l] as an additional lateral phoneme in Turkish. Also, the results regarding the integration of the [l] in new Swedish borrowings pointed to a dominant tendency towards adopting its original front quality. The average adoption rate among all tokens of the new borrowings was 78 percent, while it was velarised in 22 percent of all words. In all cases, the back quality of the preceding vowel remained unchanged. Thus, the observed adoption of the non-phonemic front (i.e. non-velarised) phonetic quality of the [l] in both cases proved that the input was *phonetic* in nature. Next, a range of phonological factors in the preceding environment were investigated in order to determine if the less common cases of adaptation (i.e. velarisation) could be explained with the help of phonological factors, but no conclusive evidence was found in either case of borrowing.

An examination of the morpho-phonological patterns of suffixation showed that the regular back suffixation pattern was found in those few instances where the original [l] was adapted through velarisation in the stem as in (10b). This *nativised* pattern applied equally to words from Arabic and Swedish, and basically mimicked the native pattern in (10a). In cases where the front quality of the [l] was preserved in the stem, two different patterns were observed in the data. In the historical loanwords from Arabic, the front [l] started participating in stem-suffix harmony processes that usually operate through vowels and thereby became *harmonic*. As can be seen in (10c), it is the front coda [l] that assigns a front vowel to the suffix as the rightmost stem segment with a frontness classification. Thus the coda [l] overrules the

stem's last vowel and *violates* the core rules of vowel harmony between stems and suffixes in Turkish. This creates a novel and *irregular* suffixation pattern in the periphery of the Turkish phonological lexicon. In all Arabic loanwords, where the front quality of [l] was adopted, this irregular front suffixation pattern was prescribed by the consulted dictionaries.

(10)	a. Regular back suffixation in native words	*dal-ı*	'branch-ACC'	[dalɯ]
	b. Regular back suffixation in nativised loanwords (non-preserved [l], i.e. adapted as [ɬ] in the stem)	*fal-ı*	'fortune-ACC'	[faɬɯ]
	c. Irregular front suffixation in non-nativised loanwords (*harmonic preservation*: preserved i.e. adopted [l] in the stem that participates in stem-suffix harmony)	*hâl-i*	'state-ACC'	[ha:li]
	d. Irregular back suffixation in non-nativised loanwords (*non-harmonic preservation*: preserved i.e. adopted [l] in the stem that does not participate in stem-suffix harmony)	*Gröndal-ı*	'G-ACC'	[da:lɯ]

The reconstruction of the earlier usage of such Arabic loanwords showed that the harmonic preservation pattern in (10c) was also dominant in Standard Ottoman Turkish in the eighteenth century. On the one hand, further diachronic evidence suggested that there may have been a preference for this pattern in elite speech while regular back suffixation as in (10b) was, instead, preferred in vernacular speech. On the other hand, there was also evidence of at least one word that received a front suffix in the 18th century, as in (10c), but receives a back suffix in Modern Standard Turkish, as in (10b). Therefore, it seems likely that the exceptional 14 percent of the [l]-final loanwords that receive a back suffix today are the result of a process of *language change* from elite to vernacular patterns, that is from (10c) to (10b). This change must have been taking place at least since the 18th century. This means that the early bilingual borrowers and users belonging to the Ottoman elite most probably adopted the [l] in all words and suffixed it with a front vowel. Moreover, this elite integration pattern was largely maintained by later generations of monolingual (i.e. not Arabic-speaking) speakers of Standard Turkish, later adaptations in some words notwithstanding.

The harmonic preservation pattern in (10c) that was thus established in the periphery of the Turkish phonological lexicon through Arabic loanwords was also observed in later loanwords that were borrowed from other languages such as Italian and French. This pattern is most probably still *productive* in new loanwords of this type that are being borrowed into Turkish today. Consequently, the integration choices that are available to a contemporary Turkish speaker who borrows new Swedish words into his/her Turk-

ish are *essentially* different from those that were initially available to an Ottoman Turkish speaker who borrowed Arabic words. This is due to the fact that the Ottoman case has established a precedent through harmonic preservation, which is part of the implicit phonological competence of a native speaker of Modern Standard Turkish. Thus, the only option already available to the initial Ottoman Turkish borrowers was the one in (10b), whereas both the option in (10b) and the one in (10c) are available to Turkish borrowers today. However, it is conceivable that some heritage speakers might not have acquired the harmonic preservation pattern in (10c), which constitutes the necessary competence in the Turkish periphery. When it was checked if the heritage speakers of Turkish employed this pattern in established loanwords, it was found that they used it on average 80 percent of the time. However, there was some variation among the speakers, where one speaker used it only in one third of all words while all others used it in at least two thirds.

An examination of the suffixation data from new Swedish borrowings revealed that both available options were attested. As mentioned before, regular back suffixation in nativised words, as in (10b), was attested in 22 percent of all cases. As for the words with an adopted [l] (i.e. the remaining 78 percent of all cases) only harmonic preservation, as in 10c, was expected because this was the only other available option. However, this was observed in roughly half of the adopted cases (40 percent of all cases) while a completely *novel* suffixation pattern was encountered in the other half (38 percent of all cases). This novel pattern is referred to as *non-harmonic preservation* and is illustrated in (10d). What is new, and strictly speaking *ungrammatical*, about this pattern is that the preserved [l] does *not* participate in stem-suffix harmony processes and thus remains non-harmonic. Perhaps it would be more appropriate to say that the [l] is *deharmonised* in the sense that it becomes irrelevant or *invisible* to harmony processes. Apart from the irregularity of the preserved [l] that disrupts the back string of segments across the morpheme boundary, the resulting pattern is similar to the regular suffixation patterns in (10a) and (10b), where the stem vowel assigns a back suffix vowel.

Interestingly, all twelve speakers displayed all three patterns (10b–d) in their morpho-phonological integration, albeit to different degrees. The rates of occurrence of these three patterns were correlated with some *background factors* such as self-reported language proficiency, Swedish dominance (based on self-reported relative proficiency), self-reported language use, nativelikeness of accent in Swedish and use of harmonic preservation in established loanwords. The significant patterns (with correlation values above 0.5) that emerged from these analyses are the following. The more the speakers used harmonic preservation in established loanwords, the higher they reported their proficiency to be in Turkish, the less dominant they

reported to be in Swedish and the more they also tended to use harmonic preservation in new borrowings, as in (10c). In contrast, the more dominant they reported to be in Swedish the more they used the novel pattern of non-harmonic preservation, as in (10d). The third option in (10b) did not significantly correlate with any background variable. The speakers' preservation rates of the [l] in the stem, regardless of the following suffixation pattern, did not correlate significantly with any background variable either.

The fact that [l] adoption in the stem, regardless of subsequent suffixation, was not sensitive to proficiency or nativelikeness of accent in Swedish could be explained by the uniformly high phonological competence in Swedish that was observed in the participants. This was mainly due to growing up with Swedish as the ambient majority language from early ages onwards. There was simply not enough variation in Swedish proficiency in this small sample in order to produce potential effects on adoption rates.

In contrast, there was relatively greater variation regarding measures of Turkish proficiency such as periphery competence in Turkish and overall proficiency in Turkish (and consequently also in Swedish dominance). This Turkish-related background variation played an important role when the variation in morpho-phonological integration was analysed. Having high competence in the peripheral pattern of harmonic preservation in established loanwords was crucial for applying it to new borrowings at a high rate. Interestingly, the reverse was not true, meaning that speakers who had lower periphery competence did not necessarily opt for more non-harmonic preservation. This could be a sample effect as there was more variation in the top end of the periphery-competence spectrum than in the bottom end.

The background variable that was most successful in explaining the choice between harmonic and non-harmonic preservation was *Swedish dominance*. Speakers with higher Swedish dominance tended to use more non-harmonic preservation (r = .567, p = .027) while speakers with less Swedish dominance (i.e. with relatively more balanced proficiency in their languages) tended to use more harmonic preservation. Since both these options involve preserving, that is adopting, the front quality of [l] in the stem, they are both faithful to the original forms in Swedish. The crucial difference between them regards the faithfulness of their suffixation patterns to the grammar of Turkish. Considering that non-harmonic preservation has not been previously documented and is strictly speaking ungrammatical in Modern Standard Turkish, harmonic preservation is more faithful to the *morphophonemic rules* of Turkish than non-harmonic preservation. Hence, harmonic preservation offers *faithfulness* to both languages while non-harmonic preservation only offers faithfulness to Swedish. From this perspective, it makes sense that speakers who are more dominant in Swedish preferred the latter option while the relatively more balanced (or Turkish dominant) speakers preferred the former one.

The co-existence of harmonic and non-harmonic preservation in all speakers suggests that there was a conflict in the heritage speakers' phonological systems as to whether to assign a phonological front classification to this adopted word-final [l] at all or to treat is as non-classified, as all other coda consonants are in native Turkish words. Even those speakers who displayed high periphery competence and were less Swedish dominant used non-harmonic preservation to some degree. Since the data were collected through elicitation, it is possible that those speakers who had high periphery competence were using more harmonic preservation in the rather formal context of data collection than they would use in vernacular speech, where they might, instead, use more non-harmonic preservation. Furthermore, since the data came from the second generation of Turkish speakers in Sweden, it is possible that this mixed suffixation pattern reflects a snapshot of *on-going language change*, more specifically from the harmonic pattern documented in the majority context in Turkey to the non-harmonic pattern, which has so far only been documented in the heritage context in Sweden. Therefore, it could be hypothesised that even more non-harmonic preservation might be found in later generations of Turkish speakers in Sweden.

Since the original word-final [l] was adopted both by elite bilinguals and by later monolinguals in Turkey, as well as by the heritage bilinguals in Sweden, it was inferred in this study that it must have been *accurately perceived* by all Turkish speakers. In contrast to Study II, this inference was not rigorously compared to accuracy predictions based on established SLA facts regarding the role of salience in perception. This aspect of Study I will be complemented later in Section 6.3 of the dissertation. In the Arabic case, it was inferred that the elite bilinguals must have produced the [l] accurately in their Arabic as a second language while in the Swedish case the heritage bilinguals' nativelike accents in Swedish guaranteed accurate production of the [l]. Hence, it was concluded that Turkish speakers had the necessary phonological *competence* to adopt the [l] in all investigated cases (which was referred to as "phonological factors" in the study). Although the elite bilinguals in Ottoman Turkey did not have nativelike proficiency in the donor language, in contrast to the heritage bilinguals in Sweden, it seems that their proficiency was, nevertheless, sufficient for the accurate perception and production of the particular segment [l]. It is also interesting to note that even the monolinguals, who were exposed to the adopted [l] through input from the elite bilinguals, were able to acquire it since they seemed to have largely continued with the elite's adoption, despite no proficiency in Arabic.

As for the sociolinguistic factors that gave the borrowers the *incentive* to transfer the accurate production of [l] from words in the donor language to loanwords in the recipient language, again the conditions were more *conducive* to adoption in the Swedish context. In Sweden, the donor language was the majority language in which most of the borrowers were dominant. In

the Ottoman context, however, Arabic was a classical language that practically functioned as a second language in the school context. Thus, the sociolinguistic incentive was sufficient to cause high adoption rates in the Ottoman context. It is possible that the extreme reverence for Arabic as the language of Islamic religion and civilisation, which played an important cultural role for Muslim speakers of Ottoman Turkish, coupled with the conditions of supervision by teachers who were nativelike in Arabic, had gone some distance in creating an adoption incentive close to what is usually found in contexts where the donor language is the majority language.

6.2 Study II

The data sources and methods in Study II (Aktürk-Drake 2014) are identical to those in Study I. The main difference is the phonological structure that is investigated. The structural focus of Study II is long segments (i.e. both long vowels and long consonants) that occur in the word-final closed syllable in borrowings from Classical Arabic and Swedish. A total of 818 Arabic loanwords with original long vowels and 53 Arabic loanwords with original long consonants were identified in an etymological dictionary of Turkish, corresponding to 5.5 and 0.4 percent of the entire dictionary, respectively.

The word-final closed syllable is a *typologically marked position* for long segments because it is rare for long consonants to occur word-finally (Thurgood 1993:129–130) and for long vowels to occur in closed syllables (Gordon 2006:225). The positional markedness constraints that capture these facts are high-ranked in Turkish, which makes long segments illicit in this position. Since long segments are licit in unmarked positions the appropriate Turkish constraint ranking is: {*V:C]$_\sigma$; *C:]$_\sigma$} >> MAX-IO(length) >> {*V:; *C:}. Here, the positional markedness constraints that block length in the word-final closed syllable are ranked highest and the faithfulness constraint MAX-IO that should prevent length deletion is ranked above the markedness constraints that block length in all positions. This state of affairs makes it interesting to investigate if the illicit length in loanwords will be adopted or adapted by the borrowers.

There is a crucial difference between the phonetically long segments in Arabic and Swedish. In Arabic, the phonetically long segments are *also* phonologically long, meaning that the length is *phonemic* in both vowels and consonants (de Jong & Zawaydeh 2002). The phonological status of the phonetically long segments in Swedish has been subject to some debate. In Study II, only consonant length is analysed as distinctive, although some researchers view also vowel length as distinctive in Swedish. The analysis in Study II is based on a long line of Scandinavian linguists such as Teleman (1969), Eliasson and LaPelle (1973), Eliasson (1978, 1985), Löfstedt (1992),

and Riad (1992, 2014), who have convincingly argued for the distinctiveness of length in consonants only.

These phonetic and phonemic length differences are illustrated in (11). Furthermore, vowel length and consonant length are *independent* from one another in Arabic but *complementary* in Swedish. In Swedish, the Stress-to-Weight principle (Prince & Smolensky 1993) applies, whereby vowels are lengthened in stressed syllables that do not end with a single consonant or a consonant cluster. Hence, either the vowel or the consonant of the rime needs to be long in stressed syllables.

(11)	DL: Arabic	DL: Swedish
a. Long vowel in a closed syllable	/di:n/ [di:n] 'religion'	/vik/ [vi:k] 'bay'
b. Long consonant in word-final position	/ħis:/ [ħis:] 'feeling'	/dam:/ [dam:] 'pond'

Following the general trend in languages with phonemic *and* independent length, the durational difference between short and long segments in Arabic is relatively big with a minimal long-to-short ratio of 1.5 (Flege & Port 1981:127; Mitleb 1992:29). In contrast, the length complementarity in Swedish is accompanied by differences in duration. The duration of Swedish long vowels is on average 1.5 times the duration of short vowels (Elert 1965: 141), which puts them at a safe distance from their short counterparts, just as seen in Arabic long segments. On the other hand, the duration of long consonants is on average *only* 1.3 times the duration of short consonants (Elert 1965:141). The durational difference between vowels and consonants may at first appear to be relatively small if the means 1.5 and 1.3 are compared. However, this still means that the long consonants are more *similar* to their short counterparts because 1.3 is quite close to the singleton value 1, whereas the long vowels are durationally less similar to their short counterparts at the safer distance of 1.5.

All in all, it seems that the length in both segment types in Arabic, and in vowels in Swedish, has greater *perceptual salience* than the length in Swedish consonants. This means that phonemic status and salience go hand in hand in Arabic while there is a *mismatch* between them in Swedish. The non-phonemic long vowels in Swedish are more salient than the phonemic long consonants. This state of affairs in Swedish creates a unique opportunity for testing the opposing claims about the *nature of the input*. If the input is phonemic, underlying length will only be attested in Swedish consonants, which would, in turn, enable them to be candidates for adoption. In contrast, the non-phonemic length of the vowels should be blocked from adoption because it is absent from the underlying forms to begin with. If, however, the input is phonetic, Swedish vowel length should be more easily adopted than the less salient consonant length. Furthermore, the data on the

bilingual borrowers' phonological competence in the donor language Swedish (including the accuracy of their perception) facilitate an examination of the precise *role of perceptual salience* in the integration of illicit length. If perceptual effects due to salience are found to impact the possibility of adoption, the next question to answer would be whether these effects occur in perception (as in *filtering out* in the Perceptual Stance Model) or in production (as in *filtering in* in the P-map).

The study also makes use of what is known about the bilingual borrowers' language backgrounds. The conditions that have resulted in the attested *type of bilingualism*, which is elite bilingualism in Turkey and heritage bilingualism in Sweden, and the related L2 acquisition processes are taken into account with reference to key SLA facts. Here, the main base for the discussion is the Speech Learning Model (Flege 1995) with its claims that perceptual similarity causes acquisition difficulty and that this degree of difficulty is proportional to the age of onset for L2 acquisition. Consequently, the prediction is made that length should be acquired accurately in both segments in Arabic and Swedish. In the Arabic case, this is based on the high salience of length in both segments and the relatively early age of onset of the initial elite bilingual borrowers. In the Swedish case, the high salience of the vowel length should not pose any acquisition difficulty but the low salience of consonant length would result in acquisition difficulty if the age of onset were high. However, since the borrowers did have early ages of onset and a high degree of exposure to Swedish, this difficulty should be overcome. Therefore, the borrowers in both contexts are expected to have the *competence to adopt* long segments due to accurate perception. This should exclude perceptual effects of the filtering-out type but filtering-in should theoretically still be possible.

The results regarding the Arabic loanwords based on prescribed contemporary use according to dictionaries of Modern Standard Turkish and on the reconstruction of historical usage revealed the diachronic pattern illustrated in (12) and (13).

(12) Pronunciation of original long vowels in Arabic loanwords according to different diachronic norms

	Reconstructed norm in Ottoman Standard Turkish	Current norm in Modern Standard Turkish
a. din 'religion'	[di:n]	[din]
b. dinden 'religion-ABL'	[di:nden]	[dinden]
c. dini 'religion-ACC'	[di:ni]	[di:ni]
Integration strategy:	Full adoption	Partial adoption

(13) Pronunciation of original long consonants in Arabic loanwords according to different diachronic norms

	Reconstructed norm in Ottoman Standard Turkish	Current norm in Modern Standard Turkish
a. his 'feeling'	[his:]	[his]
b. histen 'feeling-ABL'	[his:ten]	[histen]
c. hissi 'feeling-ACC'	[his:i]	[his:i]
Integration strategy:	Full adoption	Partial adoption

The integration strategy *partial adoption* (i.e. adoption in underlying forms but adaptation through shortening in surface forms in marked syllabic positions) was observed in approximately 70 percent of all loanwords while the length was shortened for good (i.e. also in the underlying forms) in the remaining cases in contemporary Turkish. The reconstruction indicated that the initial elite bilingual borrowers had most probably opted for *full adoption* (i.e. adoption in underlying *and* surface forms) as their integration strategy. This suggests that both the initial bilingual borrowers and the subsequent monolingual users of the Arabic loanwords were able to perceive the length accurately both in vowels and consonants since the underlying forms predominantly contained long segments. This is precisely what was predicted based on SLA facts.

The results regarding the new Swedish borrowings showed that there were similarly dominant patterns here as in the Arabic loanwords. Vowel length was fully adopted in 67 percent of all cases whereas consonant length was adapted through shortening in 79 percent of all cases, as illustrated in (14) and (15) with the help of one of the loanwords that featured in the study.

(14) Dominant pattern in vowel-length integration such as in the place name *Stenstavik*

Swedish original: /stensta'vik/ [ste'nsta'vi:k]

Syllabic position		Group Mean
Non-resyllabifiable (simplex/ablative)	(a) vi:k, vi:k-ten	67.11%
Resyllabifiable (accusative)	(b) vi:k-i	62.50%
Inferred underlying lexical form in Turkish	(c) /vi:k/	

Integration strategy: Full adoption

The Arabic data showed that the *markedness of the syllabic position* played a crucial role for the surfacing of the underlying length. Statistical analyses performed on the Swedish data revealed, on the contrary, that syllabic position had no significant effect on the surfacing of the length. The length was either shortened for good or preserved for good.

(15) Dominant pattern in consonant-length integration such as the place name *Zinkensdamm*

Swedish original: /sinkens'dam:/ [sɪnkɛns'dam:]

Syllabic position		Group Mean
Non-resyllabifiable (simplex/ablative)	(a) dam, dam-dan	65.38%
Resyllabifiable (accusative)	(b) dam-ɯ	86.84%
Inferred underlying lexical form in Turkish	(c) /dam/	

Integration strategy: Full adaptation

As seen in Study I, the great majority of the participants could generally pass as native speakers of Swedish. Furthermore, the data in Study II revealed that they could produce long vowels accurately in their Swedish with a group mean of 92 percent and long consonants with a group mean of 74 percent. These facts suggest that the heritage bilinguals could perceive and produce Swedish length accurately, just as previously predicted based on SLA facts. However, the accurately perceived length *only* surfaced in vowels but not in consonants.

When the background factors self-reported Swedish dominance, passing as a native speaker in Swedish, nativelikeness of accent in Swedish and correct length production in Swedish were correlated with the individual participants' length adoption rates in Swedish borrowings and no significant correlation was found with any factor at the 5 percent level. The only background factor that came close to having a moderate impact on length adoption was Swedish dominance in vowel-length adoption ($r = .440$, $p = .076$).

In the OT analyses of the data, two separate faithfulness constraints, MAX-IO(high-salience length) and MAX-IO(low-salience length), were used with the default internal ranking MAX-IO(high-salience length) >> MAX-IO(low-salience length) that captures a *universal* preference for retaining salient segments. In order to capture the *partial adoption* attested in Modern Standard Turkish, that is the surfacing of underlying length *only* in unmarked positions, MAX-IO(high-salience length) must be ranked higher than both *C: and *V:. This results in the rankings *C:]$_\sigma$ >> MAX-IO(high-salience length) >> *C: > MAX-IO(low-salience length) and *V:C]$_\sigma$ >> MAX-IO(high-salience length) >> *V: > MAX-IO(low-salience length) in the core stratum of the Turkish phonological lexicon.

In order to enable *full adoption* of underlying length in Standard Ottoman Turkish, which has been reconstructed as the preferred integration strategy of the initial elite bilingual borrowers, the core ranking has to be *modified* in the periphery by promoting MAX-IO(high-salience length) to an undominated position. This results in the rankings MAX-IO(high-salience length) >> *C:]$_\sigma$ >> *C: > MAX-IO(low-salience length) and MAX-IO(high-salience length) >> *V:C]$_\sigma$ >> *V: > MAX-IO(low-salience length) in the periphery. When the above periphery ranking, which results in full adoption in Ottoman Turkish, is applied to the new Swedish borrowings, the different

positions that MAX-IO(high-salience length) and MAX-IO(low-salience length) occupy in the ranking produce the observed *differential* outcome with full adoption of vowel length but full adaptation of consonant length.

The results regarding the integration of Swedish borrowings showed clearly that the input was *phonetic in nature* because non-phonemic vowel length was adopted. This finding clearly refutes the general claim of the Phonological Stance Model that the input is phonemic in nature as well as the more specific proposal by Heffernan (2005) that the input is phonemic in cases of bilingual borrowing. Since it was also known that Swedish consonant length with low salience was accurately perceived by the bilingual borrowers, the fact that this length nonetheless failed to surface points to a perceptual effect of the filtering-in type. This effect was successfully formalised by using two separate salience-sensitive MAX constraints in accordance with the assumption of the filtering-in stance that adaptation takes place in production rather than in perception.

Since the only one of the four long segments where the original length was *not* adopted by bilingual borrowers was simultaneously the only one where the length was shown to have low salience, the following conclusion was drawn regarding the role of perceptual salience in bilingual borrowing: High perceptual salience is a *necessary* condition for the adoption of donor language structures. However, the fact that the Ottoman bilingual elite's length adoption was not adopted by the subsequent monolingual Turkish speakers who, nevertheless, could perceive the length accurately suggests that high perceptual salience is necessary but not *sufficient* for adoption.

Which other criteria beside high salience were, then, fulfilled in the bilingual Turkish speakers' full adoption but not in the monolingual's non-adoption (i.e. adaptation through shortening)? An obvious factor to consider is the presence of *bilingualism* itself. One type of explanation would be that the *exposure* to long segments that was provided by the relatively few loanword forms that contained them in the L1 was too little to enable the monolingual speakers to produce them accurately in marked syllabic posi tions. According to Flege (1995:263), accurate perception does not result in accurate production in L2 acquisition if it is not accompanied by substantial exposure. Hence, the monolinguals would simply adhere conservatively to their existing ranking in production due to insufficient exposure.

This is exactly what is claimed by the special OT model proposed by Boersma and Hamann (2009), albeit without references to SLA facts. They treat loanword integration as a *conservative* process (i.e. one where the possibility of adoption is discounted) that takes place exclusively in L1 phonology. The Ottoman context where the monolinguals received their loanword input from bilinguals (i.e. *bilingually mediated monolingual borrowing*) is precisely such a case where insufficient exposure would be expected to hinder the modification of core production constraints in the periphery and

thus block adoption. Hence, even though the monolinguals could perceive the length accurately they would not produce it faithfully.

Even if it were hypothetically assumed that the monolinguals *could* produce the length accurately, this would not mean that they *would*, in fact, opt for doing so. It is a well-established fact in the language-contact literature that *social factors* such as attitudes towards structural borrowing have the final say in the adoption of contact-induced innovations (Thomason 2001: 70–71). In the bilinguals, knowledge of the donor language and its regular use could, then, be assumed to also promote the necessary positive attitudes towards structural borrowing. Even though the monolinguals may have shared the bilinguals' reverence for Arabic, the minute role this foreign language played in their everyday lives might not have given them sufficient *sociolinguistic incentive* to adopt structures from it.

In conclusion, a perceptual effect of the filtering-out type occurs when the borrowers are non-nativelike in the donor language and therefore perceive some of its structures inaccurately. In contrast, the other perceptual effect, filtering in, occurs only in cases where donor-language structures with low salience can, nevertheless, be perceived accurately because the borrowers have had the opportunity to acquire nativelike proficiency in the donor language. Hence, filtering out and filtering in should not be seen as *competing* with one another but, instead, as *complementary* because they apply in different cases depending on the borrowers' level of phonological competence in the donor language.

A tentative conclusion based on the findings of this study is that a long segment needs to have at least 50 percent longer duration than its short counterpart in order to count as highly salient. Filtering in is envisioned to operate with such an *objective* measure of salience that is independent of other factors such as the borrower's native language (referred to as *absolute* salience in the rest of the dissertation). In contrast, in filtering out, salience has an additional *subjective* dimension because the accuracy of perception is not only dependent on the objective properties of the linguistic structure in question but is also influenced by additional subjective factors related to the underlying process of L2 acquisition.

Consequently, this study makes the testable claim that donor-language structures with low objective salience (i.e. absolute salience) will never be adopted in the recipient language regardless of the accuracy of their perception. If they are not perceived accurately, the process of filtering out will result in adaptation in perception. Even if they are perceived accurately, the process of filtering in will, instead, result in adaptation in production. Hence, one of these filtering processes will always prevent donor structures with low objective salience from getting adopted in loanword forms. Thus, this claim provides a model of loanword integration where adoption is *multiply restricted*, which should make it quite rare in cases of language contact.

6.3 Complement to Study I: Predicting the borrowers' accuracy of perception

In contrast to Study II, relevant findings from SLA were not used in Study I to predict and discuss the accuracy of the bilingual borrowers' perception. Therefore, this aspect of Study I will be complemented in this section.

The heritage bilinguals in Sweden were shown in studies I and II to have nativelike proficiency in Swedish. Therefore, it is not surprising that they could accurately perceive the front (or non-velarised) phonetic quality of the [l] after a back vowel in the word-final rime. Their nativelikeness in Swedish can be explained by the advantageous conditions of their L2 acquisition. They had early ages of onset for Swedish acquisition, their motivation to acquire Swedish as the majority language must have been high and they most likely had a high degree of exposure to Swedish as the ambient language. These conditions in heritage bilingualism are discussed at greater detail in Study III for a similar group of heritage bilinguals in Sweden. Given the heritage bilinguals' predictable nativelike proficiency, any potential acquisition difficulty associated with perceiving and producing a front [l] after a back vowel would not be relevant because the conditions that resulted in their nativelikeness would naturally also enable the learners to overcome the structural difficulties in L2 acquisition.

However, since the initial elite bilinguals who borrowed [l]-final Arabic words in Ottoman Turkey were shown *not* to be likely to have had nativelike proficiency in Arabic, the acquisition difficulty of the word-final [l] becomes relevant. According to the Speech Learning Model, an important aspect of L2 acquisition is the cue robustness of the particular syllabic position where the segment occurs (here absolute salience). Studies on the acquisition of liquids in first languages (Yavaş & Topbaş 2004) and in second languages (Sheldon & Strange 1982) have shown that liquids have low cue robustness (i.e. lower absolute salience) in the word-final coda position. However, this regards the salience of the [l] as a lateral (i.e. its *consonantal* qualities) and not necessarily the salience of the *type* of lateral (i.e. its darkness or vocalic qualities). Since the issue in Study I is not whether the [l] can be perceived as a lateral in that position *at all*, the cue robustness of laterals (or more generally liquids) in word-final position does not seem to be the relevant issue here.

The main question is, rather, how salient the precise phonetic quality of the [l] is in the word-final position in Arabic loanwords *relative* to the segment [ɬ] in the same environment in Turkish. Put differently, how similar is the Arabic [l] to the Turkish [ɬ] for a Turkish speaker? Since no similarity judgments by Turkish speakers based on experimental data are available, cross-linguistic facts and a relevant SLA study will be consulted here in order to determine the salience of the word-final [l].

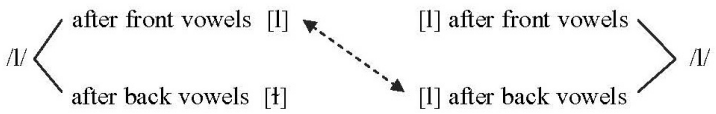
As mentioned before, secondary velarisation stands for the *vocalic* qualities of laterals. A well-known cross-linguistic phenomenon related to this vocalic quality is *lateral vocalisation* (or /l/-vocalisation) in the coda position. This entails deleting the consonantal quality of the lateral in surface forms and realising it as a vowel or semi-vowel instead. The aspect of this phenomenon that is relevant for the present case is that the *particular vocalic realisation* of the underlying lateral is intimately connected to presence or absence of secondary velarisation in the lateral (von Essen 1964).

One area where lateral vocalisation is often discussed is sociolinguistic variation and dialectology. In some linguistic varieties, non-velarised laterals tend to be realised as high or high-mid *front* vowels (or as the *palatal* semi-vowel [j]) such as the German *wollen* 'to want' [vɔlən] vocalised as [voɪn] in Bavarian varieties. Velarised laterals tend, on the other hand, to be realised as high or high-mid *back* vowels (or as the *labio-velar* semi-vowel [w]) such as the English *milk* [mɪɬk] vocalised as [mɪʊk] in the Cockney variety. A further area of research where the same tendency is observed is first-language acquisition where velarised laterals undergo "gliding" to [w] and non-velarised laterals to [j] (Johnson & Britain 2007:303).

These *cross-linguistic tendencies* suggest that the precise vocalic quality of the lateral has high *absolute salience* (referred to as perceptual salience in Study II) in coda position, and is acoustically more robust than the lateral's consonantal cue. Thus, even when the lateral is lost as such its vocalic qualities tend to survive. This absolute salience makes the Arabic [l] relatively less similar to the Turkish [ɫ]. However, they are still both laterals, they cannot be viewed as completely dissimilar either. This means that the acquisition difficulty of [l] is neither high nor low but intermediate in this environment. Therefore, the non-velarised quality of the Arabic word-final [l] can be perceived accurately by the initial elite bilingual borrowers provided that they have had sufficient exposure to Arabic input. The accuracy of perception would, furthermore, be aided by the fact that their ages of onset to Arabic acquisition were not high.

Another way to determine the actual acquisition difficulty of the coda lateral's vocalic quality is to consult actual SLA studies. As mentioned in Study I, the crucial structural facts for this language combination are that the L2 Arabic only has one lateral phoneme, which is uniformly realised as non-velarised in the word-final position, as can be seen in (16). The L1 Turkish also has a single native lateral phoneme, but this phoneme has two allophones in the coda position as can be seen in (16).

(16) L1: Turkish — *allophonic variation with* [l] *and* [ɬ]



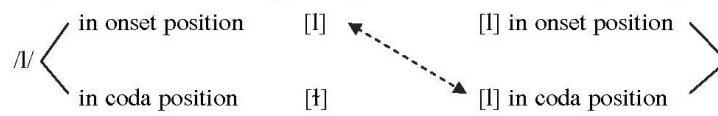
L2: Arabic — *lateral invariability with* [l] *everywhere*

Thus, there is a *segmental match* between the non-velarised lateral surface forms in the L1 and L2 in (16). However, this does not mean that the segments are necessarily *identical* as they may still differ slightly in terms of their exact place of articulation, which can range from dental to postalveolar. At the same time, there is a *distributional mismatch*, as indicated by the diagonality of the dashed arrow in (16). The segment [l] has *wider distribution* in the L2 than in the L1. More specifically, the realisation of the lateral phoneme is *non-variable* in the L2 whereas it is subject to allophonic variation in the L1. Assuming that its perception is accurate as predicted, L2 acquisition would entail establishing a wider and uniform realisation for an existing L1 allophone in L2 production.

In such cases, where the perception is accurate but new rules/constraints still need to be established in production, substantial exposure to L2 input is a prerequisite according to the Speech Learning Model (Flege 1995:263), as seen earlier. In the Ottoman context, Classical Arabic was not the ambient language but it still had a strong presence in Muslim schools as a medium of instruction alongside Turkish. Therefore, it is likely that the learners received substantial input. Unfortunately, no studies on the pronunciation of L2 Arabic by L1 Turkish speakers could be found in the literature.

However, the language pair L1 English and L2 Spanish in Example 17 provides a sufficiently similar case that is well-researched in the SLA literature. The only difference between the language combination in Study I in (16) and the case in (17) is the particular environment where the same allophones occur in the L1. All other relevant structural properties are the same, which makes these cases suitable for comparison. Therefore, the acquisition difficulty attested in English L1 speakers' pronunciation of L2 Spanish would constitute relevant data to complement Study I.

(17) L1: English — *allophonic variation with* [l] *and* [ɬ]



L2: Spanish — *lateral invariability with* [l] *everywhere*

Díaz-Campos (2004) compared the phonological competence of two groups of Spanish learners with English as their L1 in order to determine the

effect of learning context on pronunciation. This first group received instruction in Spanish as a foreign language in a regular university-classroom setting in the USA and the second group participated in a ten-week study-abroad program in an L2 environment in Spain. However, the groups were not matched for the background factors age of onset for Spanish acquisition and years of formal instruction. 26 percent of all participants had started their formal Spanish instruction in elementary school (while the rest had later starts) and as many as 59 percent had already received three or more years of formal instruction in Spanish. Thus, the majority of the participants were not beginners.

The groups' Spanish was tested both before and after the treatment period. The investigated structures were aspiration in the word-initial stops [p t k], the intervocalic fricatives [β ð ɣ], the palatal nasal [ɳ] and the word-final lateral [l]. The results showed statistically similar tendencies in both groups meaning that treatment type (i.e. the learning context) did not make a significant difference in this sample. There was improvement in both groups regarding accuracy in word-initial stops and in word-final laterals, whereas there was no improvement in the palatal nasal and the intervocalic fricatives in either group. Accuracy was equally low in the fricatives and equally *high* in the nasal as before treatment in both groups. As for the word-final lateral, the USA group increased its mean accuracy (i.e. percentage of non-velarised pronunciation) from 16 to 45 percent while the Spain group increased it from 21 to 31 percent. Díaz-Campos (2004:266–267) admits that the surprisingly greater improvement in the USA group may be due to prior differences in factors such as age of onset and years of instruction. Further statistical analyses based on all participants showed that the learners' overall pronunciation accuracy was most sensitive to background factors such as age of onset and length of formal instruction as well as L2 use in different contexts.

These results suggest that the investigated structures are *differentiated* in terms of their sensitivity to improvements based on increased (or continued) exposure to Spanish. Among the structures where pre-treatment accuracy was low, increased exposure (regardless if in the USA or in Spain) did not improve the learners' accuracy in intervocalic fricatives but it resulted in gains in word-initial stops and in the word-final lateral.

Díaz-Campos (2004:266) indicates that the continued high accuracy in the palatal nasal can be attributed to this segment being a new sound in the Speech Learning Model's (SLM) sense. Therefore, this sound can be viewed as having a low degree of difficulty. Since most participants were past the beginner's level in their Spanish, they were likely to have received sufficient exposure to this sound already prior to the treatment period, which is why neither treatment made a difference. On the other end of the spectrum, there are the intervocalic fricatives as similar sounds (i.e. sounds with high acquisition difficulty), for which no new phonetic category had been established

(Díaz-Campos 2004:265). For such sounds, the crucial factor is the age of onset according to the SLM. Since only a fourth of the group had started their formal instruction already in elementary school, the lack of improvement in these sounds can be predicted by the relatively late ages of onset in the sample.

Regarding the sound that is most interesting for Study I, the word-final lateral, Díaz-Campos' (2004) results did show beneficial effects of increased exposure. As the previous discussion based on (16) and (17) illustrated, the [l] is not a new sound, which means that it should not be as easy to acquire as the palatal nasal. This is confirmed by the low pre-treatment accuracy in Díaz-Campos (2004). However, as also argued earlier in this section, the word-final lateral should have an intermediate degree of difficulty. Therefore, the SLM would predict that increased exposure should result in increased accuracy, unlike in the intervocalic fricatives, because substantial exposure is what is needed for the accurate production of accurately perceived L2 sounds. Again, this prediction is confirmed by the improvement attested in both groups in Díaz-Campos (2004).

In conclusion, the SLA study by Díaz-Campos (2004) on a comparable language pair as L1 Turkish and L2 Arabic proves the previous claim that the word-final [l] has sufficient absolute and relative salience to be perceived accurately by the learners but that substantial exposure is needed in order for this accurate perception to be transferred to production as well. Given the aforementioned background factors in the Ottoman context, it is now possible to explain that the elite bilinguals had the linguistic competence to adopt the word-final [l] after a back vowel in Arabic loanwords because they had received substantial exposure to it in the school context.

6.4 Study III

Study III (Aktürk-Drake submitted) revisits one of the main theoretical threads in Study I: the interplay between linguistic competence and sociolinguistic incentive in the adoption of foreign phonological structures. The structural focus of Study III is the phonological integration of word-initial onset clusters in established loanwords from French and English in Turkish. A balanced sample of 29 loanwords with original onset clusters was investigated in this study. The selection of these loanwords took several factors into consideration such as cluster type, word frequency and phonetic similarity across the included second languages.

Loanwords from different languages with original consonant clusters in their initial onset are quite numerous in contemporary Turkish. As many as 514 such loanwords could be identified in an etymological dictionary of Turkish, corresponding to 3.3 percent of the entire dictionary. Since the native lexicon of Turkish lacks words with onsets cluster altogether, the

main structural question is if the participants of the study will adopt the foreign clusters or if they will adapt them through the insertion of an epenthetic vowel between the consonants of the onset cluster.

As in Studies I and II, bilingual heritage speakers of Turkish in Sweden were compared with bilingual elite speakers in Turkey. This time, the L2 of the bilinguals in Turkey was not Arabic but English, again a language with high prestige in contemporary Turkey, just as Arabic had been in Ottoman Turkey. In contrast to Studies I and II, no reconstruction was carried out regarding how the initial borrowers of these loanwords might have integrated the clusters. The focus was, instead, on the *current usage* of these words. A second difference was that the L2 of the elite bilinguals was not a classical language but an international lingua franca. The third and most important difference was that the data in Study III reflected individual usage by both elite and heritage bilinguals, as opposed to only from the heritage bilinguals in Studies I and II.

These differences coupled with a greater sample of bilingual participants facilitated a statistically and theoretically more rigorous investigation of the unique contributions of linguistic competence and sociolinguistic incentive in Study III. The methodological practice established in Study II, to provide an *objective* measurement for the participants' specific L2 competence in the investigated structures, was continued in Study III through the analysis of the participants' pronunciation of onset cluster in their strongest L2. The background factors that contribute to the participants' general phonological competence in their L2, which were introduced in Study II based on established SLA findings, were developed further in Study III. This is also true for the progression from Study I to Study III regarding the factors that influence sociolinguistic incentive. The factors at the *societal* level that are included are the same in the two studies, but Study III makes a more explicit attempt to operationalise these factors at the *individual* level so that their effects can be tested statistically.

The unique contributions of competence and incentive were investigated in this study through comparisons of *different bilingual groups* with one another and through *regression analyses* based on all bilingual participants. Four hypotheses regarding group differences were formulated beforehand based on previous findings in the literature. The 65 participants of the study consisted of three major groups: 12 monolingual speakers in Turkey (as control subjects), 24 elite bilingual speakers in Turkey and 29 heritage bilingual speakers in Sweden. The criterion for monolingualism was to report a proficiency level in a foreign language equal to or lower than three on an ascending scale from zero to ten. The criterion for bilingualism was to have spent a total of one year minimum in an environment where the speaker used an L2, which contains onset clusters (henceforth a *cluster language*), on a daily basis as a means of oral communication. Based on the theoretical

assumption that bilingualism, more specifically substantial proficiency in a cluster language, is a prerequisite for cluster adoption it was expected that the bilinguals in Turkey would use significantly more clusters in the loanwords in their Turkish than the monolinguals in Turkey (*Hypothesis 1*).

The *heritage bilinguals* were generally simultaneous bilinguals as most of them had started acquiring both their Turkish and their Swedish prior to age 3. Moreover, all speakers in this group had spent the great majority of their lives in Sweden, where Turkish is a minority language. In contrast, the *elite bilinguals* in Turkey were successive bilinguals as they had started acquiring their first cluster language after age 3, typically with the onset of secondary education around age 11. As they had all grown up in Turkey, they were raised in an environment where Turkish was the majority language. Based on previous findings in the literature, and on the aforementioned differences regarding the age of onset and the socio-political context of upbringing, it was hypothesised that the heritage bilinguals in Sweden would have higher competence *and* higher incentive to adopt clusters than the elite bilinguals in Turkey. Therefore, it was hypothesised that significantly higher cluster adoption rates should be found in the heritage bilinguals in Sweden compared to the elite bilinguals in Turkey (*Hypothesis 2*).

The two major bilingual groups consisted of two minor groups each, which differed from one another in respects that were assumed to significantly influence their members' competence *or* incentive to adopt clusters. All members of the Turkey group were successive bilinguals but they differed in the onset of their exposure to an L2 environment. The 10 *early successive bilinguals* had acquired their cluster language in an L2 environment from the beginning while the 14 *late successive bilinguals* had acquired their cluster language initially in a foreign-language environment and were exposed to an L2 environment first after age 18. Based on previous findings on factors that influence nativelikeness of accent in an L2, it was assumed that the early successive bilinguals would have obtained significantly higher phonological competence in a cluster language due to a greater *degree of exposure* to it and higher initial *motivation* to acquire it compared to the late successive bilinguals. Consequently, it was hypothesised that the early successive bilinguals in Turkey would display significantly higher cluster adoption rates that the late successive bilinguals due to higher competence (*Hypothesis 3*).

In the Sweden group, all speakers were either born in Sweden or raised there from an early age on, and had resided there for a long time. Nevertheless, there were some differences in the language development trajectories of the participants due to moves between Turkey and Sweden. The 19 *even-trajectory heritage bilinguals* had grown up in Sweden without longer periods of residence in Turkey. The 10 *mixed-trajectory heritage bilinguals* had, on the other hand, had abrupt changes in their language development

due to periods of residence in Turkey that were longer than one year. These longer periods of residence were either due to being born in Turkey and arriving in Sweden at a later age and/or due to their families' relocation to Turkey for a limited period after initially being raised in Sweden. Thus, the mixed-trajectory bilinguals had spent an average of 5 years of their lives in Turkey. Based on the previous finding that a donor language's *socio-political status* as a majority language increases the borrowers' incentive to adopt donor-language structures, it was expected that growing up *entirely* in Sweden would create a higher incentive to adopt clusters than only *partly* growing up in Sweden. Hence, it was assumed that the even-trajectory heritage bilinguals would have higher incentive than the mixed-trajectory heritage bilinguals. Therefore, it was hypothesised that the former group would also display higher cluster adoption rates (*Hypothesis 4*).

These four group-based hypotheses were complemented by *Hypothesis 5*, which states that regression models that also include independent variables that measure the *sociolinguistic incentive* to adopt clusters will deliver more satisfactory results than models that only include variables that measure the *linguistic competence* (i.e. phonological competence) to adopt clusters.

As with the Swedish data in Studies I and II, an elicitation task was preferred here in documenting the participants' pronunciation of loanwords that begin with an onset cluster in their original forms. To this end, the participants were given an *oral fill-in-the-blanks test* consisting of 150 written sentences in Turkish. The sentences contained 29 established loanwords with original word-initial onset clusters, which were faithfully spelled with clusters according to the rules of Modern Standard Turkish orthography. The loanwords either came from English or had phonetically similar (hence transparent) counterparts in the bilinguals' L2s English or Swedish, respectively. Hence, it was assumed that the bilingual participants of this study would have *implicit knowledge* of the fact that the loanwords that they were producing had word-initial onset clusters in their original forms.

The bilingual participants' linguistic competence to accurately produce onset clusters was measured through the recitation of a text in their L2s. These texts in English and Swedish were designed specifically to include similar types of word-initial onset clusters as in the loanword elicitation task in order to ensure comparability. The participants' incentive to adopt clusters was operationalised through the variables self-reported *L1 use* and *L2 dominance* (based on self-reported proficiency in both languages) with the help of a background questionnaire. The reason behind the choice of the variables L1 use and L2 dominance was the assumption that they captured in individual speakers the dominance relationship between the languages at the societal level, which are related to the degree of community bilingualism, the socio-political status of the languages and socio-economic dominance relationships between the language communities.

Three of the five hypotheses and the assumptions behind them were confirmed by the results. The heritage bilinguals in Sweden displayed significantly higher cluster adoption rates (88 percent) than the elite bilinguals in Turkey (55 percent) because the former had both higher competence and higher incentive to adopt clusters (Hypothesis 2). The early successive bilinguals in Turkey had significantly higher cluster adoption rates than the late successive bilinguals because the former had higher competence (Hypothesis 3). Regression analyses were conducted with cluster adoption rate as the dependent variable and cluster competence as well as the two incentive-related variables L1 use and L2 dominance as the independent variables. The analyses showed that models that included *both* the competence variable and one of the two incentive variables outperformed the model that only included the competence variable. This confirmed that an adequate model of loanword integration needs to take both linguistic competence and sociolinguistic incentive into account (Hypothesis 5). The variable L2 dominance had the strongest correlation with the cluster adoption rate in loanwords (one-tailed Pearson: $r = 0.764$, $p = 0.000$). The best model was the one that included competence and L2 dominance. These two independent variables could explain nearly two thirds of the variance in the dependent variable cluster adoption rate. In bilinguals with perfect cluster competence, L2 dominance could explain 40 percent of the variance in adoption rates. Furthermore, the beta values in the best model revealed that in this particular study the incentive variable contributed roughly twice as much to explaining the variance as the competence variable.

The remaining two hypotheses had to be rejected based on the results. Contrary to the prediction made in Hypothesis 4, the even-trajectory heritage bilinguals did not have significantly higher cluster adoption rates compared to the mixed-trajectory heritage bilinguals in Sweden but, instead, significantly similar rates. This hypothesis was based on the assumption that the even-trajectory heritage bilinguals would display significantly higher incentive. Since the data showed that this assumption was not fulfilled, as the two minor groups in Sweden were significantly similar in *all* independent variables, it was concluded that Hypothesis 4 was disproven because the assumption behind it was wrong. Despite the fact that the mixed-trajectory group had resided for an average of 5 years in a Turkish majority context, the average of 20 subsequent years of residence in the minority context in Sweden seems to have "evened out" potential differences in incentive that may have existed between the mixed-trajectory group and the even-trajectory group.

Contrary to the prediction in Hypothesis 1, that the bilinguals in Turkey would have significantly higher cluster adoption rates than the monolinguals, it was found that bilingualism *per se* did not make a significant difference in this study. Both monolinguals and bilinguals in Turkey had cluster adoption means around 45 percent. Closer inspection of the two minor groups in

Turkey revealed, however, that the monolinguals' adoption rates were undistinguishable from those of the minor group late successive bilinguals but significantly lower than the minor group early successive bilinguals. Moreover, the early successive bilinguals had significantly higher competence than the late successive bilinguals. These facts suggest that the monolinguals and the late successive bilinguals in Turkey may have obtained a similar *rudimentary* level of cluster competence through their L1 acquisition in Turkish. Given the long contact that Turkish has had with cluster languages, earlier bilingual borrowers and subsequent users of cluster loanwords are likely to have adopted (at least some) clusters and, therefore, also supplied the monolinguals with their first cluster input through the L1.

In the Turkey group, the type of bilingualism that had a significant positive effect on cluster adoption rates was early successive bilingualism. The cluster adoption mean of the early successive group was about 20 percentage points higher compared to the means of the monolinguals and of the late successive group. This could be explained by the higher competence of the early successive group, which, furthermore, was similarly high as that of the two heritage bilingual groups in Sweden. What these three groups of bilinguals had in common was that their members were *early bilinguals* in the sense that they had started acquiring a cluster language in an L2 environment before age 12. Hence, the results of this study suggest that early bilingualism boosts cluster adoption rates by an average of 20 percentage points through increasing the bilinguals' competence. This was called the *competence-based effect of bilingualism* in this study.

Since the early successive bilinguals in Turkey and the even-trajectory heritage bilinguals in Sweden had significantly similar competence levels, but the latter group had significantly higher incentive, a comparison of these two groups' cluster adoption means helped discover the unique effect of the type of higher incentive that was found in the context of heritage bilingualism. This effect, which was called the *incentive-based effect of bilingualism* in the study, amounted to an adoption boost of roughly 26 percentage points, which was only slightly greater than the competence-based effect.

Only four speakers displayed full cluster adoption (i.e. an adoption rate of 100 percent). All four had perfect cluster competence and a minimum L2 dominance score of 2.8. This suggests that perfect competence and at least *moderate L2 dominance* were *necessary* for full adoption. However, it seems that these two conditions were not *sufficient* for full adoption. Beside the four full adopters, 11 other speakers fulfilled both conditions without displaying full adoption. Nonetheless, these conditions resulted in a minimum adoption rate of 79 percent in all 15 speakers who fulfilled them, which can be viewed as guaranteeing *high* adoption rates.

Before discussing the main conclusions of this study, it is important to mention two of its particular characteristics. Firstly, this was a study on

established loanwords that had been around during a relatively long period of contact with cluster languages. This seems to have resulted in generally high cluster adoption rates in all investigated groups, even in monolinguals, as some rudimentary cluster competence is likely to have "trickled down" from bilinguals to monolinguals through the medium of the first language Turkish over several generations. Secondly, the particular bilingual sample in this study displayed very high cluster competence across the board. This lack of variation in competence was an advantage for highlighting the impact of incentive, but it could cause an underestimation of the impact of competence if it were to be generalised to other cases. In other samples where the speakers have higher ages of onset or less exposure, more variation in phonological competence would be expected. Consequently, competence would have a greater impact in such samples than in the current one. Therefore, it is important that the relatively low impact of competence on adoption rates in the present study not be viewed as generally valid across different cases.

Based on the analysis of the data in this study, it was concluded that the linguistic competence to adopt foreign phonological structures was sensitive to the *onset of bilingualism* according to the definition of bilingualism used here (i.e. how early the speakers became immersed in an L2 environment). On the other hand, the sociolinguistic incentive to adopt was sensitive to the *socio-political status of the recipient language* in the context of borrowing/use (i.e. as a majority or minority language). Hence, while high competence could "cut across" the socio-political divide and was attested both among elite and heritage bilinguals, high incentive was very closely tied to the context of heritage bilingualism, where the recipient language had minority status. Both competence and incentive were shown to play their unique roles in the outcome of the loanword integration process, but in this particular study the adoption-boosting effect of sociolinguistic incentive was greater than the effect of competence.

7 Discussion

In this dissertation, there are two types of *transmission cases*. Firstly, Studies I and II provide reconstructed data on the integration of Arabic loanwords by the initial elite bilingual borrowers and the data on new borrowings from Swedish by heritage bilinguals. In these cases, the input forms of the borrowings came *directly* from the donor language. Therefore, these data essentially reflect the *initial state of borrowing* without the effects of transmission through subsequent loanword users. Secondly, the remaining cases in all three studies are the result of complex processes of *transmission over several generations*. This concerns the data on the Modern Standard Turkish norms regarding the pronunciation and suffixation of established Arabic loanwords as well as the data on established French and English loanwords in Study III.

In these cases, the loanword input came *indirectly* from the recipient language Turkish (i.e. from the bilinguals' loanword use in their Turkish). Due to the fact that these loanwords were already established (i.e. used by both bilinguals and monolinguals) the input in Turkish probably came from a mixture of bilingual and monolingual speakers. Thus, the data in this dissertation provide an opportunity to investigate both the initial state of bilingual borrowing prior to transmission and the current state after transmission.

Section 7 comprises four sub-sections that focus on initial borrowing by bilinguals, subsequent loanword use by monolinguals, comparisons between the dissertation's findings and the results predicted by Thomason's borrowing scale and by established models of loanword integration.

7.1 Explaining adoption in the initial borrowing by bilinguals

From the perspective of overall proficiency in the donor language, there are two general types of initial borrowing by bilinguals. The reconstructed data on historical Arabic loanwords in Studies I and II constitute initial borrowing by elite bilinguals with non-nativelike proficiency (*non-nativelike bilingual borrowing*). The elicited data on Swedish borrowings in Studies I and II constitute borrowing by heritage bilinguals with nativelike proficiency (*nativelike bilingual borrowing*). Table 5 presents an overview of the results and some key background factors in Studies I and II.

The first general observation concerning the results in Table 5 is the striking similarity between the integration strategies in elite and heritage bilinguals. In all structures in Table 5, the perception of both types of bilingual groups was accurate. The combination of sufficient exposure and high absolute salience explains the accuracy of the perception of the following structures: Arabic long vowels and consonants, Swedish long vowels, and [l] in the word-final rime in Arabic and Swedish. The perception of Swedish long consonants was accurate *despite* their low absolute salience because the beneficial conditions involving early age of onset and substantial exposure enabled the heritage bilinguals to accurately perceive even structures with low absolute salience. Hence, no difference in perception accuracy was observed between the non-nativelike elite bilinguals and the nativelike heritage bilinguals here. This is due to the fact that the Arabic structures did not have a high degree of acquisition difficulty for the non-nativelike bilinguals and because the high acquisition difficulty of the Swedish long consonants could be overcome by the nativelike bilinguals. Consequently, both groups of bilinguals had acquired the necessary *competence* to accurately produce these particular donor-language structures.

The only difference between the outcome of integration in elite and heritage bilinguals, which is rendered in bold style in Table 5, is found in the

Table 5. Overview of the dominant patterns in the integration of the same phonological structures by different types of initial bilingual borrowers in different contexts (Studies I and II).

Structure	Borrowers: Non-nativelike elite bilinguals in Turkey Donor language: Arabic				Borrowers: Nativelike heritage bilinguals in Sweden Donor language: Swedish			
	Absolute salience	Perception	Perceptual effect	Integration outcome	Absolute salience	Perception	Perceptual effect	Integration outcome
long consonants	high	accurate	none	adoption	**low**	accurate	Filtering in	**adaptation**
long vowels	high	accurate	none	adoption	high	accurate	none	adoption
[l] after back vowel in the word-final rime	high	accurate	none	adoption	high	accurate	none	adoption
Suffixation of [l] after back vowel in the word-final rime	not applicable	not applicable	not applicable	novel morpho-phonemic pattern 1 (harmonic preservation)	not applicable	not applicable	not applicable	novel morpho-phonemic pattern 2 (non-harmonic preservation)

long consonants. The Arabic long consonants with high absolute salience were adopted, whereas the Swedish long consonants with absolute low salience were not adopted but adapted through shortening. Contrary to the previous hypothesis, the only case of adaptation in initial borrowing was, thus, found not in the elite bilinguals but in the heritage bilinguals. As argued in Study II, this was precisely due to the difference in absolute salience between long consonants in Arabic and Swedish. Therefore, it can be concluded that *high absolute salience* of the donor structure is a *necessary structural condition* in order for adoption to prevail over adaptation.

As seen in Study II, this means that the faithfulness constraint MAX-IO(high-salience length) is allowed to be reranked in the periphery by being promoted to a new position higher than the relevant markedness constraints *C:]$_\sigma$ and *V:C]$_\sigma$ that mitigate against length in the rime of closed syllables. At the same time, the faithfulness constraint MAX-IO(low-salience length) is banned from promotion in the periphery. Hence, it can be concluded that there is a *salience-based structural restriction on adoption* whereby only structures with high absolute salience can be adopted because only they are allowed to be promoted in the periphery. This means that so far two types of

restrictions on reranking in the periphery have been identified. Firstly, only faithfulness constraints are potential candidates for promotion in the periphery following the postulation by Itô and Mester (1999). Secondly, based on the analysis in this dissertation the salience-based restriction can be added as a second restriction, which further narrows down the class of promotable faithfulness constraints to only those constraints that involve structures with high absolute salience. A third and final restriction will be added later in Section 7.2.2.

The following sub-sections of Section 7.1 will discuss the bilinguals' sociolinguistic incentive to adopt, the role of L2 dominance and linguistic purism in the incentive to adopt, the necessary conditions for adoption, modelling initial borrowing by bilinguals, and a general comparison of elite bilingualism with heritage bilingualism.

7.1.1 The bilinguals' sociolinguistic incentive to adopt

All structures with high absolute salience in Table 5 were adopted by both groups of bilingual borrowers. This means that both groups not only had the necessary *linguistic competence* to adopt these donor-language structures but also the necessary minimum level of *sociolinguistic incentive* to adopt them. This may seem surprising given the results of Study III, which showed that the principal difference between elite bilingualism and heritage bilingualism was significantly different levels of sociolinguistic incentive. The heritage bilinguals in Sweden in Study III had significantly higher incentive, measured through L2 dominance and L1 use, compared to the elite bilinguals in Turkey. Furthermore, it was shown that at least a moderate level of L2 dominance was necessary for high degrees of adoption. Based on these findings, the sociolinguistic incentive would not be expected to be sufficient for adoption in cases of borrowing from Arabic. The non-nativelike elite bilingual borrowers could hardly have been dominant in their classical L2 Arabic or have used it more than their L1 Turkish. Based on the same finding, adoption would be expected in the cases of Swedish borrowings, which is confirmed by the results of Studies I and II.

It should be remembered at this point that the heritage bilinguals in Sweden could still have had significantly higher incentive to adopt than the elite bilinguals in Ottoman Turkey, as the findings of Study III suggest. However, even though the elite bilinguals may have had *relatively* lower incentive, they seem to have fulfilled the *minimum incentive requirement* for adoption despite not being dominant in Arabic. How can this apparent contradiction between the findings of Studies I and II, and Study III be explained?

Firstly, it is important to keep in mind that L2 dominance does not provide a comprehensive explanation for the results in Study III, despite proving to be a good predictor of adoption rates. Even in bilinguals with perfect phonological competence, L2 dominance cannot account for 60 percent of

the variance in adoption rates. In fact, Study II suggests that the speakers' *attitudes* towards adoption might be a good complement to their L2 dominance in measuring their incentive to adopt. Moreover, the results in Tables 9 and 10 in Study III show that L2 dominance is a better predictor in the L2-dominant heritage bilinguals than in the L1-dominant elite bilinguals. A plausible interpretation of this is that L2 dominance ensures more uniformly positive attitudes towards the donor language, thus making L2 dominance also a good predictor of attitudes in L2-dominant borrowers. In contrast, in more balanced or L1-dominant bilinguals the relevant attitudes towards the donor language cannot be captured by L2 dominance with the same level of success. Therefore, L2 dominance should be complemented by an additional factor that captures those attitudes towards the donor language that influence the incentive to adopt structures from it.

Accepting that L2 dominance misses some crucial aspects of the attitudes towards the donor language in bilinguals who are not L2-dominant, it is necessary to ask which aspects of the donor language or the borrowing context are likely to have a positive impact on their attitudes. In order to do this, the special social conditions of elite bilingualism in Turkish and Arabic that are discussed in Study I should be taken into account. As the principal language of Islam in the theocratic Ottoman state, and as one of the most important languages of the Islamic civilisation in general, Arabic was the dominant language in domains such as education, natural sciences, historiography, theology and law (Lewis 2002:5–27). Hence, Arabic definitely enjoyed the highest *prestige* among all foreign and second languages spoken by Muslim Turkish speakers in Ottoman Turkey, most likely even higher than that of Turkish itself. Due to this high prestige, both monolingual and bilingual Turkish speakers' *attitudes towards the donor language* Arabic are likely to have been very positive.

This high prestige, which is not uncommon in cases of elite bilingualism, might thus have provided the bilingual elite with the necessary minimum incentive for adoption. Hence, it can be concluded that attitudes towards the donor language related to its prestige in the recipient community (and not seldom beyond it, i.e. regionally or internationally) are an indispensable part of the borrowers' sociolinguistic incentive to adopt in the context of elite bilingualism.

7.1.2 The role of L2 dominance in the sociolinguistic incentive to adopt

The next question is what L2 dominance contributes to the sociolinguistic incentive to adopt beyond the contribution of attitudes towards the donor language. Self-reported L2 dominance is tested as an explanatory background variable in all three studies. In Study I it proves useful in explaining the heritage bilinguals' preference for the novel suffixation pattern with a

non-harmonic [l], with which it correlates moderately (one-tailed Pearson: $r = .567$, $p = .027$). In Study II, the adoption rate of the long segments in Swedish with high absolute salience (i.e. the vowels) also shows a trend towards a moderate correlation with L2 dominance (one-tailed Pearson: $r = .440$, $p = .076$). In Study III, which has the largest participant sample of the three studies, the cluster adoption rates of the entire bilingual group correlate strongly with L2 dominance (one-tailed Pearson: $r = .764$, $p = .000$). Hence, it is clear that L2 dominance is a good predictor of adoption rates in L2-dominant bilinguals. The relevant question is, rather, how it can be ascertained that it is measuring more than the borrowers' attitudes towards the donor language.

As discussed in Study III, individual speakers' L2 dominance is to a significant extent an expression of the dominance relationship between the donor language and the recipient language on the societal level. Put differently, the *practical status* or the everyday presence that the donor language has in the recipient community in terms of the domains it occurs in and the functions it performs is inextricably linked with the relative proficiency that bilingual recipient-language speakers develop in it by acquiring and using it as an L2 in specific contexts. As such, an individual speaker's L2 dominance does not only reflect that person's linguistic background but also functions as a mirror for the macro-sociolinguistic conditions in his/her community. Thus, the socio-political status or *societal dominance* of the L2 in the recipient community determines to a substantial extent large speaker groups' proficiency profiles in different languages, certain individual exceptions notwithstanding. This is clearly demonstrated by the distinct pattern of language dominance in Table 5 in Study III, which shows that elite bilinguals tend to be L1-dominant while heritage bilinguals tend to be L2-dominant. Hence, a particular speaker's degree of L2 dominance is at the same time a micro-sociolinguistic indicator of macro-sociolinguistic conditions that are conducive to the same L2 dominance profile in a much greater number of speakers.

Thus, individual L2 dominance correlates strongly with the degree of societal bilingualism. Therefore, it is very likely that an L2-dominant speaker will encounter many other L2-dominant speakers in his/her recipient community. As discussed in Study III, the existence of a large number of bilinguals in the recipient community makes lexical borrowing more likely and concomitant phonological adoption less conspicuous or even normal. Consequently, individual L2 dominance based on the societal dominance of the donor language increases the likelihood that phonological adoption will not be socially stigmatised in the recipient community. In this way, individual L2 dominance indirectly captures those sociolinguistic norms regarding bilingual speech in the recipient community that are related to the societal dominance relations between the languages.

A comparison with an individual speaker's attitude towards the donor language as his/her L2 can prove useful at this point. As mentioned earlier, this attitude is determined partly by the prestige that the donor language enjoys on the societal level. As just seen in the Ottoman context, a language such as Arabic could enjoy high prestige throughout the language community without necessarily being a dominant language in the same way a majority language is. On the individual level, a speaker can have a positive attitude towards a particular language without acquiring higher proficiency in it than another language such as his/her L1. Thus, the prestige of a language is an expression of its *symbolic status* in a community, whereas the dominance of a language reflects its *practical status* in the community. Similarly, an individual's attitude towards a donor language expresses his/ her *mental tendency* for evaluating and valorising it in a certain way. The same person's self-report on his/her dominance in the same language is, on the other hand, an evaluation that has a strong basis in *actual* accumulated language practices over a long period of time.

As suggested earlier, attitudes and individual dominance, on the one hand, and prestige and societal dominance, on the other, can overlap in cases where the donor language has an important status as an L2 in the recipient community. In such cases, the attitudes are, in fact, translated into practice. It is only when the donor language's status is less important that these two sociolinguistic factors start to diverge and positive attitudes towards the donor language are no longer necessarily matched by dominance in it for a large number of speakers.

Another possible source of divergence is that the very macro-sociolinguistic conditions that result in L2 dominance, for example by coercion, can trigger an attitudinal "backlash" in social contexts that are characterised by linguistic oppression. In such cases, negative attitudes towards borrowing from the oppressive dominant language can emerge and hinder not only lexical borrowing but also phonological adoption. The reverse is also possible in the same type of social context. A speaker who is dominant in the oppressed or undervalorised recipient language may internalise the donor-language speakers' negative attitude towards his/her dominant language (i.e. the recipient language) and develop positive attitudes towards the donor language, in which he/she may not be dominant. Hence, there are several reasons to keep attitudes and dominance apart, and to include them both as distinct factors that impact the sociolinguistic incentive to adopt.

The above comparison between attitudes and dominance implies that L2 dominance is a more *stable* factor because it is underpinned by institutional structures on the societal level that affect the development of bilingual proficiency. In contrast, despite being influenced by prestige on the societal level, attitudes towards the donor language can be influenced by several other factors that are more difficult to pinpoint and foresee. As such, attitudes are

more dynamic than dominance as they can be quite *idiosyncratic*. This is precisely why Thomason (2001:61) calls attitudes the 'wild card' in contact-induced language change.

It is probably due this stability of dominance as an explanatory variable that different studies on bilingual populations have found it to be an important factor in cross-linguistic influence. Winford (2003:37) draws attention to the directionality of linguistic influence in language contact from the dominant towards the dominated language in lexical borrowing when he writes that "the power and prestige differences between the (speakers of the) languages involved play[s] an important role in promoting lexical borrowing from the High to the Low language." According to Barlow (2014:11), who examines the pronunciation of Spanish-English bilinguals in both languages, "language dominance is a critical factor in determining the direction of influence between the L1 and L2." Also Genesee and Nicoladis (2006:327) mention that the directionality of cross-linguistic influence in bilingual acquisition is from the children's dominant language to their weaker language.

Thus, the factors positive attitudes towards the donor language (due to its high prestige) and individual dominance in the donor language (due to its societal dominance) contribute together to the sociolinguistic incentive to adopt phonological structures from the donor language. As Study III shows, there is a strong *linear relationship* between L2 dominance and adoption rates. The linearity also holds in the negative range (i.e. for L1-dominant speakers). Thus, even a bilingual speaker with weak L1 dominance has relatively greater incentive to adopt than a bilingual speaker with strong L1 dominance. Firstly, this means that the only case where the degree of L2 dominance does not matter is a monolingual speaker. Nonetheless, positive attitudes due to the donor language's high prestige would still contribute to a monolingual speaker's incentive to adopt. Secondly, the linearity in L2 dominance in the negative range (i.e. in L1 dominant bilinguals) is mainly due to varying levels of L2 proficiency, as L1 proficiency tends to be at the ceiling level in this range. However, starting in the upper section of the negative range and continuing in the positive range, the linearity begins to include effects of lower L1 proficiency in addition to effects of higher L2 proficiency. Hence, while L2 dominance could be replaced with L2 proficiency in the lower negative range, its predictive power would diminish if we were to replace it with L2 proficiency in the entire range.

As mentioned before, positive attitudes towards the donor language and L2 dominance usually converge in L2-dominant borrowers, where they both contribute positively to the incentive to adopt. However, positive attitudes may contribute more to incentive than L2 dominance in L1-dominant borrowers. Study III suggests that a *moderate level of L2 dominance* (i.e. a minimum of 2.8 on an ascending scale from zero to ten, where the upper

range above 6 is absent in the bilinguals) guarantees high adoption rates (above 79 percent in this particular study). Consequently, the lower the degree of L2 dominance is, such as in L1-dominant speakers, the more positive attitudes need to be in order to "compensate" for the lack of a strong impact from high L2 dominance.

It is difficult to be precise about the minimum degree of positive attitude. The particular case of Classical Arabic as the donor language in Ottoman Turkey is a rather extreme one in that the Muslim Turkish speakers revered Arabic as the language of the Qur'an and due to its cultural prestige in the Islamic civilisation. This type of *extremely high prestige* is not uncommon in elite bilingualism in a classical language because some classical languages enjoy such a status precisely due to their religious significance. Further examples of such classical languages are Latin, Greek and Sanskrit in other contexts. However, it is difficult to determine on the basis of the Arabic case alone if such extremely high prestige is sociolinguistically necessary for adoption in borrowers with a low degree of L2 dominance or if it constitutes "an added bonus" beyond a lower necessary minimum level.

7.1.3 The role of linguistic purism in the sociolinguistic incentive to adopt

A third and final factor that should be included in the list of factors that impact the sociolinguistic incentive to adopt is the borrower's *general attitude* towards lexical borrowing, regardless of the specific donor language in question. This attitude is linked on the societal level to the degree of *linguistic purism* that exists as a cultural tendency in the recipient community. As seen earlier in Section 4.1.1, some language communities such as the speakers of Mandarin Chinese are known to be quite averse to borrowing in general. It is difficult to claim that this societal factor is completely independent of societal dominance and prestige. However, there are some cases where linguistic purism in language policy can coexist with the high prestige of wide-spread second or foreign languages. The popularity of English loanwords in vernacular French in France despite legal obstacles for their use in public communication, which was briefly discussed in Section 4.1.1, is a case in point. Therefore, generally negative attitudes towards borrowing due to linguistic purism can potentially counteract or cancel out the positive effects that high prestige can have on the sociolinguistic incentive to adopt. This is relevant to take into account probably only in L1-dominant borrowers because dominance in a particular donor language and puristic aversion towards lexical borrowing in general are not likely to coexist in L2-dominant borrowers and communities.

7.1.4 Summary of necessary conditions for adoption in bilingual borrowing

The three sociolinguistic factors general attitude to lexical borrowing, attitude towards the donor language and dominance in the donor language are then responsible for the *sociolinguistic licensing* of the promotion of faithfulness constraints in the periphery of the recipient language's phonological lexicon. Moreover, the donor-language structures must have high absolute salience and the borrower must have the linguistic competence to produce them accurately. Thus, donor-language structures that are illicit in the core are adopted in the periphery when the three sociolinguistic factors result in sufficient sociolinguistic incentive to adopt. Hence, *any* phonological structure that has high absolute salience and can be accurately produced thanks to the borrower's acquisition background should be adopted in lexical borrowings when the borrower has sufficient sociolinguistic incentive to adopt it.

In summary, three necessary conditions can be identified in order for adoption to prevail over adaptation in initial bilingual borrowing based on the data discussed so far in this dissertation.

1. *The salience condition*: The donor-language structure must have high absolute salience.
2. *The competence condition:* The borrower must have acquired the linguistic competence (i.e. phonological competence) to accurately produce the donor-language structure based on a combination of the structure's salience (both absolute and relative) and such factors as age of onset, degree of exposure and motivation in the acquisition of the donor language as an L2.
3. *The incentive condition:* The borrower must have sufficient sociolinguistic incentive to adopt phonological structures from the donor language based on his/her attitudes towards lexical borrowing in general and towards the donor language in particular as well his/her dominance in the donor language.

Since phonological structures pertaining to different types and phonological levels such as segment quality (Study I), segment length (Study II) and new morphophonemic rules (Study I) are adopted by the initial bilingual borrowers in this dissertation, there is no reason at this point to assume that the type or level of the phonological structure constitutes an additional structural condition for adoption in bilingual borrowers. However, as will be shown shortly in Section 7.2.2, the data on the loanword use of subsequent monolinguals will result in the formulation of a fourth and final necessary condition for adoption related to phonological levels.

7.1.5 Modelling initial borrowing by bilinguals

The different types of factors on the individual and societal levels that have been discussed as background variables for the necessary conditions for adoption are summarised in the overview in Figure 1 with the help of two Swedish example words with long segments from Study II.

The upper half of the figure is devoted to the different steps in the integration process that the borrowed words go through in initial borrowing by bilinguals. It starts on the left in Step 0 with the word being uttered by a native speaker in the donor language Swedish, continues through the word's acquisition in Swedish as an L2 in Steps 1–3 and ends with its incorporation into the recipient language Turkish in Steps 4–5. The connections between these different steps are represented by straight arrows, which symbolise the theoretical possibility of alteration (i.e. adaptation) in that particular step. The only exception is the connection between Steps 3 and 4, which is stipulated as direct copying without alteration possibilities, and this is symbolised by the two parallel lines that resemble an equal sign. The steps are also given specific names underneath their rectangles, where the different relevant integration strategies are indicated.

The middle section of the figure is devoted to different factors on the individual level (rendered in round-edged rectangles with a white background) that impact different steps in integration process. At the bottom, there are the underlying *metafactors* on the societal level (rendered in rectangles with a grey background to signal that they do not pertain to the individual level) that are linked to the factors on the individual level. The causal links between the different factors on the different levels are represented through dashed arrows. For the sake of simplicity, only vertical arrows have been included, which means that the relationships between factors on the same level are not captured in the figure. However, this should not be taken to mean that such horizontal relationships do not exist between the factors.

Following the findings in Studies I and II, the input to the integration process is phonetic in nature (i.e. the produced surface form in native Swedish in Step 0). In Step 1, the accuracy of the perception of this form in the L2 depends, on the one hand, on the structure's salience, as represented by the hexagonal shapes on the upper left hand side of the figure. Here, both its absolute salience (i.e. universal acoustic cue robustness), and its relative salience depending on the similarities between the donor and recipient phonologies, influence the accuracy of its perception. The evaluation of the similarity depends on the two involved languages' phonological systems, which is represented in Figure 1 by dashed arrows that link L1 and L2 phonologies to relative salience. When the structure in question is segment length, absolute and relative salience overlap (referred to collectively as objective salience in Study II) since the similarity does not involve segment quality. If the long segment's duration is close to that of its short counterpart,

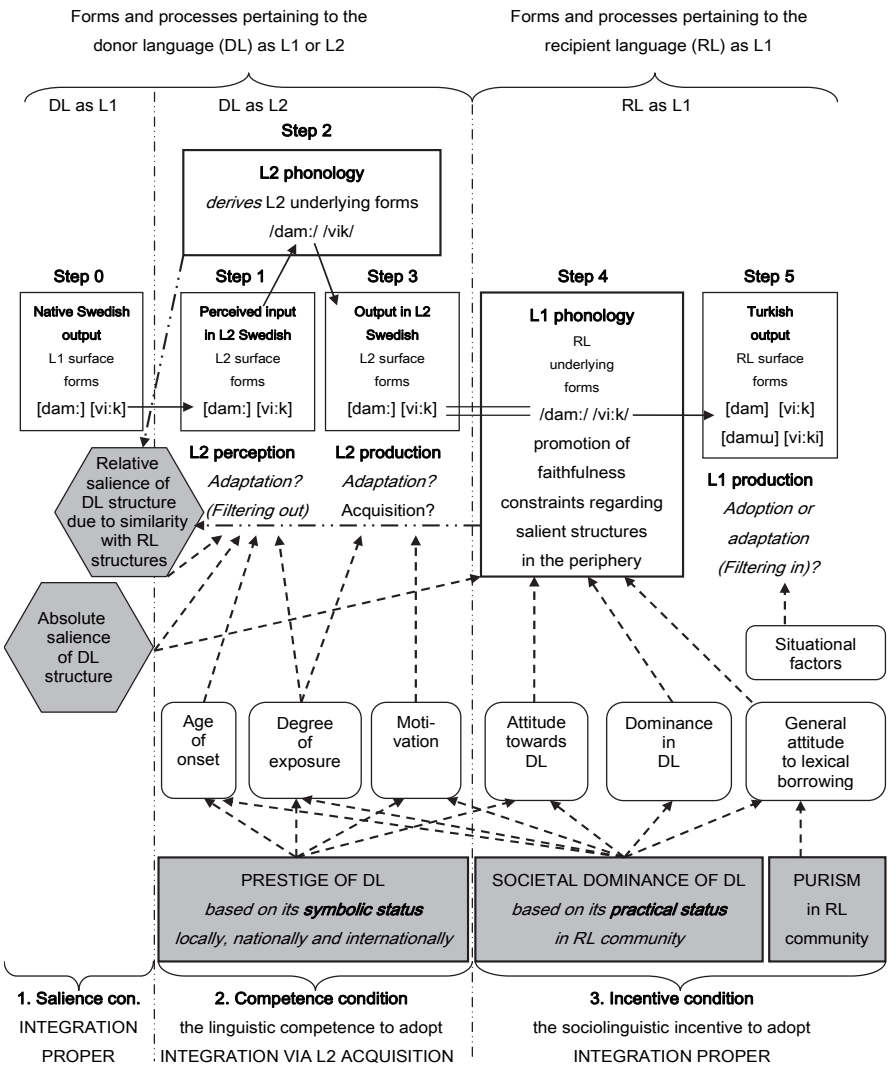


Figure 1. A preliminary overview of the process of initial borrowing by bilinguals with examples from the integration of Swedish long segments where vowel length has high salience but consonants length has low salience.

it has both low absolute and relative salience. The greater the durational difference is between short and long segments the greater the absolute and relative salience of the long segment will be. In Swedish, length has low absolute and relative salience in consonants but high absolute and relative salience in vowels.

The accuracy of L2 perception is further influenced by age of onset and the presence of sufficient exposure (referred to collectively as subjective salience in Study II). In Step 1, there is the theoretical possibility of percep-

tual adaptation if the L2 structure is perceived inaccurately (i.e. *filtered out* in perception). When this happens, adoption is no longer possible because the competence condition is not fulfilled. However, the Swedish-Turkish bilinguals can perceive all L2 structures accurately thanks to their low ages of onset and high degree of L2 exposure. Therefore, the high acquisition difficulty of Swedish consonant length due to low absolute Salience can be overcome by these bilinguals.

In Step 2, the perceived form of the input is stored in the phonological lexicon of the L2. Here, the borrower derives the accurate underlying form thanks to his/her competence in Swedish phonology, which includes *inter alia* that only consonant length is underlying and a rule that lengthens underlying short vowels in the right environment. This phonological competence is used again in deriving the accurate L2 surface form in Step 3 from the underlying form in Step 2. The nativelike heritage bilinguals in Sweden possess the right phonological competence to perform these phonological derivations. The accuracy of L2 production in Step 3 is dependent on a sufficient degree of exposure (i.e. experience) according to the Speech Learning Model (SLM).

Motivation has also been found to be a relevant factor for nativelike pronunciation in SLA studies. Since the SLM does not mention it as a relevant factor for perception, in Figure 1 it is presented as impacting L2 production alone. Hence, if there is insufficient motivation to acquire the L2, or insufficient exposure to L2 input, L2 production will not be accurate despite accurate perception. Then, the structure will not have been acquired in the L2. Thus, Step 3 potentially involves a second instance of the donor-language structure being excluded from adoption already in the L2 (i.e. adapted in L2 production). However, this is not the case for the nativelike heritage bilinguals in Sweden.

It is then the L2 surface form in production (i.e. the actual L2 pronunciation of the word by the borrower) that is directly copied to the L1 phonological lexicon as the underlying form in the recipient language Turkish in Step 4. If there is insufficient sociolinguistic incentive, the underlying form will be stored in the core stratum and subjected to the constraint ranking in the core. Consequently, no adoption will take place because the form will be adapted (i.e. shortened in this case) in L1 production due to the high-ranked markedness of long segments in the rime of closed syllables in Turkish. If, however, the sociolinguistic incentive is sufficient it will be stored in a peripheral stratum and subjected to the modified ranking in the periphery, where the faithfulness constraint MAX-IO(high-salience length) is promoted to a higher position than the relevant markedness constraint. The three factors on the individual level that influence the sociolinguistic incentive to adopt (i.e. attitude towards the donor language, dominance in the donor language, and general attitude to lexical borrowing) are presented in the lower

right hand side of Figure 1. Since the heritage bilinguals in Sweden are generally L2-dominant it can be assumed that they also have positive attitudes towards borrowing in general and towards Swedish as the donor language. Therefore, they should have the necessary sociolinguistic incentive to adopt.

Absolute salience does not only impact L2 perception but also L1 production by determining the *promotability* of the faithfulness constraints in Step 4. Since Swedish consonant length has low absolute salience, its MAX-IO constraint cannot be promoted because the salience condition is not fulfilled. This results in a case of adaptation in L1 production (i.e. *filtering in*) in Step 5. Thus, only vowel length can be adopted in surface forms. In Step 5, both the unsuffixed and accusative-suffixed forms of the words in Turkish are included in order to show that there is no length alternation in this case due to the constraint ranking that is discussed in detail in Study II.

Earlier in Section 5.2.2, it was shown in (4) that *interpersonal variation* can be attested in some loanword forms, where some speakers adopt a donor-language structure while others adapt it. Theoretically, *intrapersonal variation* is also possible whereby one and the same speaker may prefer to pronounce the same loanword with structural adoption in some situations and adaptation in others. Following the English loanword *web* in (4), some Swedish speakers might thus stylistically shift between the pronunciations [**w**ɛbː] and [**v**ɛbː] depending on *situational factors*. As such, the *loan phoneme* /w/ can perform a similar function to that of a *sociolinguistic variable* of the type *marker* (Labov 1972). Such situational factors can include interlocutor, context and topic of conversation, to name just a few.

Applying this possibility to the examples in Figure 1, in Step 5 a bilingual borrower can potentially shift between the forms [viːk] and [vik] depending on situational factors. Such a speaker would need to have two separate lexical entries with the same underlying form [viːk]. One entry would be stored in the periphery of the phonological lexicon, whose constraint ranking would produce the surface form [viːk] with vowel-length adoption. The other entry would, instead, be stored in the core, whose constraint ranking would produce the surface form [vik] with vowel-length adaptation through shortening. The same possibility for a stylistic shift involving length is not available in Swedish long consonants because length adoption is blocked there due to the low absolute salience of the consonants' length.

Which particular situational factors could then be considered as relevant in the data collection in this dissertation? As described in detail in Study I, the Swedish borrowings were uttered in the *formal* context of a research interview with a visible microphone and computer used for the recording that took place in a university building in most cases. The only interlocutor (i.e. the researcher) was approximately in the same *biological age* bracket as the participants. The interlocutor was recognisably *bilingual* as both languages were used in different research tasks. Moreover, he consciously em-

ployed different types of language mixing with the purpose of putting the participants at ease. The participants knew or could most probably tell by his Turkish that their interlocutor had grown up entirely in Turkey. Consequently, the interlocutor did not have the same *background* as the participants who themselves had mainly grown up in Sweden. Furthermore, the participants knew that the researcher had a special *interest* in documenting different aspects of their Turkish. Some of the participants were friends or acquaintances of the interlocutor while others were meeting him in person for the first time.

As situational factors, the formality of the context as well as the interlocutor's background and interest in Turkish may have given some participants the incentive to speak Turkish in as "pure" a form as they could produce. This would entail both avoiding lexical borrowing and code-switching as much as possible, and preferring structural adaptation in those cases where lexical borrowing could not be avoided. However, it is also possible that the commonalities between the participants and their interlocutor in the factors bilingualism and age as well as familiarity with the interlocutor may have given some participants the opposite incentive to use their vernacular Turkish and to employ lexical and structural borrowing more freely. Finally, some speakers may have been used to employing intrapersonal variation while others may rather have stuck to one and the same form regardless of situational factors. Since the research design was not planned to capture or elicit intrapersonal variation, it is ultimately impossible to know how different situational factors influenced the participants. Nevertheless, it is important to demonstrate that the model in Figure 1 is capable of formally capturing intrapersonal variation through stylistic shifts between different lexical entries in the core and the periphery in Step 5. It should also be noted that situational factors are the only factors on the individual level that are not assumed to have links to the metafactors on the societal level. Situational factors are rather envisioned to differ from situation to situation, and therefore more difficult to derive from societal factors.

The remaining six factors on the individual level in the middle of Figure 1 are linked to the three metafactors on the societal level at the bottom: the prestige of the donor language, the societal dominance of the donor language, and linguistic purism in the recipient-language community. The links between these societal factors and their counterparts on the individual level have already been discussed for the sociolinguistic factors. Societal dominance also impacts all three factors on the individual level that influence L2 perception and L2 production. When the donor language is the majority language in the recipient community, such as in heritage bilingualism, the age of onset for L2 acquisition is often very low. L2 acquisition starts typically already before the onset of compulsory schooling. Its status as the ambient language also results in a high degree of exposure and high motivation to

acquire it. Thus, societal dominance of the donor language impacts all six factors on the individual level. Consequently, it is the most powerful metafactor on the societal level.

The second most influential societal metafactor is prestige as it impacts four of the six factors on the individual level in Figure 1. In addition to impacting attitudes towards the donor language, the prestige of the donor language is commonly one of the primary motivations for acquiring the donor language, even when it is not the dominant language in the recipient society, as in elite bilingualism. By also creating a strong incentive for the establishment of institutions of education, with the donor language as the sole medium of instruction or at least one of the media of instruction on all educational levels from kindergarten to university, the prestige of the donor language can impact the age of onset and the degree of exposure to the donor language. However, its impact on the latter two factors is rather variable and may be weaker than the impact of societal dominance.

The links between the factors on the individual and societal levels that impact a bilingual borrower's sociolinguistic incentive to adopt mean that the model in Figure 1 is essentially a macro-sociolinguistically oriented model. Thus, macro-sociolinguistic factors that are crucially linked to higher-order societal structures are expected to have greater impact on a bilingual borrowers' incentive to adopt compared to the micro-sociolinguistic factors that are at work in particular conversational situations (i.e. the situational factors). Individual speakers are assumed to have a vernacular pronunciation for a borrowing, which is predicted by the six factors related to competence and incentive on the individual level in Figure 1. However, provided that speakers have the competence to adopt a donor-language structure, they can choose to deviate from their vernacular pronunciation in certain situations by switching between adoption and adaptation when certain situational factors motivate a switch. Thus, this possibility for style shifting gives the generally macro-sociolinguistically oriented model in Figure 1 a certain micro-sociolinguistic flexibility that captures the speakers' agency in expressing their identity through language use and their ability to accommodate to different situations.

The overview in Figure 1 clarifies where all the different steps in loanword integration occur and what the different processes involve. On the top row of the figure, it is clearly marked whether a specific form in the integration chain pertains to the donor language as L1 or as L2, or to the recipient language as L1. Vertical lines running down from these categories delineate the language realm within which different processes operate. Similarly, at the bottom of Figure 1, it is indicated which of the necessary conditions for adoption the different factors are associated with. It should be clarified here that the salience condition on the bottom left hand side only concerns the *absolute* salience and the relative salience of the phonological structure.

Further down, it can be seen if the different processes are *unique* to loanword integration or if they are actually related to processes of L2 acquisition. Thus, it is elucidated that the linguistic competence to adopt is *entirely* underpinned by the borrowers' ultimate attainment in L2 acquisition. If adaptation is already encountered in L2 perception or in L2 production, which ultimately makes adoption impossible down the line due to the non-fulfilment of the competence condition, it can be said that such a case of loanword integration is completely due to imperfect phonological competence in the L2, or put differently due to foreign accent. This is referred to as *loanword integration via L2 acquisition* in Figure 1. By thus making the role of L2 acquisition in loanword integration visible, the risk of "reinventing the wheel" by proposing loanword integration processes that merely mimic what SLA research has already established as facts related to L2 acquisition can be eliminated. Moreover, the theoretical requirements for models of loanword integration are thus increased by compelling them to check their compatibility with relevant findings in SLA.

Singling out processes that actually involve L2 acquisition helps reveal that the other involved processes are unique to loanword integration and consequently constitute *loanword integration proper*. These processes are those that involve the salience condition and the incentive condition. The role of salience in L1 production and sociolinguistic factors on the individual level also happen to be among the least researched aspects of loanword integration. Therefore, drawing attention to what loanword integration proper is can have the theoretically beneficial effect of pointing out a more fruitful line of inquiry, which may help progress in loanword phonology as a relatively new sub-discipline within linguistics.

Although the model in Figure 1 depicts the loanword integration process from the perspective of an individual bilingual borrower, it should not be taken to mean that the process need look exactly this way in every individual bilingual borrower. The main point is, rather, that this depiction captures what is likely to be the case in the *average* bilingual borrower. Further factors exist on the individual level such as *foreign-language aptitude*, which influences the competence to adopt, and a range of additional factors that influence different individuals' *attitudes*, and by extension their incentive to adopt, but these have not been included in Figure 1. The reason for this is that such additional factors lose their impact on the outcome when observing large groups of speakers, as in community-wide cases of borrowing, because they tend to be normally distributed in large populations

7.1.6 Comparing elite and heritage bilingualism based on all six individual factors and societal dominance as a metafactor

It has already been shown that the only case of initial bilingual borrowing investigated in this dissertation where a difference is found between the inte-

Table 6. Comparing the probability of adoption based on general tendencies in different factors in elite bilinguals and heritage bilinguals.

		Factors that impact phonological competence via donor-language acquisition			Factors that impact sociolinguistic incentive		
Type of bilinguals (donor-language proficiency)	Adoption probable in structures	Age of onset	Degree of exposure	Motivation	Attitude to donor language	Language dominance	General attitude to lexical borrowing
Elite bilinguals (non-native-like)	with high absolute AND relative salience	beginning of compulsory school or later	intermediate to high	intermediate to high	positive	dominant in recipient language	depends on the particular context
Heritage bilinguals (native-like)	with high absolute salience	prior to compulsory school	high	high	positive	dominant in donor language	positive

gration strategy preferred by elite bilinguals and heritage bilinguals is the integration of long consonants. This difference is structural in character as it is due to a difference in absolute salience of consonant length in the donor languages Arabic and Swedish.

However, no difference is found between the elite and heritage bilinguals' incentive to adopt the particular phonological structures that are investigated. Therefore, it was concluded earlier that not only heritage bilinguals but also elite bilinguals can fulfil the minimum incentive requirement given the right sociolinguistic circumstances. On the right hand side of Table 6, this generalisation is summarised with the help of the three main sociolinguistic factors on the individual level.

Attitudes towards the donor language are usually positive in both types of bilinguals, as donor languages tend to enjoy high prestige, both in recipient communities with elite bilingualism and in those with heritage bilingualism. The sociolinguistic factor that most clearly distinguishes elite bilinguals from heritage bilinguals is the language-dominance status of the bilinguals. Generally and as shown in Study III, elite bilinguals tend to be dominant in the recipient language (their L1) whereas heritage bilinguals tend to be dominant in the donor language (their L2). However, this incentive "disadvantage" for the elite bilinguals can be "compensated" for by positive attitudes due to high prestige, as was discussed earlier. As for the general attitude to lexical borrowing, heritage bilinguals tend to have more uniformly positive attitudes due to their L2 dominance. However, in elite bi-

linguals this general attitude is more variable as it depends on the particular culture that exists in their community regarding openness or purism towards foreign words.

On the left hand side of Table 6, the three factors that impact competence on the individual level can be seen. As was discussed earlier, due to immersion in a majority-language context heritage bilinguals tend to have earlier ages of onset for donor-language acquisition, usually already before compulsory school, compared to the elite bilinguals, whose donor-language acquisition typically starts in school. The same general circumstances regarding the donor language's status as the majority language or a minority language also influence the degree of exposure to the donor language and the motivation to acquire it. In heritage bilinguals, both exposure and motivation tend to be uniformly high, whereas they can vary between the intermediate level and the high level depending on the more variable circumstances that characterise elite bilingualism. As seen in Study III, the acquisition circumstances in school, and the type of school, can have an important impact on exposure and motivation, and consequently on phonological competence in elite bilinguals.

Since SLA research in general, and the Speech Learning Model in particular, has found that the nativelikeness of accent in the L2 is very sensitive to the age of onset, this factor is most probably the competence variable where the most significant difference between elite and heritage bilinguals can be found. This difference can, of course, be compounded by further differences in exposure and motivation in some cases of elite bilingualism. Since the SLM claims that the age of onset needs to be lower the higher the degree of acquisition difficulty is for a particular L2 structure, it can be predicted that it is precisely in the more difficult L2 structures where competence differences between elite and heritage bilinguals are likely to be attested.

According to the salience condition, donor-language structures with low absolute salience will not be adopted by either group. They tend to be filtered out (i.e. adapted in L2 perception) in elite bilinguals whereas they are filtered in (i.e. adapted in L1 production) in heritage bilinguals, as seen in Study II. Therefore, what makes a significant difference in adoption is the degree of *relative* salience of donor-language structures with high absolute salience. The nativelike heritage bilinguals will be able to perceive all donor-language structures accurately, including those with low relative salience (i.e. those that are more similar to L1 structures). In contrast, elite bilinguals are more likely to perceive structures with low relative salience inaccurately. Such structures will, thus, have a relatively high degree of acquisition difficulty for the non-nativelike elite bilinguals. According to the findings of the SLM (Flege 1992), even substantial exposure to L2 input will not improve production accuracy in such L2 structures. Consequently, if the elite bilinguals' ages of onset are not low, such difficult structures will not be

acquired and by extension also excluded from adoption. This general prediction is summarised in the last column of Table 6.

In conclusion, it can be said that elite bilinguals are more like the heritage bilinguals in the fulfilment of the minimum incentive condition than in the fulfilment of the competence condition. The fulfilment of the competence condition is not subject to the acquisition difficulty of the donor-language structures for the nativelike heritage bilinguals, but it is rather sensitive to the acquisition difficulty of the particular structure in question in elite bilinguals. Therefore, heritage bilinguals are more likely to fulfil the competence condition across all possible donor-language structures compared to elite bilinguals. Thus, the principal difference between elite bilinguals and heritage bilinguals in loanword integration comes down to linguistic competence in the donor language, which is, in turn, very sensitive to the age of onset for donor-language acquisition.

As can be seen in the overview in Figure 1, age of onset is determined on the societal level by the prestige and dominance (i.e. socio-political status) of the donor language. By definition, borrowing in elite bilingualism involves a dominant recipient language with the socio-political status of the majority language, whereas borrowing in heritage bilingualism involves a dominated or weak recipient language with the socio-political status of a minority language. Thus, societal dominance is, on the one hand, the most powerful metafactor in loanword integration, and the main criterion for the definition of elite and heritage bilingualism on the other. Therefore, it might be appropriate to view the aforementioned differences between elite and heritage bilingualism with the help of the concept *dominance* in order to shed light on general patterns in loanword integration.

The societal dominance of the donor language in heritage bilingualism "trickles down" to *all* relevant factors on the individual level and, thereby, impacts competence *and* incentive to the same high extent. In contrast, the lack of societal dominance in the donor language in elite bilingualism results in a *differential impact* on competence and incentive. The incentive to adopt can be comparably high if the donor language has high prestige, but the competence to adopt is not equally likely to reach the same uniformly high level due to the differentiating effect of the donor-language structures' acquisition difficulty. Thus, the potentially high prestige of the donor language in elite bilingualism does not permeate all factors on the individual level to the same extent as societal dominance does in heritage bilingualism. Therefore, it may be appropriate to characterise heritage bilingualism as a context where the donor language has *strong dominance*.

In elite bilingualism, the high prestige of the donor language can deliver incentive effects that resemble those delivered by dominance, but this similarity in incentive is not matched by equally high competence in elite bilinguals as in heritage bilinguals. Hence, it may be appropriate to characterise

elite bilingualism as a context where the donor language has weak dominance. The use of the term *weak dominance* in elite bilingualism is especially felicitous in cases where the donor language enjoys even higher prestige than the recipient language in the recipient community, as Arabic did in the Ottoman context. The high probability of finding strong dominance in heritage bilingualism but weak dominance in elite bilingualism makes adoption more likely when the initial borrowers are heritage bilinguals. However, as seen in the cases in this dissertation it is ultimately the salience of the donor-language structures in question that determines if different outcomes will be found in initial borrowing by elite and heritage bilinguals.

7.2 The cases of loanword use by monolinguals after transmission

The data on the contemporary norms regarding Arabic loanwords constitute a case of loanword use *after* transmission through several generations of bilingual and monolingual speakers of Turkish. The intensity of contact with Arabic has historically been on a decreasing trend and around the middle of the 20th century the transmission and use of Arabic loanwords stopped comprising Turkish-Arabic bilinguals. Hence, the data on the contemporary norms regarding Arabic loanwords has been transmitted from monolinguals to monolinguals for at least a couple of generations. Thus, in contemporary data on Arabic loanwords there is a diachronic transmission chain that began with initial bilingual borrowing, continued with transmission from initial bilinguals to monolinguals and ended with transmission from monolinguals to monolinguals. Since the initial borrowers were bilingual and the great majority of the subsequent users were monolingual, contemporary monolinguals' use of the Arabic loanwords can be generally characterised as a case of *bilingually-mediated monolingual borrowing*.

Bilingually-mediated monolingual borrowing can be considered an intermediate case between bilingual borrowing and *dialect contact*. It resembles bilingual borrowing with respect to the factors that impact the speakers' competence to adopt. There are, however, two crucial differences. Firstly, there is no actual L2 acquisition of the donor language in monolinguals but only potential acquisition of those donor-language structures that have been adopted by the initial bilingual borrowers in loanword forms. Nevertheless, the monolinguals' perception and production accuracy in such bilingually adopted structures can be predicted with the help of similar factors as in the bilinguals' L2 acquisition. Secondly, the loanword input is not transmitted through the medium of the donor language (i.e. the L2) as in bilingual borrowing but through the recipient language (i.e. the L1 variety that was spoken by the initial bilingual borrowers). This is precisely why bilingually-mediated monolingual borrowing also resembles dialect contact (or in the

present case sociolect contact). Thus, the contact and the transmission take place within the same language but can often, especially when the initial bilingual borrowers were elite bilinguals, involve contact between speakers of different *varieties* of that language. Therefore, the factors that impact the speakers' sociolinguistic incentive to adopt foreign structures in bilingually-mediated monolingual borrowing resemble the sociolinguistic factors that are generally at work in dialect contact.

Before the different factors in bilingually-mediated monolingual borrowing are discussed in detail in the next section, a brief overview of the sociolinguistic context in Ottoman Turkey is necessary in order to understand the conditions of *sociolect contact*. When descriptions of the lexicon and structure of Ottoman Turkish are consulted (e.g. Develi 2009; Kerslake 1998; Lewis 2002), it becomes clear that the bilingual elite spoke a distinct *elite sociolect* that was differentiated from other varieties of Turkish. To a great extent, this was due to the many Persian and Arabic influences that the Ottoman elite sociolect contained. Lewis (2002:8) even remarks that the monolingual Turkish speakers had difficulty in understanding this sociolect. Kerslake (1998:180) states that "[w]ith the exception of a small lexical component, these imported elements were absent from the speech of the mass of the Turcophone population." Hence, it seems justified to view the transmission of Arabic loanwords from the bilinguals to the monolinguals in Ottoman Turkey as a special case of sociolect contact.

As for the later context in Republican Turkey, the standardisation of Modern Turkish and the language reform with its shift from the Arabic to the Latin alphabet and its attempt to purify Turkish from Persian and Arabic elements as well as the institutions of the modern secular nation state (including new compulsory schools) changed the sociolinguistic situation in Turkey quite radically. Moreover, the teaching and use of Arabic in schools was discontinued under the Republic. The Ottoman elite sociolect that was previously associated with erudition and high socioeconomic status gradually lost its high prestige and eventually even acquired negative associations with old Ottoman values in the younger generations. At the same time, a certain levelling of sociolects and dialects took place in Turkey as many speakers were forced to or felt compelled to shift to the new Modern Standard Turkish. While the use of Arabic loanwords began being officially discouraged and acquired a negative connotation after the 1920s, also the proficiency, use and prestige of Arabic as a second language started decreasing in Turkish society. Thus, the bilingual-to-monolingual transmission occurred in context where Arabic and the Ottoman elite sociolect had high prestige, while the subsequent monolingual-to-monolingual transmission took place in a different context where the prestige of both Arabic and the Ottoman elite sociolect was considerably lower and possibly somewhat stigmatised.

Table 7. Overview of the dominant patterns in the integration of the same phonological structures by the initial elite bilingual borrowers and the subsequent monolingual users in Turkey (Studies I and II).

	Initial borrowers: Non-nativelike elite bilinguals in Turkey Input language: Arabic				Subsequent users: Monolinguals in Turkey Input variety: The bilinguals' Turkish			
Structure	Absolute salience	Perception	Perceptual effect	Integration outcome	Absolute salience	Perception	Perceptual effect	Integration outcome
long consonants	high	accurate	none	adoption	high	accurate	none	**adaptation**
long vowels	high	accurate	none	adoption	high	accurate	none	**adaptation**
[l]	high	accurate	none	adoption	high	accurate	none	adoption
Suffixation of [l]	not applicable	not applicable	not applicable	novel morphophonemic pattern 1	not applicable	not applicable	not applicable	adoption of novel morphophonemic pattern 1

The following sub-sections of section 7.2 will discuss the transmittability of adopted structures from bilinguals to monolinguals, structural restrictions for constraint promotion in the periphery, and demographic and social factors in bilingually-mediated monolingual borrowing.

7.2.1 The transmittability of adopted structures from bilinguals to monolinguals

As seen earlier, the initial bilingual borrowers had adopted long vowels, long consonants and word-final [l] in Arabic loanwords. A relevant question to ask at this point is if these adopted Arabic structures were transmitted without alteration from the initial bilingual borrowers to the subsequent monolingual users (i.e. if the bilinguals' adoptions were adopted or adapted by the monolinguals). Table 7 presents an overview of both groups' dominant patterns of integration in the aforementioned Arabic structures. The structures where the monolingual pattern differed from the bilingual pattern are indicated in bold style in the last column.

The comparison in Table 7 shows that the word-final [l] was transmitted without alteration (both in suffixed and unsuffixed forms) but that the long vowels and consonants adopted by the bilinguals were subsequently adapted by the monolinguals by shortening in the word-final rime. How then can this pattern of *differential transmission* in bilingually-mediated monolingual borrowing be explained?

Figure 2 presents a modified version of the model that was presented earlier in Figure 1 in Section 7.1.5. The modifications to the original model that captured initial bilingual borrowing involve adjusting it to monolingual borrowing. The phonological integration process is illustrated with the help of two Arabic loanwords: one with a long consonant and the other with a long consonant. The initial bilinguals' variety of Turkish, the Ottoman elite sociolect, is referred to as bL1 (i.e. bilingual L1) while the monolinguals' variety is shortened as mL1 (i.e. monolingual L1) in Figure 2.

In initial bilingual borrowing, the input was tacitly assumed to be primarily acoustic despite the borrower's knowledge of the words' orthographic representation. Therefore, the *orthographic representation* of the investigated phonological structure was not included in the input in the model in Figure 1. However, the situation may potentially be different in monolingual borrowers, whose only medium of input is the L1 Turkish, and for whom the orthographic visibility of the structure in the written input may be relevant. Therefore, the Modern Standard Turkish orthographic representation of the example loanwords is included in graphic brackets (< >) in the input in Step 0. Thus, the input to the monolinguals comprises both orthographic and acoustic forms of the loanword.

If the structure's orthographic visibility mattered, the orthographically (more) visible structures should be easier to adopt because they would raise the borrower's awareness of the original donor-language input form. The orthographic visibility of the four structures investigated in established loanwords in this dissertation is summarised in Table 8 according to different orthographic periods in the history of the Turkish language.

As the diachronic overview in Table 8 illustrates, there have been several diachronic changes in the orthographic representation and visibility of the phonological structures in question. The decrease or increase in orthographic visibility correlates positively with changes in the intensity of contact with the donor language. Comparing the first two rows with the last two rows in Table 8, it can be seen that there is no causal relationship between the attested integration norm and orthographic visibility in any of the included periods. Therefore, it must be concluded that orthography did not play an important role in the present cases of borrowing. It is possible that this is due to the fact that these are cases of bilingually-mediated monolingual borrowing. Perhaps orthographic visibility matters more in cases of naïve monolingual borrowing, where there is no bilingual mediation that provides a model for the pronunciation of the loanwords.

Studies I and II established the fact that the underlying forms of the monolingual users contained the original forms of the following structures: long segments and fully specified front [I]. This means that the monolinguals' perception was accurate in all of them. Then an important question is how this accuracy can be accounted for.

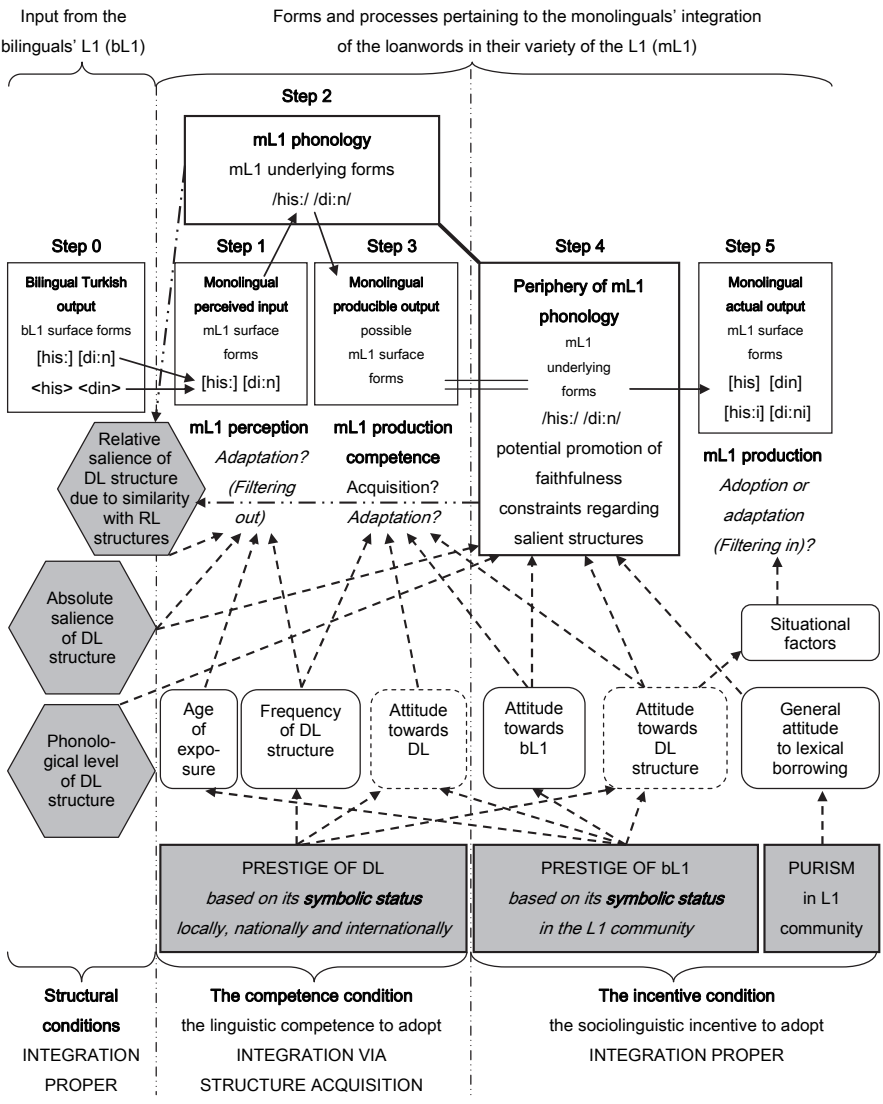


Figure 2. A comprehensive overview of the process of bilingually-mediated monolingual borrowing with examples from the integration of Arabic long segments that were adopted by the initial bilingual borrowers.

The factors that impact the competence to adopt (including perceptual accuracy) in Figure 2 correspond directly to the factors in Figure 1 because the acquisition difficulty of a specific donor-language structure should be the same for L1 speakers of the same recipient language, regardless if they are exposed to the structure in the L2 or the L1 as the medium of transmission. Therefore, the *salience condition* is relevant here.

Table 8. Overview of the orthographic visibility of the investigated structures in Ottoman Turkish and Modern Standard Turkish before and after the orthographic reform of 1965 (based on information in Studies I–III).

Original phonological structure	Arabic script in Ottoman Turkish before 1929	Latin script before the orthographic reform 1929–1965	Latin-based script after the orthographic reform 1965–today	Contemporary integration norm
Long vowels	visible	visible	reduced visibility	not adopted
Long consonants	visible in Qur'anic texts	visible only before vowel-initial suffixes	visible only before vowel-initial suffixes	not adopted
Word-final [l]	not visible	visible	reduced visibility	adopted
Onset clusters	not visible	visible in some words	increased visibility	adopted

The adoption of foreign length makes the Turkish of the initial bilingual borrowers a language of the phonological type where segment length is distinctive in both vowels and consonants and where the vowels' length does not depend on the consonant's length and vice versa. Therefore, the long segments in Turkish should have high *absolute salience* like those in Arabic, which is a language of the same phonological type. Although it is not included in Figure 2, the word-final [l] will also be included in the discussion here. Even though there may be subtle differences in the primary place of articulation between the Arabic [l] and the Turkish [l], their secondary articulation (i.e. the absence of velarisation) was the same and the [l] should therefore have equally high absolute salience in Turkish, as it does in Arabic. Hence, all three structures, whose transmission is examined, fulfil the salience condition in Turkish.

Relative salience is the other salience factor that impacts the competence to adopt and since the change of transmission medium does not affect it, previous evaluations of these structures' relative salience can be used again. In Section 6.3, the relative salience of word-final [l] after a back vowel was shown to be intermediate. The same evaluation can be made about segment length as it is neither completely new (i.e. dissimilar) nor too similar (i.e. close to a durational ratio of 1 between short and long segments). Hence, neither absolute nor relative salience can explain the attested differential transmission pattern.

As for the factors that impact the competence to adopt on the individual level, the previously discussed factors age of onset, degree of exposure and motivation in Figure 1 correspond to the factors age of exposure, frequency of donor-language structure and to the attitudinal factors in Figure 2. Here

age of exposure concerns mainly whether the monolinguals were exposed to adopted structures in the loanword forms in their initial environment of L1 acquisition, such as in the family, slightly later in compulsory school or much later when they entered work life and thus came into contact with speakers of a different variety. In the Ottoman period, when schooling was not compulsory and schools were attended mainly by the sons of the elite class, the age of exposure was probably much later than in the Republican period. Since age of exposure is likely to affect all three structures equally, it cannot explain the differential transmission pattern.

For structures with an intermediate degree of relative salience, the *degree of exposure* is important for the accuracy of both perception and production in L2 acquisition. Regarding the degree of exposure in bilingually-mediated monolingual borrowing, it seems most reasonable to examine the *frequency* of loanwords that contain the particular structure in question. Since token frequency is very difficult to ascertain in historical cases, the focus will be on *type frequency* here. As seen earlier in Section 5.1.1, Winford (2003:54) claims that the number of loanwords containing the original structure in question (i.e. type frequency) is crucial for the structure's adoptability. Therefore, it would be useful to determine how many words of the respective types there were in the contemporary corpus. Based on the information on Arabic loanwords in Studies I and II, there were 818 words with a long vowel (corresponding to 5.5 percent of all words in the corpus), 53 words with a long consonant (0.4 percent) and 92 words with a word-final [l] after a back vowel (0.6 percent). Furthermore, these numbers were most probably higher in the Ottoman period, prior to the Turkish language reform. Since the number of words with [l] is not significantly greater than that of the words with long segments, the number of relevant loanwords cannot explain the attested pattern of differential transmission where only [l] was transmitted from bilinguals to monolinguals. It is, however, likely that regarding exposure to adopted structures in loanwords, even the lowest attested type frequency of 53 words (with word-final [l]) will have provided sufficient exposure for accurate perception. Thus, the combination of intermediate relative salience and sufficient type frequency could together explain the accuracy of the monolinguals' perception.

In cases of accurate perception, accurate production depends on sufficient exposure and motivation in bilingual borrowing according to the model in Figure 1. Motivation to acquire the donor language as an L2 cannot be applied to the monolinguals here. However, there must be other factors that impact the motivation to acquire of single donor-language structures that occur in the elite bilinguals' speech. A relevant question is if the monolinguals were aware of the Arabic origin of the loanwords. To the extent that the monolinguals were aware of it, the positive attitudes towards the donor language Arabic due to its high prestige in the Ottoman period would have

functioned as motivation to acquire those Arabic structures that the bilinguals had adopted in loanwords. However, since it is not certain that the monolinguals are always aware of the loanwords' origin the factor *attitude towards the donor language* is represented with a rectangle whose contour consists of a dashed line in Figure 2. Due to this uncertainty, this factor cannot provide a satisfactory explanation for the differential transmission pattern either.

Another factor that may have motivated the monolinguals to acquire donor-language structures, regardless of their origin, is the *prestige of the bilinguals' L1 variety* in which the adopted foreign structures occurred. The prestige of varieties such as dialects is often included as an important social factor in language change due to dialect contact (e.g. Trudgill 1986). For a monolingual speaker, having the same pronunciation of a word as in a prestigious variety would automatically entail maintaining the adopted structures in it. The Ottoman elite sociolect definitely had high prestige in the Ottoman period, which would have had a positive impact on the monolinguals' competence to adopt. However, it is also a known fact in sociolinguistics that far from all speakers gravitate towards prestige pronunciations due to solidarity with their own group's variety and linguistic norms. Hence, this motivation may not have applied to all monolinguals.

There is a third and final sociolinguistic factor that might influence the monolinguals' motivation to acquire donor-language structures. This factor was not included in the model for initial bilingual borrowing in Figure 1 because its existence requires that a loanword is established in the speech community (i.e. has gone through transmission). However, it may potentially play an important role in monolingual borrowing. The pronunciation of loanwords, just like the pronunciation of any other word, can potentially carry *social meaning* due to the social status that is associated with the speakers who display that pronunciation. When this happens a monolingual borrower can have attitudes towards *particular* donor-language structures in addition to (and possibly separate from) his/her attitude towards the donor language or the bilinguals' L1 variety in general. Since not all donor-language structures necessarily acquire social meaning, the rectangle of the factor *attitude towards donor-language structure* is represented by a dashed contour in Figure 1. In the Ottoman context, loanwords that were pronounced with adopted structures could thus have been associated with elite status. This could, in turn, potentially result in positive attitudes towards particular adopted structures in the monolinguals, which would motivate them to acquire them.

Is it then possible that the only monolingually adopted Arabic structure, the word-final [l] after a back vowel, had come to carry a social meaning that resulted in positive attitudes towards it and gave the monolingual borrowers special motivation to acquire it while this was not the case for the long

vowels and consonants? Such a scenario could potentially explain the differential transmission pattern because by adopting the faithful pronunciation of a foreign structure in an Arabic loanword a monolingual speaker would be able to index his/her association with the elite. In the absence of relevant sociolinguistic studies on these structures in Turkish, the only possibility is to examine on anecdotal basis if the three adopted Arabic structures has acquired social meanings that can explain the differentiation in their integration by monolinguals.

Sarıgül (2010:55–57) investigated the pronunciation of originally long vowels in *open* syllables in Arabic loanwords by Turkish speakers belonging to two different age groups: old speakers with a mean age of 78 and young speakers with a mean age of 20. Some loanwords with original long vowels in Arabic such as *elbise* 'dress' are pronounced with a long vowel in the mid syllable as [elbiːse] by some speakers but with a short vowel as [elbiːse] by other speakers. The former pronunciation has diachronically been the prescribed norm but the latter pronunciation has become very common, if not more common, today. Sarıgül's (2010) results showed that the older speakers used long vowels at a significantly higher rate in such words with variable length. The old group in this study can be viewed as belonging to the first Republican generation who would still have had considerable exposure to the norms and practices of Ottoman Turkish through the parent generation. Therefore, it is conceivable that vowel length in such words functions as a sociolinguistic variable that expresses generational identity through identification with Ottoman values or the old elite sociolect. However, it is not likely that long vowels in open syllables carry a positive social meaning for large groups of Turkish speakers. Some speakers might even perceive such pronunciations as pedantic, pretentious or arrogant, or possibly as old-fashioned. Nevertheless, positive attitudes may exist in some groups such as the old generation, as Sarıgül's (2010) study implies, as well as in certain intellectual or religious Muslim circles, where it might be associated with linguistic correctness or with faithfulness to Ottoman or Muslim values.

Anecdotal evidence about long segments in the word-final rime of Arabic loanwords suggests that there may be *intrapersonal variation* among speakers of Modern Standard Turkish (MST) regarding *length alternation* due to suffixation. To give an example, in the accusative-suffixed forms of the Arabic loanwords *his* 'feeling' [his] and *din* 'religion'[din], a speaker might sometimes use a long segment such as in [hisːi] and [diːni], as is the standard norm, but other times the same speaker may use a short segment such as in [hisi] and [dini]. Such intrapersonal variation would depend on situational factors and could potentially be interpreted as segment length functioning as a *sociolinguistic marker*. The social meaning of length alternation is probably quite close to that of long vowels in open syllables. In any case, there

is no strong evidence to suggest that length alternation carries a strong social meaning of a positive or negative kind.

Regarding the word-final [l], anecdotal evidence about loanwords from several donor languages (including Arabic) suggests that there is both dialectal variation and *interpersonal variation* among speakers of MST. The final lateral in the French loanwords *kontrol* 'control' and *santral* 'switchboard, power plant' are pronounced by some MST speakers with a velarised [ɬ] and by others with a non-velarised [l], which is the standard norm. The same is also true for word-initial laterals in loanwords. However, there are no available data regarding which background variables might determine this interpersonal variation. Neither is there any anecdotal evidence that suggests that the word-final [l] is subject to intrapersonal variation. Therefore, it is very difficult to make any claim about what this structure's social meaning could be.

To conclude the discussion of donor-language structures' potential social meanings, the preceding discussion on attitudes towards the three investigated structures could not provide a satisfactory explanation for the differentiated transmission pattern because. On the one hand, it is difficult to make reliable claims on the basis of such weak evidence. On the other hand, the observation that long segments probably did not carry positive connotations among the general population while no social meaning could be determined for word-final [l] is not likely to have given the monolinguals greater motivation to acquire [l] than long segments.

All in all, the high prestige of the donor language Arabic and the elite sociolect are the most reliable sociolinguistic factors that are likely to have given the monolinguals sufficient motivation to acquire donor-language structures in the Ottoman period. More importantly, if the loanwords' type frequency was sufficient for accurate perception, it is very likely to have been sufficient for accurate production as well. Taken together, these facts suggest that the monolinguals most probably had the necessary competence to adopt all three structures in question.

At this point, it should be remembered that the initial bilingual borrowers' production accuracy can be tested by investigating their L2 pronunciation. However, the same possibility does not exist in monolingual borrowers. Hence, the only instance where the monolinguals' production of a specific donor-language structure can be tested is their actual pronunciation of the loanword in their L1. Therefore, the competence to adopt corresponds in monolinguals to the (more or less hypothetical) possibility to accurately produce a donor-language structure. This is the reason why the output is referred to as *producible output* (as opposed to L2 output in Figure 1) and the surface forms as *possible surface forms* in Step 3 in Figure 2.

To summarise the discussion in this section so far, both the salience condition and the competence condition were fulfilled in all three instances of

bilingually-mediated monolingual borrowing. Furthermore, none of the discussed factors related to salience and competence could explain the attested differential transmission pattern. Consequently, the explanation for it must lie in the monolinguals' incentive to adopt these structures rather than in their phonological competence to produce it accurately.

In initial bilingual borrowing in Figure 1, the individual sociolinguistic factors that impacted the speakers' incentive to adopt were general attitude towards lexical borrowing, attitude towards the donor language, and dominance in the donor language. In monolingual borrowing, dominance in the donor language is clearly irrelevant. Instead, the factor attitude towards the bilinguals' variety of the L1, which is not relevant in initial bilingual borrowing, is relevant as a sociolinguistic factor in monolingual borrowing. Another sociolinguistic factor that is unique to bilingually-mediated monolingual borrowing is attitude towards donor-language structures due to their social meaning. As the previous discussion on this factor showed, segment length is more likely to have acquired social meaning compared to word-final [l] but the evidence is too weak to make any reliable claims.

The final sociolinguistic factor is the monolinguals' general attitude towards lexical borrowing. This attitude can be claimed to be generally positive in the Ottoman period as Ottoman Turkish abounded with lexical borrowings from a range of different languages. However, the later puristic official policies under the Republic, most intensively in the 1920s and 1930s, that attempted to purge *inter alia* Arabic loanwords from the new standard language, did receive support in some segments of the society. This has also resulted in a certain decrease in the type frequency of Arabic loanwords. However, at the same time, lexical borrowing from Western languages began increasing. Therefore, most monolinguals are not likely to have had generally negative attitudes towards lexical borrowing but certain political groups and individuals may nevertheless have had negative attitudes towards lexical borrowing.

Before continuing with the discussion on which factor could explain the attested differential transmission pattern, the vertical relationships between different factors in Figure 2 need to be briefly discussed here. Firstly, *situational factors*, which were not connected to any societal factor in bilingual borrowing in Figure 1, are assumed to be impacted by potential attitudes towards donor-language structures in Figure 2. As discussed earlier in Section 7.1.5, the function of situational factors is to explain intrapersonal variation between adoption and adaptation. Since attitudes towards donor-language structures were not a relevant factor in bilingual borrowing but can be relevant in some cases in monolingual borrowing, the social meaning of the structure that gives rise to the attitude is likely to factor into the situational factors that underpin intrapersonal variation (i.e. style shifting).

The relationships between the factors on the individual level in the middle section of Figure 2 and the societal factors at the bottom of the figure also merit some attention. The main difference on the societal level between bilingual borrowing (in Figure 1) and monolingual borrowing (in Figure 2) is the replacement of the factor dominance of the donor language by prestige of the bilinguals' L1 variety in the latter figure.

The societal *prestige of the donor language* naturally impacts all three individual factors in Figure 2 that involve the donor language. However, since monolingual speakers are not necessarily aware of the origin of the loanwords their attitudes towards the donor language in general and its structures in particular cannot be assumed to be "activated" in all loanwords from that language. Contrary to its impact on age of onset in bilingual borrowing in Figure 1, it is not plausible that the prestige of the donor language impacts the age at which a monolingual speaker becomes exposed to loanwords from this language. Instead, it is assumed here that it is the prestige of the bilinguals' L1 variety (as the medium of transmission for loanwords with adopted structures) that impacts the monolinguals' age of exposure to adopted structures. Nevertheless, the prestige of the donor language is assumed in Figure 2 to indirectly impact the type frequency of loanwords containing a particular structure because the higher its prestige is the more words the initial bilinguals will borrow from it and the higher the probability will be for a particular structure to be included in these loanwords. All in all, not surprisingly the societal prestige of the donor language plays a *smaller* role in monolingual borrowing than in bilingual borrowing when its impact on individual factors is compared in Figures 1 and 2.

The most influential societal factor in bilingually-mediated monolingual borrowing is the *prestige of the bilinguals' L1 variety* as the medium of loanword transmission. In Figure 2, this metafactor is assumed to directly impact as many as four of the six individual factors. Furthermore, it is also assumed to impact situational factors indirectly through attitudes towards donor-language structures as the social meaning that particular structures may acquire in the L1 community are based on the bilinguals' use of that structure. Its impact on frequency was just discussed and its impact on attitudes towards the bilinguals' L1 variety is self-explanatory. Its fourth and final impact is assumed to be on attitudes towards the donor language. If the bilinguals have intensive contact with the donor language, its prestige is likely to be high in an L1 community where the bilinguals themselves have high status and their L1 variety has high prestige. This is, in turn, bound to result in a positive impact on the monolinguals' attitudes towards the donor language. Thus, the impact of the prestige of the bilinguals' L1 variety on the monolinguals' attitudes towards the donor language operates indirectly via the prestige of the donor language. However, since horizontal relationships

are not indicated in the figure, for the sake of simplicity this indirect impact is depicted as direct in Figure 2.

All in all, the prestige of the bilinguals' L1 variety is the most powerful metafactor as it impacts several individual factors that underpin the monolinguals' competence *and* incentive to adopt foreign phonological structures in loanwords that are introduced to them by the initial bilingual borrowers. Based on this observation, it can be predicted that when the initial bilingual borrowers are *elite bilinguals* and their L1 variety therefore has high prestige, the likelihood of adoption by the subsequent monolingual loanword users will be relatively greater than in a case where the initial bilinguals have lower socio-economic status in the L1 community.

To conclude this section, it can be said that neither the factors that impact the monolinguals' competence to adopt nor the factors that impact their incentive to adopt can provide a satisfactory explanation for the attested differential transmission pattern. This leaves one final possibility for explaining this pattern: *structural restrictions on adoption*.

7.2.2 Structural restrictions for constraint promotion in the periphery

Since the salience condition was shown to be fulfilled for all three structures, the type of structural restriction that is needed cannot involve the structures' absolute salience but must be of a different type. Earlier Section 5.2.3 introduced the *level hypothesis*, which states that the phonological level on which a structure is situated impacts its borrowability. In Thomason's (2001: 70–71) version, prosodic features are less borrowable as they require higher intensity of contact to be borrowed than segments. The *phonemicisation argument* in the language-change literature, which was discussed in Section 5.1.3, also lends support to the proposed high adoptability of segments, more specifically of allophones. Applied to the approach in this dissertation, it could be asked if the reason behind the differential transmission pattern is the fact that the segment [l] with allophonic status in Turkish phonology requires a lower *minimum sociolinguistic incentive* to be adopted. Donor-language structures that involve prosody, such as long segments, would then require a higher minimum sociolinguistic incentive to be adopted.

As mentioned before, one problem with the phonemicisation argument's claim that structural similarity facilitates adoption is that it seems to contradict SLA facts such as the Speech Learning Model's (and the Perceptual Assimilation Model's) claim that perceptual similarity causes difficulty in the acquisition of foreign structures. The main source of this apparent contradiction is that the phonemicisation argument is formulated too broadly (i.e. that it applies to *all* cases of allophony).

Claiming that all allophones are equally likely to obtain phonemic status through borrowing amounts to saying that allophonic distribution is completely *idiosyncratic* from a perceptual point of view. However, it is a well-

known fact in phonology that many cases of allophony are due to *positional markedness*, where certain phonetic realisations are avoided, or other alternatives are preferred in marked positions (Beckman 1998:1). The avoidance of a certain phonetic realisation in a specific position is often related to its perceptual salience in that particular environment (Beckman 1998:1–2, 6). This is, of course, also one of the main tenets of the Speech Learning Model. Nevertheless, there are also genuinely idiosyncratic cases, which cannot be explained by reference to typological markedness and where that particular distribution is attested only in a limited number of languages in the world.

If the phonemicisation argument could be reformulated more narrowly and in a way that would distinguish cases of allophony that rely on perceptual salience from more idiosyncratic allophony that does not rely on perceptual salience, the apparent contradiction between the phonemicisation argument and well-established SLA facts could be alleviated. In such a narrow formulation, the phonemicisation argument would claim that only allophones whose distribution is not linked to perceptual salience would be easier to be phonemicised through borrowing.

In the case of lateral allophony in Turkish, where the velarised coda allophone [ɬ] is preceded by back vowels and the non-velarised coda allophone [l] is preceded by front vowels, the allophonic distribution is of the idiosyncratic type because this pattern is not attested in a large number of languages. Furthermore, it was shown earlier that the non-velarised quality of [l] is salient in the coda position. These facts would lend support to both the narrow phonemicisation argument and to the predictions made by Thomason's (2001:70–71) version of the level hypothesis. Moreover, such a claim of high borrowability would be compatible with SLA facts.

Based on the differential integration of Arabic these structures by monolinguals, it could be said that the lower incentive requirement for [l]-adoption was met by the monolinguals' positive attitudes alone, whereas the higher incentive requirement for length adoption could not be met in monolinguals but was met in bilinguals where positive attitudes were reinforced by L2 dominance. The case of the monolinguals whose integration of word-initial onsets in established loanwords from French and English was included in Study III also constitutes a case of bilingually-mediated monolingual borrowing, as the initial borrowers are likely to have been elite bilinguals in this case as well. The results of Study III showed that the monolinguals had a cluster adoption mean of 42 percent. Furthermore, the standard norm for the use of such loanwords is to pronounce them with initial clusters, as also captured by their orthography. Thus, this case constitutes adoption of a prosodic structure by monolingual borrowers.

Phonotactics (including onset clusters) is traditionally regarded as pertaining to the prosodic level in phonology because it is connected to syllable structure. Based on this view, the adoption of onset clusters by monolinguals

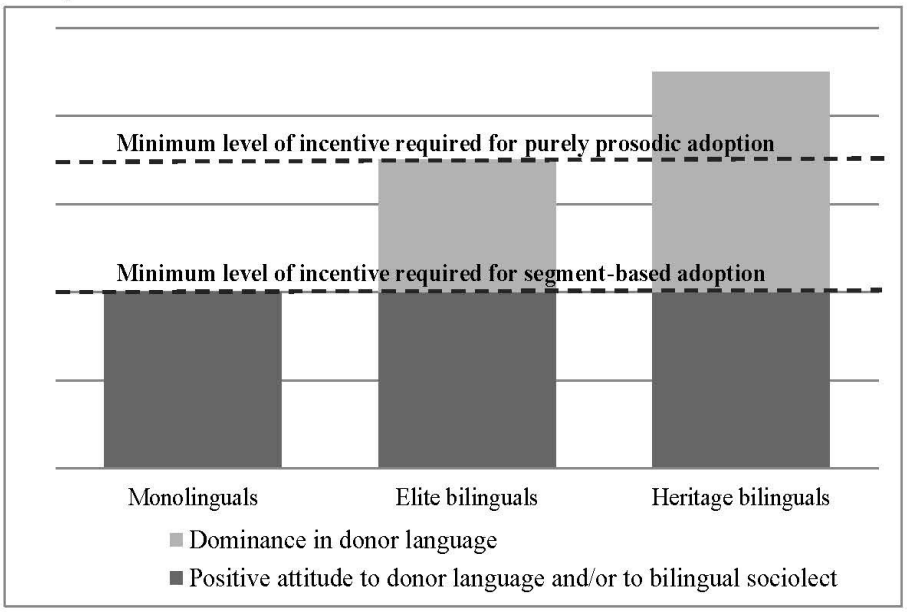


Figure 3. Schematic representation of the total incentive to adopt in different groups of borrowers and the different minimum levels required for adopting different types of structures

would constitute a counter-example to the level hypothesis. However, compared to other prosodic phenomena such as length, stress and tone, phonotactics cannot be considered as "purely prosodic" as these other phenomena. Although phonotactics is connected to the prosodic level via syllable structure constraints, it is also strongly anchored on the segmental level because it involves the combination of segments. As such, phonotactics has an intermediate position between purely segmental and purely prosodic levels in phonology. Based on this observation, it is conceivable that phonotactic adoption, such as the adoption of onset clusters, might be subject to the restrictions that apply to segmental adoption rather than those that apply to purely prosodic adoption. Hence, the adoption of segments and clusters of segments could be referred to as *segment-based adoption*, as opposed to *purely prosodic adoption*.

An overview regarding different borrower groups' total sociolinguistic incentive to adopt foreign structures and the minimum incentive requirements for structures connected to different phonological levels is presented schematically in Figure 3.

In the figure, total sociolinguistic incentive is composed of positive attitudes to the donor language and/or to the initial bilingual borrowers' variety of the L1 (i.e. the bilinguals' sociolect). When applicable, dominance in the donor language also contributes to this incentive. As discussed before, posi-

tive attitudes to the donor language apply to all groups. In contrast, dominance in the donor language applies only to bilinguals, and positive attitude to the bilingual sociolect only applies to monolinguals. It is assumed for the sake of simplicity that the total level of positive attitude is the same in all three groups.

As Study III has confirmed, heritage bilinguals tend to be dominant in the donor language while the elite bilinguals tend to be dominant in the recipient language. If absolute dominance in the recipient language is assumed to provide the lowest possible score, which is found in monolinguals, then the elite bilinguals would have dominance scores between the monolinguals' and the heritage bilinguals'. Therefore, the lighter-coloured part of the bar that represents dominance is taller in heritage bilinguals than in elite bilinguals in Figure 3.

In order to emphasise that the representation in Figure 3 is only schematic, no numerical values are assigned to the level of total incentive. As discussed before, following Thomason (2001:70–71) it is assumed that the non-structural requirements (the intensity of contact in Thomason and the incentive to adopt here) are different for different levels of structures. Here, it is assumed that the minimum incentive requirement for segments and segments clusters is lower than that for purely prosodic structures. In Figure 3, the symbolic levels for the total incentive in the different groups are chosen in such a way that the monolinguals just fulfil the minimum requirement for segment-based adoption while the two bilingual groups exceed it. As for purely prosodic adoption, the monolinguals fall short of fulfilling it while the elite bilinguals just fulfil it and the heritage bilinguals exceed it. In reality, the average levels of positive attitudes are more likely to vary between these three groups, probably in a similar way as the dominance level varies between the elite and heritage bilinguals but the total incentive levels would probably have a similar gradation in reality as in Figure 3.

Accepting that the borrowers' sociolinguistic incentive to adopt interacts with the level of donor-language structure in the way depicted in Figure 3, the promotion of a purely prosodic faithfulness constraint in the periphery of the recipient-language lexicon would require a higher minimum level of sociolinguistic incentive compared to the promotion of a segment-based faithfulness constraint. This means that the phonological grammar of the recipient language is *principally* more resistant to change on the purely prosodic level than on the segmental level. Such resistance can be interpreted as a *self-preservation strategy*, as also already implied by Thomason (2001:71).

This structural restriction based on the phonological level of the donor-language structure constitutes the third and last *restriction on the promotion of constraints* in the periphery. The first two stated that only faithfulness constraints can be promoted, more specifically only those that regard structures with high absolute salience. This final restriction corresponds to the

fourth condition for adoption, *the level condition*. This condition states that for the purely prosodic adoption higher sociolinguistic incentive is necessary than for segment-based adoption.

Hence, the level condition makes the testable prediction that purely prosodic adoption is unlikely when the borrowers are monolingual. This prediction would definitely apply to cases of naïve monolingual borrowing. However, an exception needs to be made for cases of bilingually-mediated monolingual borrowing where the age of exposure is very early. As mentioned in Study II, the only cases of underlying segment length in Turkish are found in loanwords. When a child with parents who spoke the Ottoman elite sociolect was exposed to segment length in the input from the parents, there was no way for that child to know that there was something foreign about that length. The child would acquire the length as part of his/her L1 acquisition just like with any other structure in that L1 variety. Thus, when the age of exposure is very early the acquisition case is rather one of L1 acquisition than sociolect contact.

This example could be taken further in order to explain the diachronic change that has taken place regarding long segments in Turkish. As in the first Republican generation, the same child could grow up monolingually (i.e. without becoming bilingual in Arabic like his parents). He/she would then transmit the same input with long segments to his/her own monolingual children. However, by the time his/her children were growing up the sociolinguistic conditions would have changed and both Arabic and the Ottoman elite sociolect would have lost their prestige. This new generation would then have stored the length in the underlying forms of the loanwords but might have lacked the incentive to realise it in surface forms, or even have had an incentive to avoid it in surface forms. Therefore, the new generation would shift from an L1 grammar that allowed all realisations of underlying length with the ranking MAX-IO(high-salience length) >> {*V:C]$_{\sigma}$; *C:]$_{\sigma}$} >> {*V: ; *C:} to a modified version where MAX-IO(high-salience length) is demoted, which results in the ranking {*V:C]$_{\sigma}$; *C:]$_{\sigma}$} >> MAX-IO(high-salience length) >> {*V: ; *C:}. MAX-IO(high-salience length) cannot be demoted all the way (i.e. ranked lower than {*V: ; *C:}) because there are native phonological processes that result in long segments in the unmarked positions. This new ranking would consequently result in the length alternation in loanwords, where the underlying length is realised only in the unmarked positions. This is precisely the grammar that corresponds to the norms of Modern Standard Turkish.

The available empirical evidence for testing the predictions of the level hypothesis is currently quite limited. This is partly owing to the fact that many researchers publishing on loanword phonology do not provide a detailed description of the borrowers' proficiency in the donor language. Nonetheless, there are already some counter-examples, as mentioned earlier in

Section 5.2.3. Therefore, more, and more rigorous, research is definitely needed to test this prediction.

Even if the validity of the level condition were to be confirmed by future research, the following questions would still require deeper theoretical discussion. What is the basis for the difference between segment-based adoption and purely prosodic adoption? Is it really based on the structures' "degree of integration in the grammatical subsystem" as Thomason (2001:71) claims for both morpho-syntax and phonology? Or do we need separate theoretical arguments for these subsystems because their internal organisation is different? Could the level differences rather be based on how much awareness or conscious effort the different types of adoption require? Or alternatively, should all attempts to generalise be given up in favour of separate structural conditions for recipient languages that pertain to different phonological types in terms of the organisation of their phonological systems?

Since the overview for bilingual borrowing in Figure 1 did not include the level condition, it is complemented in Figure 4 to include the level condition as well. The level condition was already included in the overview of bilingually-mediated monolingual borrowing in Figure 2. In Figure 4, both the salience condition and the level condition are subsumed under the cover term *structural conditions* on the left hand side. As earlier in Figure 1, all factors in Figure 4 that are not on the individual level are presented in rectangles with a grey background. These include the structural factors on the left hand side represented through hexagonal shapes and the metafactors on the societal level in the rectangles at the bottom.

As seen earlier in Table 7 in Section 7.2.1, not only the word-final [l] in unsuffixed words but also its irregular suffixation pattern with harmonic preservation has been transmitted unaltered from the initial bilingual borrowers to the subsequent monolingual users. However, since Thomason's (2001:70–71) borrowing scale classifies change in morphophonemic rules as likely only under more intensive contact (Level 3), the irregular suffixation pattern's adoption by monolinguals through bilingual mediation constitutes a significant counter-example.

The harmonisation of [l] in suffixation involves a fundamental change in the way palatal harmony operates in Turkish, because consonants such as the coda [l] also start participating in processes of stem-suffix harmony. Thus, not just the nucleus of the stem but its entire rime starts to determine the suffix vowel. Considering that harmony plays a crucial role in almost all suffixation in Turkish, this morphophonemic change can be viewed as quite disruptive for the phonological system of Turkish. According to Thomason's borrowing scale, it is, therefore, not predicted to occur in a case of contact such as the Arabic-Turkish contact in Ottoman Turkey (see Table 7 in Sec-

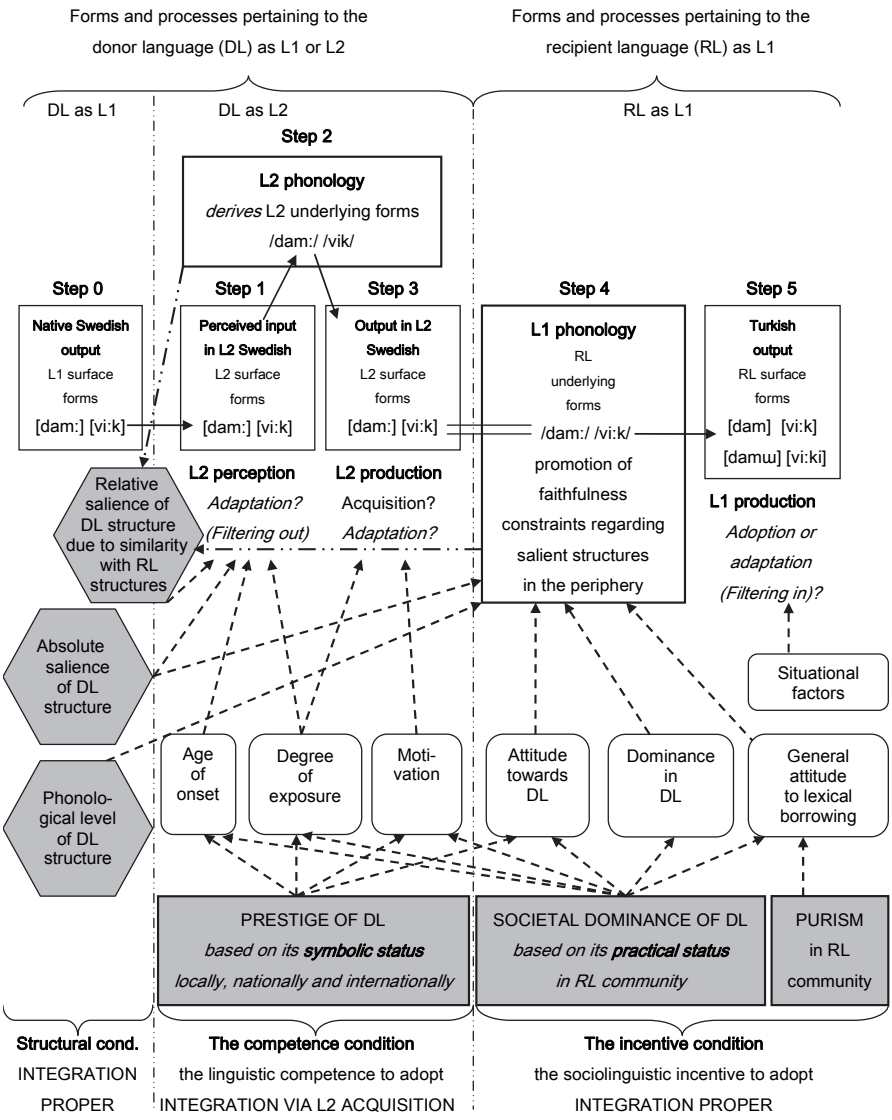


Figure 4. The final overview of the process of initial borrowing by bilinguals with examples from the integration of Swedish long segments where vowel length has high salience but consonants length has low salience.

tion 7.2.1). Therefore, further theoretical discussion is needed in order to explain why morphophonemic changes (or perhaps rather which morphophonemic changes) require high intensity of contact. However, since the above formulation of the level condition does not refer to changes in morphophonemic rules, this morphophonemic change that was transmitted

from the bilinguals to the monolinguals does not constitute a counter-example to the level condition.

To conclude the discussion of transmittability, the most plausible analysis is that transmission from bilinguals to monolinguals was already concluded during the Ottoman period, when both the donor language Arabic and the bilinguals' elite sociolect enjoyed high prestige among the monolinguals and the general attitude towards lexical borrowing was positive. As discussed earlier, the monolinguals also had the competence to accurately produce these structures and all three structures had high absolute salience. Hence, the structures' adoptability ultimately depended on the level condition. However, since the monolingual borrowers by definition lacked dominance in the donor language, their total incentive to adopt, which was solely based on positive attitudes, would be on the intermediate level, as depicted in Figure 2. According to the level condition, this level of incentive suffices for segment-based adoption but not for purely prosodic adoption. Consequently, the monolinguals adopted the Arabic word-final [l] but adapted the Arabic long segments by shortening them in marked positions in production.

7.2.3 Demographic and social factors in bilingually-mediated monolingual borrowing

In this dissertation, bilingually-mediated monolingual borrowing involved only cases, where the initial bilingual borrowers constituted a small minority in the recipient community that consisted to a very great extent of monolinguals (in the sense of speakers without competence in the donor language in question). Although not uncommon in cases of elite bilingualism, this demographic composition results in a special type of transmission dynamic that deserves to be briefly discussed here. The main question is which group sets the norms for loanword use in such cases of mediated borrowing. Is it sheer numbers that count, that is the proportion of the monolinguals in the recipient community, as implied by the Perceptual Stance Model? Or do the initial bilingual borrowers have a disproportionately great impact on the subsequent monolingual users' integration of the loanwords, as the Phonological Stance Model claims?

In addition to the particular proportions at hand, the bilingual minorities in Turkey also belonged to the socio-economic elite. It is a well-known fact in language-policy research that the elite have a disproportionately great impact on which variety of the language and which forms should be selected and prescribed as the standard norm. In the case of Turkish, the standard norms were historically based on the elite sociolect in Istanbul, whose speakers had previously borrowed the Arabic loanwords. However, the new standard based on this variety also included many modifications and innovations due to the the language reform.

As discussed in Study II, the bilingual speakers of Standard Ottoman Turkish (i.e. the elite sociolect) realised the underlying length in all surface positions while the monolingual majority of Ottoman Turkish speakers probably realised the underlying length only in the unmarked surface positions. The latter pattern is the same pattern that has later become the new norm in Modern Standard Turkish. Thus, the monolingual majority's linguistic practices have overridden the elite minority's practices in the formation of the new norms in Republican Turkey.

In conclusion, it seems that the sheer majority of monolingual speakers had greater impact on the establishment of the contemporary norms of loanword use in Modern Standard Turkish than the elite minority. However, the outcome of the transmission process is likely to be different in cases where the proportion of the bilinguals in the recipient community is closer to that of the monolinguals or even greater, as has already been suggested in previous research. In such cases, the expectation is that the post-transmission integration pattern will be much closer to the pre-transmission one.

7.3 Comparisons with Thomason's borrowing scale

In Table 2 in Section 5.1.2, the predictions that Thomason's (2001:70–71) borrowing scale would make for the cases discussed in this dissertation were presented. Table 9 compares these predictions with the results of the three studies in this dissertation. In the last column of Table 9, the predictions that are contradicted by the results are rendered in bold style. These contradictions are all due to the fact that the attested adoption occurs at a *lower* level of contact intensity than predicted.

First of all, it is important to remember that Thomason's scale was originally meant to be applied to the outcome of integration processes in the *entire* language community. This is the case in the Arabic-Turkish contact on Level 2 in Ottoman Turkey where the contemporary monolingual data reflect the norms of use for the entire community. In the other cases, specific bilingual segments of the community were treated as if they were an entire community with its own (higher) level of contact intensity. Secondly, it should be noted that the scale's predictions express probabilities. Therefore, those structures in Table 9 where adoption was attested in approximately half of all cases or to a greater degree are interpreted as confirmation of the predictions.

As the overview in Table 9 shows, the predictions of Thomason's borrowing scale are generally better at predicting the outcome of phonological integration on higher levels of contact intensity (i.e. Levels 3 and 4). On Level 3, all the predictions for borrowing by elite bilinguals are confirmed. The only case that is rejected on Level 4 is the case of the Swedish long con-

Table 9. Comparison of the predictions based on Thomason's borrowing scale (2001:70–71) with the results in the three studies.

Level of contact	Prediction regarding adoptability by the investigated borrowers/users based on Thomason's borrowing scale	Results
2. Slightly more intense *Prescribed norm for the entire language community in Turkey*	Adoption probable: 2. Word-final front [l] after back vowels in Arabic loanwords (Study I)	adopted
	Adoption not probable: 3e. Change in the suffixation rules for [l]-final Arabic loanwords (Study I)	**adopted**
	3d. Long segments in the word-final Arabic loanwords (Study II)	not adopted
	3d. Word-initial onset clusters in French and English loanwords (Study III)	**adopted** (46% in use)
3. More intense *Elite bilinguals in Turkey*	Adoption probable: 2. Word-final front [l] after back vowels in Arabic loanwords (Study I)	adopted
	3e. Change in the suffixation rules for [l]-final Arabic loanwords (Study I)	adopted
	3d. Long segments in the word-final rime in Arabic loanwords (Study II)	adopted
	3d. Word-initial onset clusters in loanwords that come from English or resemble English words (Study III)	55% adopted
4. Intense *Heritage bilinguals in Sweden*	Adoption probable: 2. Word-final front [l] after back vowels in Swedish borrowings (Study I)	78% adopted
	3e. Change in the suffixation rules for [l]-final Swedish borrowings (Study I)	49% adopted
	3d. Long vowels in the word-final rime of Swedish borrowings (Study II)	67% adopted
	3d. Long consonants in the word-final rime of Swedish borrowings (Study II)	**21% adopted**
	3d. Word-initial onset clusters in loanwords that resemble Swedish words (Study III)	88% adopted

sonants with low absolute salience, which were predicted to be adoptable, but are largely not adopted. This case of contradiction points to one of the significant differences between Thomason's approach to explaining adoptability and the approach presented in this dissertation. The source of the difference is the central importance assigned to perceptual salience in this dissertation, which is not discussed by Thomason (2001). In this particular case, it

is the low absolute salience of consonant length in Swedish that results in adaptation in Turkish production.

The detailed discussion of L2 acquisition factors that affect the competence to adopt, including the structural factor relative salience, resulted earlier in the prediction that elite bilinguals (generally expected to correspond to Level 3 on the scale) would be likely to have differential competence in donor-language structures with different degrees of acquisition difficulty. This makes it likely for them to lack the competence to accurately produce structures with high acquisition difficulty and consequently not adopt such structures. This prediction applies to all phonological levels, including the segmental level, meaning that the approach in this dissertation would expect not all but only *some* segments to be adopted at Levels 2 and 3, although there were no examples of this in the present data. However, Thomason's (2001:70–71) borrowing scale does not make such a principal distinction based on degree of acquisition difficulty. This difference does not result in a contradiction on Level 2 because the only segmental case (i.e. the word-final [l]) has an intermediate degree of acquisition difficulty that can be overcome with sufficient exposure to input.

However, there are two cases on Level 2 where the scale's predictions are contradicted by the results. One of these, the suffixation of words with final [l], was already discussed in Section 6.1. The other case involves the standard norms of pronunciation for French and English loanwords with word-initial onset clusters. According to the borrowing scale, contact-induced changes in syllable structure should not occur at a level lower than 3. However, the prescribed pronunciation and orthographic norms of Modern Standard Turkish would motivate seeing onset clusters as licit syllable structure in Turkish today. In Study III, there are data on actual use by 36 speakers in Turkey whose mean cluster adoption rate is 46 percent. The 12 monolinguals have a mean of 42 percent and the 24 elite bilinguals' mean is 55 percent. These data also seem to point to some adoption albeit not as high as the prescribed norms suggest. Nevertheless, this is significant from the perspective of the borrowing scale. As mentioned before, it is not possible to provide a full explanation of the onset cluster data in this dissertation due to the fact that Study III does not include a discussion of structural factors.

Comparing Thomason' (2001) approach with the present approach, a fundamental source of difference is that Thomason's borrowing scale is a broad and general model of contact-induced change, which covers several different types of linguistic structures as well as the lexicon. In contrast, the model in this dissertation is specialised on phonological changes through lexical borrowing and is, therefore, more detailed. This more specialised approach affords the present model to delve more deeply into such issues as salience and L2 acquisition factors. Despite these perhaps understandable differences due to scope, the present model is very much inspired by

Thomason's (2001) principal tenet that structural and non-structural factors interact in producing the outcome of borrowing. The level condition is basically a reinterpretation of Thomason's (2001) stipulation that higher intensity of contact is necessary to adopt structures that are more difficult to borrow. Also, the central role assigned to the donor language's societal dominance in the present dissertation is reminiscent of Thomason's (2001) notion of intensity of contact.

7.4 Comparison of the present model with established models of loanword integration

Table 10 provides a comparison of the main characteristics of the previously discussed models of loanword integration (in Table 3 in Section 5.2.1) and the model proposed in this dissertation (in Figure 4 in Section 7.2.2). This latter model will henceforth be referred to as the *Salience and Dominance Model*.

As Table 10 illustrates, the Salience and Dominance Model is quite close to the Perceptual Stance Model as it shares the same parameter value in three of the five model parameters included in the table. As for the parameter regarding the role of perception, the Salience and Dominance Model proposes uniting the parameter values of the Perceptual Stance Model and the P-map. As discussed earlier, especially in Study II, the Salience and Dominance Model claims that perceptual effects can be found in both the perception module and the production module. The division of labour between the modules is based on the accuracy of perception. When the perception of a donor-language structure is inaccurate, filtering-out effects are expected in the L2 perception module. When perception is accurate, a filtering-in effect is, instead, to be expected in the L1 production module when the donor-language structure has low absolute salience.

The single parameter where the Salience and Dominance Model differs radically from the Perceptual Stance Model is the probability of adoption. Here, the Salience and Dominance Model is closer to the Phonological Stance Model. The difference is that the Phonological Stance Model only allows the adoption of phonemic features due to the stipulation that the input is phonemic in nature, while the Salience and Dominance Model regards phonemicity as irrelevant for a structure's adoptability. Instead, the Salience and Dominance Model proposes four different conditions that need to be fulfilled for adoption to prevail over adaptation. The salience condition and the level condition are structural conditions that stipulate which universal and language-specific structural (i.e. phonetic and phonological) features are relevant for adoptability. The competence condition is based on psycholinguistic and sociolinguistic factors that impact L2 acquisition while the incentive condition is based on sociolinguistic factors. The competence con-

Table 10. Comparison of established models of loanword integration with the model in this dissertation.

Name of model	Norm-setters in integration	Nature of the input	Role of perception	Locus of integration	Probability of adoption
Phonological Stance Model	bilinguals	phonemic	not relevant *due to always accurate perception*	production	only phonemic adoption, probability increases with higher degrees of community bilingualism
Perceptual Stance Model	mono-linguals	phonetic	relevant *due to inaccurate perception* (filtering out)	perception and production	all adoption tacitly treated as improbable
P-map (Filtering-in Stance)	*not mentioned*	phonetic	relevant *in production despite accurate perception*	production	*not mentioned* (the notion of retention resembles adoption)
The Salience and Dominance Model (the model proposed in this dissertation)	mono-linguals	phonetic	relevant for both perception (filtering out) and production (filtering in)	perception and production	subject to the conditions 1. Salience 2. Competence 3. Incentive 4. Level adoption more probable when there is greater dominance in the donor language

dition and the incentive condition are, furthermore, influenced to a great extent by the metafactor societal dominance (i.e. the socio-political status) of the donor language. Thus, the Salience and Dominance Model claims that adoptability correlates positively with the societal dominance of the donor language, provided that the salience condition is fulfilled. This is reminiscent of the Phonological Stance Model's claim that adoptability correlates positively with the degree of community bilingualism.

All in all, the Salience and Dominance Model unites different aspects of earlier models in an innovative way and develops them further with the help of SLA constructs. By proposing four different conditions for adoptability, the model lives up to the aforementioned requirement for models of loan-

word integration that they be sufficiently *restrictive* in order to account for the low prevalence of adoption compared to that of adaptation.

8 Conclusion

By examining the integration of several structures by initial borrowers who were bilingual, this dissertation has sought to answer the question when an illicit phonological structure from the donor language will *not* be adapted but adopted in the recipient language. Two types of bilinguals, elite bilinguals and heritage bilinguals, were chosen as the borrowers because they were deemed to be likely initial borrowers and transmitters of borrowings in many contexts of language contact. A further reason for the choice of these bilingual groups was the differences that were assumed to exist between the backgrounds that gave rise to these two groups' bilingualism.

The elite bilinguals had second-language competence either in a classical language or in an international lingua franca. The heritage bilinguals were second-generation speakers of Turkish in Sweden, where they had been raised by immigrant parents. Moreover, in some cases of borrowing, data on the contemporary norms and practices regarding the use of established loanwords were available. This facilitated an investigation of the diachronic transmission process from initial bilingual borrowers to subsequent monolingual users that constituted the majority in the recipient community.

The data analysis was based on key concepts and findings from several linguistic disciplines such as loanword phonology, second-language acquisition, contact linguistics and language change research. Based on the discussion of all three studies that are included in the dissertation, four necessary conditions were formulated for adoption. All four conditions must be fulfilled in order for adoption to prevail over adaptation. The concepts Salience and dominance play the central role in these conditions, which are linked to a range of structural, psycholinguistic and sociolinguistic factors. The first and most decisive condition is the salience condition, which states that the donor-language structure must have high absolute salience (i.e. acoustic cue robustness) in order to be adopted. If the structure has low absolute salience, it will either be filtered out already in the second-language perception of the donor-language input, or it will trigger adaptation in the first-language production of the recipient language. Absolute salience is such a crucial factor that it resulted in adoption in the elite bilinguals but in adaptation in the heritage bilinguals in one of the investigated cases. This is the reverse of what was hypothesised because the factors that have their basis in the societal dominance of the donor language should normally make adoption more likely in heritage bilinguals.

The second condition, the competence condition, states that adoption is only possible if the borrower has obtained the competence to accurately per-

ceive and produce the structure through his/her acquisition of the donor language as a second language. Consequently, established findings from second-language acquisition research were consulted in order to identify the following main factors that influence the borrower's competence to adopt: the structure's absolute and relative salience, the age of onset for donor-language acquisition, the degree of exposure to donor-language input, and the motivation to acquire the donor language. The degree of acquisition difficulty of the donor-language structure for learners with a particular recipient language as their first language plays a central role here and is especially sensitive to the age of onset. Again, it was shown that these factors make it generally more likely for heritage bilinguals to develop higher, and often nativelike, phonological competence in the donor language compared to elite bilinguals, whose pronunciation typically remains non-nativelike. This makes adoption more likely in heritage bilinguals.

According to the third condition, the incentive condition, all illicit structures, in which the borrower has acquired the necessary competence, will be adopted if the borrower has sufficient sociolinguistic incentive to adopt them. This incentive is based on three sociolinguistic factors on the individual level: the borrower's general attitude towards lexical borrowing, the borrower's attitude towards the donor language, and the borrower's dominance (i.e. relative proficiency) in the donor language. Provided that the borrower is positive to lexical borrowing to begin with, positive attitudes towards the donor language and dominance in the donor language will together determine if he/she has sufficient sociolinguistic incentive to adopt the particular structure in question. Again, the incentive to adopt is predicted to be higher in heritage bilinguals than in elite bilinguals.

The fourth and final condition, which also has to do with structural properties, is the level condition. According to this condition, structures on the supra-segmental level (i.e. purely prosodic structures) are more difficult to adopt than structures that are connected to the segmental level (i.e. segments and clusters of segments) because the former require higher minimum sociolinguistic incentive to be adopted. Since it was argued that heritage bilinguals are generally more likely to have higher incentive than elite bilinguals, this makes purely prosodic adoption less probable in elite bilinguals. Put differently, the phonological level of the donor-language matters more for adoption in elite bilinguals.

These six non-structural factors are also linked to the following three sociolinguistic metafactors on the societal level: the societal dominance of the donor language (i.e. its socio-political status as majority or minority language), the prestige of the donor language in the recipient community, and the general level of linguistic purism in the recipient community. Of these metafactors, the most powerful one is societal dominance, which was shown to impact all six individual factors. Hence, adoption is generally more likely

in heritage bilinguals than in elite bilinguals because the donor language is by definition the majority language in the context of heritage bilingualism whereas it is a minority language, albeit often one with high prestige, in the context of elite bilingualism. Although this means that the social metafactor dominance has a fundamental impact on the preference for adoption, it can still not be claimed that social factors can "trump" other factors in loanword phonology. As this dissertation has shown, the social factor dominance cannot override the effect of the structural factor absolute Salience. Even a nativelike bilingual borrower with the highest possible incentive to adopt donor-language structures will not adopt a structure with low absolute salience because his/her phonological production grammar will prevent it. This is due to the structural restriction that bans in the periphery of the stratified phonological lexicon the promotion of faithfulness constraints that refer to structures with low absolute salience.

Thus, this dissertation has shed light on the intricate interplay between different factors on different levels. Although heritage bilingualism was argued to be generally more conducive to adoption than elite bilingualism, the actual choice of integration strategy was shown to ultimately depend on this interplay between structural, psycholinguistic and sociolinguistic factors. Also, given the fact that neither elite bilingualism nor heritage bilingualism is as homogeneous in reality as generalised in this dissertation, the relevant factors should always be checked thoroughly in every single case of borrowing. The fact that as many as four different (but interconnected) necessary conditions were formulated for adoption makes the Salience and Dominance Model proposed in this dissertation quite restrictive. Since adoption is much less prevalent than adaptation, this degree of restrictiveness can be said to be precisely what is necessary to account for the relatively rare preference for adoption in loanword phonology.

9 Directions for future research in loanword phonology

Studies I and II have clearly shown that the input to the loanword integration is phonetic in nature even when the borrowers are nativelike bilinguals. Thus, this dissertation joins an increasing number of studies that have come to the same conclusion based on data from monolingual and bilingual borrowers. However, there are nevertheless a few studies, which have convincingly argued for the opposite conclusion, that the input is phonemic in nature based on data from bilingual borrowers. As the overview of the integration process in a bilingual borrower in Figure 4 in Section 7.2.2 illustrates, bilingual borrowers do not only have access to the phonetic surface forms of the borrowings but also to their underlying forms and to the pho-

nological grammar of the donor language as their second language. Therefore, an interesting challenge for future studies is to find an explanation for why bilingual borrowers sometimes use L2 surface forms as their input and sometimes the underlying forms, and to develop a more nuanced answer to the question regarding the *nature of the input* in loanword phonology.

As the discussion on the *structural restrictions for the promotion of faithfulness constraints* in the periphery has shown, the findings in the literature on which types of donor-language structures are more difficult to adopt, solely on the basis of the phonological level that they pertain to, point in different directions. Therefore, this issue remains both empirically and theoretically contentious and definitely merits more attention.

Although there is a relatively large body of sociolinguistic research devoted to the study of linguistic attitudes in both monolingual and bilingual populations, the *attitudes of borrowers* towards the donor language have not been researched yet in loanword phonology. Since this dissertation has elucidated the importance of attitudes for the sociolinguistic incentive to adopt foreign phonological structures, the study of attitudes, including developing an appropriate methodology for it, would be a fruitful area of research within both loanword phonology and sociolinguistics.

Another sociolinguistic issue that deserves more attention, in particular when examining adoption and adaptation as competing strategies, concerns the fact that the phonological integration of borrowings is often subject to *synchronic variation* in the recipient community. Some speakers opt for adoption while others opt for adaptation regarding the same structure in the same word within the same speech community or in different speech communities of the same language. At the same time, it is also possible that a borrower may opt for adoption in one context but adaptation in another context in the same word. Investigating this interpersonal and intrapersonal variation would, therefore, provide an important contribution to developing a deeper and more finely calibrated understanding of the sociolinguistic incentive to adopt.

Finally, the discussion on bilingually-mediated monolingual borrowing in this dissertation raises the interesting question as to whether the type of monolingual borrowing (i.e. the fact that it is sometimes mediated by bilinguals and sometimes not) makes a difference for the outcome of the loanword integration process. Put differently, is bilingually-mediated monolingual borrowing more conducive to adoption in monolinguals than naïve monolingual borrowing (which lacks bilingual mediation)? If the answer to this question were affirmative, greater attention would need to be paid to the role of *mediation in borrowing* in future studies.

Sammanfattning på svenska

Lånordsfonologi undersöker den fonologiska integrationen av ord från långivarspråket i mottagarspråket. En central forskningsfråga är om de främmande ljudstrukturerna i ett lånords ursprungliga form i långivarspråket ska behållas, d.v.s. *adopteras*, eller förändras på ett eller annat sätt för att anpassa – *adaptera* – dem till mottagspråkets fonologiska system. Adaptation innebär således att mottagarspråkets fonologiska system förblir oförändrat medan adoption innebär *kontaktbetingad förändring* i mottagarspråket genom tillägget av nya strukturer och mönster i lånord. Vissa korpusstudier har visat att adaptation är den vanligaste integrationsstrategin medan adoption förekommer i knappt tjugo procent av fallen. Andra undersökningar tyder på att ungefär en femtedel av världens språk har adopterade segment (*lånsegment*). Adoption tycks alltså förekomma relativt sällan men företeelsen är ändå icke försumbar.

Sedan 1990-talet har lånordsfonologi blivit ett eget forskningsområde inom fonologi. Fokuset i detta nya område har legat på *hur* adaptationen sker, i synnerhet *när* strykning av främmande ljudstrukturer föredras framför ersättning med inhemska strukturer samt *på vilka grunder* ersättandet sker. Ett av de viktigaste diskussionsämnena har varit vilken roll *perceptionen* spelar i adaptationen. I de senaste decenniernas forskning om lånordsfonologi har det således i princip tagits för givet att främmande ljudstrukturer ska genomgå adaptation istället för adoption. Därför har det forskats betydligt mindre om adoption än om adaptation.

Den här avhandlingen har som mål att bidra till en bättre förståelse av adoption som en integrationsstrategi genom att undersöka hur två olika typer av *tvåspråkiga inlånare* integrerar samma främmande ljudstruktur i olika fall av inlåning. De två tvåspråkiga inlånargrupperna är så kallade *elittvåspråkiga* och *arvspråkstalare*. Elittvåspråkiga är talare med hög socioekonomisk status som har majoritetsspråket som sitt förstaspråk och som även har lärt sig ett andraspråk med hög prestige. I denna avhandling är detta andraspråk antingen ett klassiskt språk eller ett internationellt lingua franca. Arvspråkstalare är personer som talar ett förstaspråk som är ett minoritetsspråk i samhället, och som de har lärt sig därför att språket är en del av familjens kulturella arv, samt ett andraspråk som är majoritetsspråket.

De tre studierna i avhandlingen undersöker hur en och samma främmande ljudstruktur från olika långivarspråk integreras av elittvåspråkiga och arvspråkstalare i ett och samma mottagarspråk. Mottagarspråket är turkiska i alla undersökta fall medan långivarspråken är svenska, arabiska, franska och engelska i de olika studierna. Två av studierna inkluderar elittvåspråkiga som behärskade klassisk arabiska och turkiska, och som lånade in arabiska ord i osmanska Turkiet för flera århundraden sedan. Den tredje studien baseras på data från elittvåspråkiga som talar engelska och turkiska, och som

använder redan etablerade lånord från franska och engelska i nutida Turkiet. Arvspråkstalarna i samtliga tre studier är barn till turkiskspråkiga invandrare i Sverige och har vuxit upp huvudsakligen i Sverige med arvspråket turkiska som förstaspråk och majoritetsspråket svenska som andraspråk. I vissa fall finns det även data om lånordsanvändningen hos *enspråkiga* talare av turkiska (d.v.s. talare som inte kan långivarspråket). Detta gäller etablerade lånord som har överförts från de ursprungliga tvåspråkiga inlånarna först till enspråkiga talare, och sedan från dessa enspråkiga till andra enspråkiga över flera generationer.

Data om de historiska arabiska lånorden kommer från turkiska lexikon och från rekonstruktionen av det osmanskturkiska uttalet med hjälp av en så kallad transkriptionstext. Resterande data har samlats in från nutida talare i Turkiet och Sverige med hjälp av olika eliciteringsuppgifter, som muntlig översättning av en svensk text till turkiska och lucktest i turkiska. Analyserna av inspelningarna har gjorts auditivt av författaren och reliabilitetskontroller med andra forskares analyser har inkluderats i samtliga fall. Studierna innehåller även ytterligare data från andra inspelningar, intervjuer och enkäter som ger detaljerad information om deltagarnas bakgrund, språkanvändning och behärskningsnivåer i de olika språken.

Tre typer av ljudstrukturer undersöks i avhandlingen: [l] efter bakre vokaler i ordfinala rim som i det svenska ortnamnet *Gröndal*, fonetiskt långa segment i ordfinala slutna stavelser som i de svenska ortnamnen *Zinkensdamm* och *Stenstavik* samt ordinitiala ansatskluster som i det svenska ordet *standard*. Samtliga typer av strukturer är otillåtna i mottagarspråket turkiska vilket gör det intressant att dokumentera om de adapteras eller adopteras av inlånarna. Adaptationen av [l] skulle innebära velarisering till [ɬ] medan längdadaptationen skulle leda till förkortning, och ansatsklustren skulle förväntas adapteras genom vokalinskott mellan ansatsens konsonanter.

Huvudhypotesen i avhandlingen är att adoption borde vara mer sannolik när inlånarna är arvspråkstalare än när de är elittvåspråkiga därför att långivarspråket är det *dominanta* majoritetsspråket i arvspråkssammanhanget. Det finns två antaganden bakom denna hypotes. För det första förväntas arvspråkstalare ha högre *språklig kompetens* att adoptera (d.v.s. att uttala de främmande ljudstrukturerna korrekt) än elittvåspråkiga. För det andra förväntas arvspråkstalare även ha starkare *sociolingvistiskt incitament* att adoptera (d.v.s. starkare sociala anledningar att inkorporera främmande strukturer som innovationer i mottagarspråket). De olika inlåningsfallen analyseras utifrån såväl *strukturella* (d.v.s. fonetiska, fonologiska och morfofonologiska) som icke-strukturella (d.v.s. sociolingvistiska och psykolingvistiska) faktorer. Dessa inkluderar bl.a. faktorer som är viktiga i *inlärningen av långivarspråket som ett andraspråk* och som i sin tur påverkar inlånarnas språkliga kompetens.

De två första studierna visar att både de ursprungliga elittvåspråkiga inlånarna av de arabiska lånorden och arvspråkstalarna i Sverige som lånade in nya svenska ord hade korrekt perception av originalstrukturerna och även kunde producera dem på ett korrekt sätt i långivarspråken. Inlånarna hade därmed den språkliga kompetensen att adoptera de främmande strukturerna. Att de hade kunnat tillägna sig denna kompetens förklaras med hjälp av följande faktorer som har visat sig vara avgörande för den slutliga fonologiska behärskningsnivån i ett *andraspråk* (d.v.s. inföddlikheten hos uttalet): robustheten hos strukturens akustiska ledtrådar (som kallas *absolut saliens* i avhandlingen), andraspråksstrukturens likhet med förstaspråkets strukturer (som kallas *relativ saliens* i avhandlingen), *startåldern* för andraspråksinlärningen, graden av *exponering* för andraspråket, samt *motivationen* för inlärningen av andraspråket.

Bägge inlånargrupperna i de två första studierna uppvisade en tydlig tendens att föredra adoption framför adaptation i strukturerna [l] och långa segment i ordfinala rim med undantag av de långa svenska konsonanterna. Detta undantag förklaras med att långa svenska konsonanter var den enda strukturen som saknade hög absolut saliens p.g.a. deras relativt korta duration. Av denna iakttagelse dras den preliminära slutsatsen att ett långt segment måste ha *minst* 50 procent längre duration än sin korta motsvarighet för att ha hög absolut saliens. Att långa konsonanter i svenska lån inte har adopterats av arvspråkstalare medan de hade adopterats av elittvåspråkiga i arabiska lånord utgör därmed ett motexempel till avhandlingens huvudhypotes. Därför kan slutsatsen dras att strukturella faktorer som saliens spelar en mer avgörande roll i lånordsintegration än vad som tidigare har antagits. Även när de kompetens- och incitamentrelaterade faktorerna främjar adoption, som hos arvspråkstalare, kan strukturella faktorer nämligen förhindra adoption.

Resultaten av de två första studierna illustrerar tydligt att arvspråkstalarna som hade en inföddlik behärskningsnivå i svenska, och därmed kunde förnimma och producera de långa konsonanterna på ett korrekt sätt, ändå föredrog att inte adoptera dem medan de adopterade de långa vokalerna i svenska lån. Detta mönster går emot den utbredda uppfattningen inom lånordsfonologin att perceptionens *enda* roll är att ”filtrera ut” strukturer, eller deras drag, som inte kan förnimmas på ett korrekt sätt (som kallas *filtering out* här). Avhandlingen framför istället argumentet att ”filtering out” är mer sannolikt hos icke-inföddlika inlånare medan *perceptuellt betingad adaptation i produktion* trots korrekt perception (som kallas *filtering in* här) är mer sannolik hos inföddlika inlånare. Av denna diskussion dras slutsatsen att hög absolut saliens är ett *nödvändigt villkor för adoption* utöver det andra nödvändiga villkoret att inlånaren måste ha tillägnat sig den språkliga kompetens som behövs för den korrekta produktionen av strukturen.

Ett av antagandena bakom avhandlingens huvudhypotes var att arvspråkstalare borde ha starkare sociolingvistiskt incitament att adoptera främmande strukturer än elittvåspråkiga. Resultaten beträffande arabiska lånord och svenska lån med [l] och långa segment visar dock att bägge grupperna av ursprungliga inlånare hade *tillräckligt* incitament för adoption eftersom adoption påvisades i samtliga strukturer med hög absolut saliens. Samtidigt pekar den tredje studien, som undersöker den fonologiska integrationen av ordinitiala ansatskluster, på att arvspråkstalare i Sverige hade signifikant *starkare* incitament att adoptera ansatskluster än elittvåspråkiga i Turkiet. Detta resultat tyder på att det faktiskt kan finnas signifikanta skillnader mellan elittvåspråkiga och arvspråkstalare rörande incitamentet att adoptera, men att elittvåspråkiga ändå kan uppfylla *minimikravet* för incitament att adoptera främmade strukturer. Avhandlingen argumenterar för att det *totala incitamentet* att adoptera har olika beståndsdelar, nämligen positiva *attityder* (gentemot lexikal inlåning, långivarspråket och specifika främmande strukturer) och dominans i andraspråket. Bägge typerna av faktorer är relevanta för tvåspråkiga inlånare medan bara positiva attityder är relevanta för enspråkiga inlånares/språkanvändares adoption.

Den tredje studien bygger på data från användningen av etablerade lånord med ordinitiala ansatskluster hos två olika grupper av elittvåspråkiga och en grupp med enspråkiga i Turkiet samt två olika grupper av arvspråkstalare i Sverige. Å ena sidan bevisar denna studie att de olika faktorerna som av teoretiska skäl hade antagits påverka den språkliga kompetensen hos lånordsanvändare faktiskt leder till kompetensskillnader mellan de olika undersökta grupperna. Dessa skillnader visar sig sedan även ha statistiskt signifikant påverkan på gruppernas adoptionsgrad. Å andra sidan framgår av studien att resultatet av integrationsprocessen inte kan förklaras på ett tillfredställande sätt av variabeln språklig kompetens som enda oberoende variabel i regressionsanalysen. Även en andra variabel som mäter talarnas sociolingvistiska incitament behövs i regressionsmodellen om den ska kunna förklara en avsevärd del av variansen i adoptionsgrad bland tvåspråkiga talare. Detta resultat kan tolkas som att lånordsintegration inte kan reduceras till utländsk brytning.

De statistiska analyserna visade att förstaspråksanvändning och dominans faktiskt mäter samma företeelse och att dominans är en bättre prediktor av incitamentet att adoptera. De få tvåspråkiga talare som adopterat samtliga ansatskluster i studien hade både helt inföddlik produktion av klustren i sina andraspråk och en moderat dominans i sina andraspråk. Av denna analys kan slutsatsen dras att tillräckligt sociolingvistiskt incitament är ytterligare ett nödvändigt villkor för adoption. Den tredje studien ger även statistiskt säkra bevis som med smärre modifikationer bekräftar avhandlingens huvudhypotes att adoption i allmänhet är mer sannolik när inlånarna är arvspråkstalare än när de är elittvåspråkiga.

Ytterligare resultat från de två första studierna beträffande senare enspråkiga talares användning av arabiska lånord pekar på att absolut saliens inte är *tillräckligt* för adoption fastän det är *nödvändigt*. Data visar nämligen att senare enspråkiga användare har behållit det [l] som hade adopterats av de ursprungliga tvåspråkiga inlånarna men *inte* behållit utan förkortat de långa segmenten som de tvåspråkiga hade adopterat från arabiska. Eftersom denna förkortning huvudsakligen sker i typologiskt markerade positioner, medan längden behålls i de omarkerade positionerna, måste de enspråkiga ändå ha långa segment i sina underliggande former. Detta mönster kan tolkas som ett bevis på korrekt perception av de arabiska originalstrukturerna hos de enspråkiga. Följaktligen kan de enspråkigas *differentierade integration* av [l] och långa segment inte förklaras med hänvisning till inkorrekt perception.

Det finns två andra möjliga förklaringar till detta mönster. De enspråkiga kan ha haft korrekt produktion av [l] men *inkorrekt produktion* av långa segment trots korrekt perception av samtliga strukturer. Alternativt kan de ha producerat samtliga strukturer korrekt men saknat tillräckligt sociolingvistiskt incitament för att adoptera just de långa segmenten. Den första av dessa förklaringar understöds inte av dataanalysen. Den andra förklaringen får dock stöd av tidigare diskussioner i litteraturen som har föreslagit att segment (som [l] i detta fall) är lättare att adoptera än prosodiska strukturer (som segmentlängd i detta fall).

Dessutom kan även enspråkiga talares integration av ansatskluster i den tredje studien tas i beaktande i denna diskussion. Normerna för standardturkiska föreskriver uttal *utan* vokalinskott (d.v.s. adoption av klustren) och även data om enspråkiga talares faktiska användning pekar på en icke försumbar grad av klusteradoption. Detta tyder på att ansatskluster, som traditionellt betraktas som en del av prosodin, beter sig mer som segment än som rent prosodiska strukturer i integrationsprocesser. Därför tyder avhandlingen på att adoption av segment och kluster av segment ställer ett lägre minimikrav angående incitamentet för adoption än rent prosodiska strukturer. Enspråkiga kan således uppfylla minimikravet för adoption av [l] och ansatskluster men inte minimikravet för adoption av segmentlängd. Det senare kravet uppfylls dock av såväl elittvåspråkiga som arvspråkstalare även om den senare gruppen kan ha starkare incitament än den första. Detta innebär att det inte finns några signifikanta skillnader i adoptionsgrad mellan elittvåspråkiga och arvspråkstalare i de fall där bägge grupperna kan uttala den främmande strukturen korrekt eftersom strukturen har en lägre grad av inlärningssvårighet. Det är precis den situation som föreligger i de två första studierna och utgör därmed ett andra motexemplet till avhandlingens huvudhypotes. Av denna iakttagelse kan slutsatsen dras att det är *svårighetsgraden i inlärningen* av den främmande strukturen som gör skillnaden mellan elittvåspråkiga och arvspråkstalare tydlig.

Dessa incitamentrelaterade minimikrav utgör därmed det fjärde och sista nödvändiga villkoret för adoption som identifieras i avhandlingen. Anledningen bakom de differentierade minimikraven för adoption tycks vara vilka konsekvenser adoption på olika *organisatoriska nivåer* skulle ha för mottagarspråkets fonologiska system. Adoption på segmentell nivå anses således innebära mindre omfattande förändringar än adoption på prosodisk nivå.

Sammanfattningsvis föreslås fyra nödvändiga villkor av olika slag som måste uppfyllas för att adoption ska föredras framför adaptation i lånordens fonologiska integration. För det första måste den främmande strukturen ha hög absolut saliens. För det andra måste inlånaren ha den språkliga kompetensen att producera strukturen på ett korrekt sätt. För det tredje måste inlånaren ha tillräckligt sociolingvistiskt incitament för att adoptera strukturen som en innovation. Till sist måste detta incitament vara starkare för adoptionen av rent prosodiska strukturer än för adoptionen av segment och segmentkluster. Det första och det fjärde villkoret är av strukturellt slag medan det andra villkoret har tydliga psykolingvistiska inslag och det tredje villkoret är av sociolingvistisk karaktär.

Avslutningsvis presenterar avhandlingen en ny modell för lånordsintegration som kallas *Saliens- och dominansmodellen* med hänvisning till de faktorer som har befunnits vara viktigast för adoption. Modellen är tämligen restriktiv gentemot adoption därför att det finns så många som fyra nödvändiga villkor. Det argumenteras att denna *restriktivitet* är en fördel eftersom den underlättar för modellen att fånga den ringa förekomsten av adoption i stora undersökningar. Huvudhypotesen bekräftas bara delvis och de fall där den inte bekräftas visas i princip involvera undantag p.g.a. olika *strukturella* krav. Således illustrerar denna avhandling att strukturella faktorer har större betydelse i lånordsfonologi än resultaten av tidigare studier har antytt.

References

Abrahamsson, N. & Hyltenstam, K. (2008). The robustness of aptitude effects in near-native second language acquisition. *Studies in Second Language Acquisition, 30:4*, 481–509.

Abrahamsson, N. & Hyltenstam, K. (2009). Age of onset and nativelikeness in a second language: listener perception versus linguistic scrutiny. *Language Learning, 59:2*, 249–306.

Adler, A. N. (2006). Faithfulness and perception in loanword adaptation: A case study from Hawaiian. *Lingua, 116*, 1024–1045.

Aitchison, J. (1991). *Language Change: Progress or Decay?* 2nd edition. Cambridge: Cambridge University Press.

Aktürk-Drake, M. (2011). Phonological and sociolinguistic factors in the integrationof /l/ in Turkish in borrowings from Arabic and Swedish. *Turkic Languages, 14*, 153–191.

Aktürk-Drake, M. (2014). The role of perceptual salience in bilingual speakers' integration of illicit long segments in loanwords. *Lingua, 143*, 162–186.

Aktürk-Drake, M. (submitted). Adoption in loanword phonology: Looking beyond linguistic competence.

Aoyama, K, Flege, J. E., Guion, S. G., Akahane-Yamada, R. & Yamada, T. (2004). Perceived phonetic dissimilarity and L2 speech learning: the case of Japanese /r/ and English /l/ and /r/. *Journal of Phonetics, 32*, 233–250.

Barlow, J. A. (2014). Age of acquisition and allophony in Spanish-English bilinguals. *Frontiers in Psychology, Language Sciences, 5*, 1–14.

Beckman, J. (1998). *Positional Faithfulness*. PhD dissertation. University of Massachusetts.

Best, C. T. (1995). A Direct Realist View of Cross-Language Speech Perception. In: Strange, W. & Jenkins, J. J. (eds.) Cross-Language Speech Perception. Timonium, MD: York Press, 171–204.

Boersma, P. & Hamann, S. (2009). Loanword adaptation as first-language phonological perception. In: Calabrese, A. & Wetzels, W. L. (eds.), *Loan Phonology*. Amsterdam: John Benjamins. 11–58.

Broselow, E. (1999). Stress, epenthesis, and segment transformation in Selayarese loans. *Proceedings of the Annual Meeting, Berkeley Linguistics Society, 25*, 311–325.

Broselow, E. (2006). Loanword phonology. In: Brown, K. (ed.), *Encyclopedia of Language and Linguistics*, 2nd edition, Volume 7. Oxford: Elsevier, 286–290.

Broselow, E. (2009). Stress adaptation in loanword phonology: Perception and learnability. In: Boersma, P. & Hamann, S. (eds.), *Phonology in Perception*. Berlin: Mouton de Gruyter, 191–234.

Calabrese, A. (2009). Perception, production and acoustic inputs in loanword phonology. In: Calabrese, A. & Wetzels, W. L. (eds.), *Loan Phonology*. Amsterdam: John Benjamins, Amsterdam, 59–115.

Calabrese, A. & Wetzels, W. L. (2009). Loan phonology: Issues and controversies. In: Calabrese, A. & Wetzels, W. L. (eds.), *Loan Phonology*. Amsterdam: John Benjamins, 1–10.

Croft, W. (2000). *Explaining Language Change: An Evolutionary Approach*. Harlow, UK: Pearson Education Limited.

Danchev, A. (1995). Notes on the history of word-final /g/ in English. In: Fisiak, J. (ed.), *Linguistic Change Under Contact Conditions*. Berlin: Mouton de Gruyter, 55–79.

Davidson, L. & Noyer, R. (1997). Loan phonology in Huave: Nativization and the ranking of faithfulness constraints. *Proceedings of the West Coast Conference on Formal Linguistics* 15, 65–79.

de Jong, K. & Zawaydeh, B. (2002). Comparing stress, lexical focus, and segmental focus: patterns of variation in Arabic vowel duration. *Journal of Phonetics, 30*, 53–75.

de Mejía, A.-M. (2002). *Power, Prestige and Bilingualism. International Perspectives on Elite Bilingual Education*. Clevedon, UK: Multilingual Matters.

Derwing, T. M. (2008). Curriculum issues in teaching pronunciation. In: Hansen Edwards, J. G. & Zampini M. L. (eds.), *Phonology and Second Language Acquisition*. Amsterdam: John Benjamins, 347–370.

Develi, H. (2009). *Osmanlı'nın Dili*. Istanbul: Kesit Yayınları.

Díaz-Campos, M. (2004). Context of learning in the acquisition of Spanish second language phonology. *Studies in Second Language Acquisition, 26*, 249–273.

Di Sciullo, A.-M., Muysken, P. & Singh, R. (1986). Government and codemixing. *Journal of Linguistics, 22*, 1–24.

Dong, X. (2012). *What Borrowing Buys Us: A Study of Mandarin Chinese Loanword Phonology*. LOT Dissertation Series 304.

Elert, C.-C. (1965). Phonologic Studies of Quantity in Swedish. Almqvist & Wiksells, Uppsala.

Eliasson, S. & LaPelle, N. (1973). Generativa regler för svenskans kvantitet. Arkiv för nordisk filologi, 88, 133–148.

Eliasson, S. (1978). Swedish quantity revisited. In: Gårding, E., Bruce, G. & Bannert, R. (eds.) Nordic Prosody: Papers From a Symposium. Travaux de l'Institut de Linguistique de Lund 13.

Eliasson, S. (1985). Stress Alternations and Vowel Length: New Evidence for an Underlying Nine-vowel System in Swedish. Nordic Journal of Linguistics, 8, 101–129.

Finegan, E. (2008). Language: Its Structure and Use. Stamford, USA: Cengage Learning.

Fishman, J. (2001). 300-plus years of heritage language education in the United States. In: Peyton, J. K., Ranard, D. A. & McGinnis, S. (eds.), Heritage Languages in America: Preserving a National Resource. Washington, DC & McHenry, IL: Center for Applied Linguistics & Delta Systems, 81–89.

Flege, J. E. (1992). The Intelligibility of English Vowels Spoken by British and Dutch talkers. In: Kent, R. (ed.) *Intelligibility in Speech Disorders: Theory, Measurement, and Management*. Amsterdam: John Benjamins, 157–232.

Flege, J. E. (1995). Second-language Speech Learning: Theory, Findings, and Problems. In: Strange, W. (ed.), *Speech Perception and Linguistic Experience: Issues in Cross-language Research*. York Press, Timonium, MD, 229–273.

Flege, J. E. (2012). The role of input in second language (L2) speech learning. *VIth* International Conference on Native and Non-native Accents of English, Łódź, 6–8 December 2012. http://jimflege.com/files/Flege_Lodz_2012.pdf. Accessed on 3 July 2014.

Flege, J. E. & Port, R. (1981). Cross-language phonetic interference: Arabic to English. Language and Speech, 24:2, 125–146.

Friesner, M. L. (2009a). The adaptation of Romanian loanwords from S: Calabrese, A & Wetzels L. W. (eds.), Loan Phonology. Amsterdam: John Benjamins, 115–130.

Friesner, M. L. (2009b). The Social and Linguistic Predictors of the Outcomes of Borrowing in the Speech Community of Montréal. Ph.D. dissertation, University of Pennsylvania.

Genesee, F. & Nicoladis, E. (2006). Bilingual acquisition. In: Hoff, E. & Shatz, M. (eds.), *Handbook of Language Development*. Oxford: Blackwell, 324–342.

Gordon, M. K. (2006). *Syllable Weight: Phonetics, Phonology, Typology*. London: Routledge.

Haspelmath, M. & Tadmor, U. (eds.), (2009). *World Loanword Database*. Leipzig: Max Planck Institute for Evolutionary Anthropology. http://wold.clld.org. Accessed on 8 November 2014.

Haugen, E. (1950). The analysis of linguistic borrowing. *Language, 26*, 210–231.

Heffernan, K. (2005). Phonetic similarity and phonemic contrast in loanword adaptation. *Toronto Working Papers in Linguistics, 24*, 117–123.

Henke, E., Kaisse, E. M. & Wright, R. (2012). Is the Sonority Sequencing Principle an epiphenomenon? In: Parker, S. (ed.), *The Sonority Controversy*. Berlin: de Gruyter, 65–100.

Holden, K. (1976). Assimilation rates of borrowings and phonological productivity. *Language, 52*, 131–147.

Hyltenstam, K. & Abrahamsson, N. (2003). Maturational constraints in SLA. In: Doughty, C. J. & Long, M. (eds.), *The Handbook of Second Language Acquisition*. Oxford: Blackwell, 539–588.

Hyman, L. M. (1970). The role of borrowing in the justification of phonological grammars. *Studies in African Linguistics, 1*, 1–48.

Itô, J. & Mester, A. (1999). The phonological lexicon. In: Tsujimura, N. (ed.), *A Handbook of Japanese Linguistics*. Oxford: Blackwell, 62–100.

Jacobs, H. & Gussenhoven, C. (2000). Loan phonology: perception, salience, the lexicon, and OT. In: Dekkers, J., van der Leeuw, F. & van der Weijer, J. (eds.), *Optimality Theory: Phonology, Syntax and Acquisition*. Oxford: Oxford University Press, 193–210.

Johanson, L. (1992). *Strukturelle Faktoren in türkischen Sprachkontakten*. Sitzungsberichte der wissenschaftlichen Gesellschaft an der J. W. Goethe-Universität Frankfurt am Main, 29:5. Stuttgart: Steiner.

Johanson, L. (2002). *Structural Factors in Turkic Language Contacts*. London: Curzon.

Johnson, W. & Britain, D. (2007). L-vocalisation as a natural phenomenon: explorations in sociophonology. *Language Sciences, 29*, 294–315.

Kager, R. (1999). *Optimality Theory*. Cambridge: Cambridge University Press.

Kang. Y. (2010). The emergence of phonological adaptation from phonetic adaptation: English loanwords in Korean. *Phonology, 27:2*, 225–253.

Kang, Y. (2011). Loanword Phonology. In: van Oostendorp, M., Ewen, C., Hume, E. & Rice, K. (eds.), *Companion to Phonology*. Oxford: Wiley-Blackwell, 2258–2282.

Kang, Y. (2013). Loanwords. Oxford Biographies: Linguistics.

Kerslake, C. (1998). Ottoman Turkish. In: Johanson, L. & Csató, É. (eds.) *The Turkic Languages*. London: Routledge, 179-202.

Kim, H. (2009). Korean adaptation of English affricates and fricatives in a feature-driven model of loanword adaptation. In: Calabrese, A. & Wetzels, W. L. (eds.), *Loan Phonology*. Amsterdam: John Benjamins, 155–180.

Labov, W. (1972). *Sociolinguistic Patterns*. Oxford: Blackwell.

LaCharité, D. & Paradis, C. (2005). Category Preservation and Proximity versus Phonetic Approximation in Loanword Adaptation. *Linguistic Inquiry, 36:2*, 223–258.

Lewis, G. (2002). *The Turkish Language Reform. A Catastrophic Success*. Oxford: Oxford University Press.

Löfstedt, I. (1992). Swedish Segment Length and Structure Preservation. *Studia Linguistica, 46*, 93–127.

Maddieson, I. (1984). *Patterns of Sounds*. Cambridge: Cambridge University Press.

Marioţeanu, M. C., Glosu, S., Ionescu-Ruxandolu, L. & Todoran, R. (1977). *Dialectoligie Română*. Bucharest: Editura Didactica şi Pedagogică.

Matras, Y. (2007). The borrowability of structural categories. In: Matras, Y. & Sakel, J. (eds.), *Grammatical Borrowing in Cross-Linguistic Perspective*. Berlin: Mouton de Gruyter, 31–73.

Matras, Y. & Sakel, J. (2007). *Grammatical Borrowing in Cross-linguistic Perspective*. Berlin: Mouton de Gruyter.

McMahon, A. M. S. (1994). *Understanding Language Change*. Cambridge: Cambridge University Press.

Mitleb, F. (1992). Some aspects of Arabic duration. *Journal of the International Phonetic Association, 22:1*, 27–34.

Munro, M. & Mann, V. (2005). Age of immersion as a predictor of foreign accent. *Applied Psycholinguistics, 26:3*, 311–42.

Muysken, P. (2000). *Bilingual Speech: A Typology of Code-mixing*. Cambridge: Cambridge University Press.

Myers-Scotton, C. (1993). *Duelling Languages: Grammatical Structure in Code-switching*.Oxford: Oxford University Press.

Myers-Scotton, C. (2005). *Multiple Voices: An Introduction to Bilingualism*. Oxford: Wiley-Blackwell.

Oakes, L. (2001). *Language and National Identity: Comparing France and Sweden*. Amsterdam: John Benjamins.

Okada, H. (1999). Japanese. In: *Handbook of the International Phonetic Association: A Guide to the Use of the International Phonetic Alphabet*. Cambridge: Cambridge University Press, 117–119.

Oxford, R. L. (2002). Sources of variation in language learning. In: Kaplan, R. (ed.), *Oxford Handbook of Applied Linguistics*. Oxford: Oxford University Press, 242–252.

Paradis, C. & LaCharité, D. (1997). Preservation and minimality in loanword adaptation. *Journal of Linguistics, 33:2*, 379–430.

Paradis, C. & LaCharité, D. (2008). Apparent phonetic approximation: English loanwords in Old Quebec French. *Journal of Linguistics, 44*, 87–128.

Paradis, C. & LaCharité, D. (2009). English loanwords in Old Quebec French: Fewer bilinguals does not mean a great increase in naive phonetic approximation. *Langues et Linguistique, 32*, 82–117.

Paradis, C. & Prunet, J.-F. (2000). Nasal Vowels as Two Segments: Evidence from borrowings. *Language, 76*, 324–357.

Paradis, C. & Tremblay, A. (2009). Nondistinctive features in loanword adaptation. In: Calabrese, A. & Wetzels, W. L. (eds.), *Loan Phonology*. Amsterdam: John Benjamins, 211–224.

Park, H.-S. (2004). Kodväxling som fenomen – exemplet svenska-koreanska. In: Hyltenstam, K. & Lindberg, I. (eds.), *Svenska som andraspråk – i forskning, undervisning och samhälle*. Lund: Studentlitteratur, 297–328.

Park, H.-S. (2006). Structural characteristics of proper nouns in Korean-Swedish discourse. *International Journal of Bilingualism, 10:1*, 17–36.

Peperkamp, S. & Dupoux, E. (2003). Reinterpreting loanword adaptations: the role of perception. In: Solé, M.-J., Recasens, D. & Romero, J. (eds.), *Proceedings of the 15th International Congress of Phonetic Sciences*. Universitat Autònoma de Barcelona, Barcelona, 367–370.

Piske, T., Mackay, I. R. A. & Flege J. E. (2001). Factors affecting degree of foreign accent in an L2: a review. *Journal of Phonetics, 29*, 191–215.

Poplack, S. (1980). Sometimes I'll start a sentence in Spanish y termino en español: Toward a typology of codeswitching. *Linguistics*, *18*, 581–618.

Poplack, S., Wheeler, S. & Westwood, A. (1987). Distinguishing language contact phenomena: evidence from Finnish-English bilingualism. In: Lilius P. & Saari, M. (eds.), *The Nordic Languages and Modern Linguistics, 6*, 22–56. Helsinki: University of Helsinki Press.

Poplack, S. & Meechan, M. (1998). How languages fit together in codemixing. *International Journal of Bilingualism, 2:2* , 127–138.

Poplack, S., Sankoff, D. & Miller, C. (1988). The social correlates and linguistic processes lexical borrowing and assimilation. *Linguistics, 26*, 47–104.

Prince, A. & Smolensky, P. (1993). *Optimality Theory: Constraint Interaction in Generative Grammar.* Unpublished manuscript, Rutgers University and University of Colorado, Boulder. Published 2004, Oxford: Blackwell.

Riad, T. (1992). *Structures in Germanic Prosody. A Diachronic Study With Special Reference To the Nordic languages*. PhD dissertation, Department of Scandinavian Languages, Stockholm University.

Riad, T. (2014). *The Phonology of Swedish*. Oxford: Oxford University Press.

Romaine, S. (1995). *Bilingualism*. 2nd edition. Oxford: Basil Blackwell.

Sandfeld, K. (1930). *Linguistique balkanique*. Paris: Klincksieck.

Sankoff, D., Poplack, S. & Vanniarajan, S. (1991). The empirical study of codeswitching. *Papers for the Symposium on Codeswitching in Bilingual Studies: Theory, Significance and Perspective*, 21–23 March, 181–206. Strasbourg: European Science Foundation.

Sarıgül, Ö. (2010). *Frequency Effects in the Production and Perception of Long Vowels in Turkish*. MA thesis in linguistics, Boğaziçi University.

Sheldon, A. & Strange, W. (1982). The acquisition of /r/ and /l/ by Japanese learners of English: Evidence that speech production can precede speech perception. *Applied Psycholinguistics, 3*, 243–261.

Shinohara, S. (2006). Perceptual effects in final cluster reduction patterns. *Lingua, 116*, 1046–1078.

Skutnabb-Kangas, T. (1984). *Bilingualism or Not. The Education of Minorities*. Clevedon, UK: Multilingual Matters.

Steriade, D. (2001). Directional asymmetries in place assimilation: a perceptual account. In: Hume, E. & Johnson, K. (eds.), *The Role of Speech Perception in Phonology*. San Diego: Academic Press, 219–250.

Strange, W. (1992). Learning non-native phoneme contrasts: Interactions among subject, stimulus, and task variables. In: Tohkura, E., Vatikiotis-Bateson, E. & Sagisaka, Y. (eds.), *Speech Perception, Production, and Linguistic Structure*. Tokyo: IOS Press, 197–219.

Tadmor, U. (2009). Loanwords in the World's Languages: Findings and Results. In: Haspelmath, M. & Tadmor, U. (eds.), *Loanwords in the World's Languages. A Comparative Handbook*. Berlin: de Gruyter, 55–75.

Teleman, U. (1969). Böjningssuffixens form in nusvenskan. *Arkiv för nordisk filologi, 84*, 163–298.

Thomas, G. (1991). *Linguistic Purism*. London: Longman.

Thomason, S. G., & Kaufman, T. (1988). *Language contact, Creolization and Genetic Linguistics*. Berkeley: University of California Press.

Thomason, S. G. (2001). *Language Contact: An Introduction.* Washington, D.C.: Georgetown University Press.

Thurgood, G. (1993). Geminates: a cross-linguistic examination. In: Nevis, J.A., McMenamin, G. & Thurgood, G. (eds.), *Papers in Honor of Frederick H. Brengelman*. Fresno: California State University, 129–139.

Treffers-Daller, J. (1999). Borrowing and shift-induced interference: contrasting patterns in French-Germanic contact in Brussels and Strasbourg. *Bilingualism: Language and Cognition, 2:1*, 1–22.

Trudgill, P. (1986). *Dialects in Contact*. Oxford: Blackwell.

Vendelin, I. & Peperkamp, S. (2004). Evidence for phonetic adaptation of loanwords: An experimental study. *IVe Journées d'Études Linguistiques de l'Université de Nantes*, 127–131.

von Essen, O. (1964). An acoustic explanation of the sound shift [ɬ] > [u] and [l] > [i]. In:Abercrombie, D., Fry, D., MacCarthy, P., Scott N. C. & Trim, J. L. M. (eds.), *In Honour of Daniel Jones*. London: Longman, 53–58.

Weinreich, U. (1953). *Languages in Contact: Findings and Problems.* New York: Linguistics Circle of New York.

Wilson, C. (2001). Consonant cluster neutralization and target constraints. *Phonology, 18*, 147–197.

Winford, D. (2003). *An Introduction to Contact Linguistics*. Malden, MA: Blackwell.

Yavaş, M. & Topbaş, S. (2004). Liquid development in Turkish: Salience vs. Frequency. *Journal of Multilingual Communication Disorders, 2:2*, 110–123.

Yip, M. (1993). Cantonese loanword phonology and Optimality Theory. *Journal of East Asian Linguistics, 2*, 261–291.

Yip, M. (2002). Necessary but not sufficient: perceptual loanword influences in loanword phonology. In: Kubozono, H. (ed.), *The Journal of the Phonetic Society of Japan, Special Issue on Aspects of Loanword Phonology, 6:1*, 4–21.

Yip, M. (2006). The symbiosis between perception and grammar in loanword phonology. *Lingua, 116*, 950–975.

Zampini, M. (2008). L2 Speech Production Research. In: Hansen Edwards, J. G. & Zampini M. L. (eds.). *Phonology and Second Language Acquisition*. Amsterdam: John Benjamins, 219–250.

I

Phonological and sociolinguistic factors in the integration of /l/ in Turkish in borrowings from Arabic and Swedish

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This article investigates the phonological integration of the front coda /l/ after a back vowel in the final rime of words borrowed from Arabic and Swedish into Turkish. This original donor structure is interesting because it is in conflict with the core rules of Turkish phonology. Several sub-disciplines of linguistics have dealt with the role of different phonological and sociolinguistic factors in the phonological integration of lexical borrowings, but there is no consensus on their respective weights in borrowing nor on the way in which their interaction is to be conceptualised. The Arabic data in the study are based on historical loanwords while the Swedish data have been obtained through an experiment. The focus of the article is the choice between adoption and adaptation as integration strategies and how different factors interact in producing the attested integration patterns. The results show that adoption is predominantly preferred to adaptation in both cases due to the dominant status of the donor languages in the contexts of borrowing. Hence, it is argued that sociolinguistic factors play the main role in these two particular cases.

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1. Introduction

From Ottoman Turkish to Modern Standard Turkish, /l/ has been one of the phonemes that have been affected most by contact-induced language change (cf. Zimmer 1985). This is due to large-scale lexical borrowing from several languages such as Persian, Arabic, Greek, Italian, French and English, which all feature laterals in phonological positions or environments where Turkish laterals were previously not attested. Hence, the status of the phoneme /l/ as a phonological exception and the underlying causes related to language contact make it an interesting object of study. This article will discuss /l/ in borrowed words in only the word-final coda position after a back vowel, as this particular environment enables an investigation of both the phonetic quality of /l/ and its phonological behaviour in suffixation. The focus will be on historical loanwords from Arabic and new experimental data from Swedish. The reason for choosing these particular instances of borrowing is firstly the structural fact that both Arabic and Swedish have a non-velarised lateral

approximant /l/ as their only lateral phoneme. This phoneme also appears in word-final coda position after back vowels, which is an illicit environment for a non-velarised /l/ in Turkish. Secondly, there are important sociolinguistic differences between these two contexts of borrowing such as the status of the borrowers and the recipient language. Therefore, these structural similarities and sociolinguistic differences can provide us with valuable insights into the role of sociolinguistic factors in the phonological integration of lexical borrowings.

2. Theoretical background

In this article, the term *borrowing* and accompanying metaphors such as *donor language* and *recipient language* will be used instead of the more appropriate term "copying" proposed by Johanson (2002: 8–18) as the former are more established in the linguistic literature. It is generally accepted that the integration of lexical borrowings from a donor language (DL) into a recipient language (RL) can involve one of two phonological strategies: adaptation or adoption. Adaptation entails the alteration of the phonological form of the borrowing in the DL in order to make it fit the phonological system of the RL. Adoption is the opposite strategy whereby deviant DL forms are incorporated into the RL without alteration resulting in the addition of DL forms and patterns to the RL system. Adaptation is thus a conservative strategy which preserves the RL system, whereas adoption means contact-induced phonological change in the RL system due to lexical borrowing from the DL.

2.1. Phonological and sociolinguistic factors in phonological integration

Several sub-disciplines of linguistics have dealt with the phonological integration of lexical borrowings. The loanword-phonology literature has largely assumed that the borrowers are monolingual or have low phonetic-phonological competence in the DL and has consequently emphasised adaptation as an integration strategy. The focus of this type of research has been on phonological factors, mainly the phonetic approximation of deviant donor-language structures (cf. Silverman 1992 and Yip 1993 and 2002). Bilingualism research has also investigated phonological integration of lexical borrowings as an instance of mixed language use. Naturally, this sub-discipline has attributed bilingualism and proficiency in the DL a greater role and has consequently included sociolinguistic factors in its analyses. These factors include the degree of community bilingualism (Paradis & LaCharité 2008), the socio-political status of the DL as a minority or majority language (Poplack, Sankoff & Miller 1988) and attitudes towards mixed language use (Poplack, Sankoff & Miller 1988). Paradis & LaCharité (2008) maintain that the bilingual borrowers set the standard for the phonological integration in the whole speech community. They also claim that a high degree of community bilingualism increases the likelihood of adoptions as opposed to adaptations. Similarly, Poplack, Sankoff & Miller (1988) have found that adoption is more common when the RL is a minority

language in a context where the DL is the majority language. They explain this finding by referring to the borrowers' high proficiency in the DL in such a minority context. Poplack, Sankoff & Miller (1988) also remark that the borrowers' integration patterns are partly acquired in the local sociolinguistic context where certain social norms of mixed language use are established.

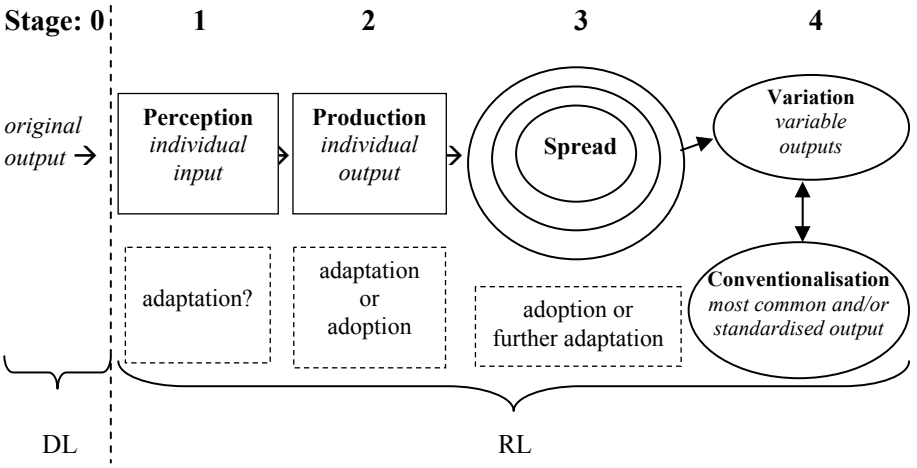
Finally, the literature on language contact and change has dealt with adoption as an instance of contact-induced language change. While this sub-discipline has focused on both phonological and sociolinguistic factors as well as their interaction, a common view is that sociolinguistic factors can "trump" phonological factors given the right social circumstances of contact (cf. Thomason 2001: 85). A commonly cited factor in language change through borrowing is the degree of bilingualism in two senses. The first sense is the degree of community bilingualism (cf. Croft 2000: 201–207; Thomason 2001: 70–71; Johanson 2002: 5-6 and Sakel 2007: 19, 25) while the second sense is the level of proficiency in the DL among individual borrowers (cf. "familiarity with the donor language" in McMahon 1994: 205; "imperfect learning" in Thomason 2001 and in Matras 2007: 39–40; and "quality of bilingualism" in Johanson 2002: 5). In summary, both the loanword-adaptation literature and the literature on language contact and change have shown a tendency to emphasise the importance or primacy of one type of factor (phonological factors in the former and sociolinguistic factors in the latter case) at the expense of the other type of factor. Bilingualism research has, on the other hand, taken a more balanced view of the roles played by both types of factors. Despite the wealth of knowledge and insights provided by these sub-disciplines on phonological integration, how the interaction between phonological factors (including phonetic factors) and sociolinguistic factors should be treated theoretically remains a central issue in need of further discussion.

2.2. The phonological integration process of a lexical borrowing

In Figure 1, a schematic overview of the integration process is presented. The original output from the DL enters the RL through an individual borrower in Stage 1. Depending on the phonetic-phonological competence of the borrower in the DL, he/she may or may not perceive the DL output correctly. Hence, the RL input may or may not be identical to the DL output during this stage. If the RL input is different from the original DL output, the first instance of adaptation is considered to have taken place in perception (cf. Silverman 1992; Yip 1993 and 2002; Peperkamp & Dupoux 2003; Vendelin & Peperkamp 2004; Adler 2006; Boersma & Hartman 2009; Calabrese 2009 and Kim 2009). In Stage 2, the input is subjected to either (further) adaptation or adoption by the borrower resulting in the borrower's individual output. If a phonological structure in the borrowing is absolutely marked (i.e. has high phonetic complexity) or relatively foreign to the RL (cf. the notion of structural "attractiveness" in Johanson 2002: 41–48), the borrowers might not possess the ability to produce the structure in question. This means that the more

demanding the phonological structure in question is, the more advanced the phonetic-phonological competence of the borrowers has to be in the DL (i.e. no or little foreign accent) in order for adoption to be available to them. Therefore, phonetic-phonological competence in the DL is a key factor as to whether adaptation starts already during Stage 1 as well as in the choice between adoption and adaptation during Stage 2. Competence in the DL is viewed as a sociolinguistic factor here because on the societal level it is directly related to the socio-political status of the DL and the socioeconomic status of the borrowers.

Figure 1. Overview of the phonological integration of a lexical borrowing



Legend: The bold numerals on top indicate the stages in the integration process. The solid-lined rectangles represent processes in individual speakers, while the ellipses refer to processes in the speech community. The dotted-lined rectangles indicate the integration strategies that are available at a particular stage. The horizontal curvy brackets indicate processes that pertain to the donor language (DL) and to the recipient language (RL).

Once the original borrower has produced his/her individual output after Stage 2, this output is introduced during Stage 3 to other individuals and thus into the speech community and can potentially start spreading as a lexical, and possibly phonological, innovation. Stage 3 crucially involves the original borrowers' individual outputs becoming inputs for other speakers. This can potentially start a new cycle of phonological integration for further speakers who themselves go through Stages 0–2 and consequently introduce their own individual outputs into the speech community. In this process, the output of the first generation of borrowers is not necessarily the only input to the second generation of borrowers if their proficiency in the DL allows them additional access to the DL, including access to the DL orthography. However, if the second generation of borrowers is monolingual

or has low phonetic-phonological competence in the DL, the first generation's output may be the only or main input. When the lexical innovation spreads through the speech community, these cycles of borrowing are repeated over and over again. These processes of spread can potentially result in variation in the RL speech community regarding the pronunciation and use of the lexical borrowings. This variation during Stage 4 can be based on different proficiency levels in the DL and/or social class to name just a few relevant factors. Since there are normative forces in every speech community, one variant might eventually become conventionalised as the community norm or the prescriptive norm. The most common type of normative linguistic force is standardisation. The chosen standard variant can be the most common one or a less common one preferred by the elites. In any case, there is interaction between variation and the forces of conventionalisation whereby the actual use throughout the speech community both influences and is influenced by the conventionalised norms as indicated by the bidirectional arrow in Figure 1. During Stage 4, such factors as the degree of community bilingualism, which is crucially linked to the prestige and socio-political status of the DL, and the socioeconomic status of the original borrowers in the RL community play an important role.

In the loanword-phonology literature, one of the most debated issues has been the role of perception. Some researchers argue that Stage 1 does not exist (cf. Paradis & LaCharité 1997; Paradis & Prunet 2000; Jacobs & Gussenhoven 2000 and LaCharité & Paradis 2005) and that integration only has to do with production i.e. Stage 2. Following Calabrese & Wetzels (2009), the view that claims that both Stage 1 and Stage 2 exist will be referred to as the "the perceptual stance", while the view that dispenses with Stage 1 will be called "the phonological stance". The crucial difference between these stances from the perspective of the present study is that the perceptual stance allows for phonetic details to play a greater role than the phonological stance. Paradis & LaCharité (1997 and 2008) maintain that the main justification for the phonological stance is the fact that the original borrowers are predominantly bilinguals with advanced phonetic-phonological competence in the DL. Consequently, these bilinguals' individual inputs in the RL are always identical to the original DL output. In order to overcome the apparent contradiction between these two stances, Heffernan (2005) has suggested a division of labour between the stances, whereby the perceptual stance should be applied to borrowing by monolinguals while the phonological stance should be reserved for borrowing by bilinguals.

2.3. The appropriateness of comparisons

When comparing different instances of borrowing, it is crucial to be aware of the fact that the particular data available for the different contexts may pertain to different stages of the phonological integration process described in Figure 1. This issue is often neglected in the literature, leading to the false assumption that

contemporary data from Stage 4 necessarily reflect the integration strategies applied by the original borrowers in an earlier period. This assumption practically amounts to dispensing with potential spread effects during Stage 3. In the present study, the experimental data on new Swedish borrowings provide us with information on a group of speakers' individual outputs, i.e. data from Stage 2. Data on historical Arabic loanwords, on the other hand, are obtained from contemporary dictionaries of Turkish and thus reflect conventionalised community outputs from Stage 4. Consequently, a direct comparison of these data from two different stages would not be appropriate. Therefore, a valid comparison requires making a qualified inference as to the group of original borrowers for Arabic loanwords and reconstructing that group's output, i.e. the original Stage 2. Thus, a reconstructed Stage 2 in one context of borrowing (Arabic) can be more appropriately compared with an actual Stage 2 in the other context (Swedish).

3. The status of the phoneme /l/ in the three languages

3.1. Laterals in the recipient language Turkish

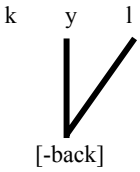
3.1.1. The native underspecified lateral phoneme /L/

In the native vocabulary of Turkish, the lateral phoneme /L/ is underspecified with respect to its phonological classification as front or back. As we can see in (1), in coda position the phoneme /L/ has a front allophone [l] after phonologically front vowels in (1a) and (1c) as well as a back allophone [ɬ] after phonologically back vowels in (1b) and (1d).

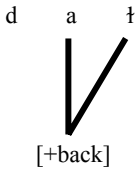
(1)	After front vowels				After back vowels		
a.	*kül*	'ash'	[kyl]	b.	*kul*	'slave'	[kuɬ]
	göl	'lake'	[gœl]		*kol*	'arm'	[koɬ]
c.	*kil*	'clay'	[kil]	d.	*kıl*	'body hair'	[kɯɬ]
	kel	'bald (person)'	[kel]		*dal*	'branch'	[daɬ]

According to Zimmer & Orgun (1999), the front allophone [l] is categorised as a post-alveolar lateral approximant and lacks secondary velarisation. The back allophone [ɬ], on the other hand, is categorised as a dental lateral approximant and displays secondary velarisation. Hence, the phonological feature that determines if the lateral is classified as front or back is not its place of primary articulation but the absence or presence of a secondary articulation in the form of velarisation, i.e. the raising of the tongue's body at the back of the mouth. These allophony rules result in palatal spreading in the rime whereby the [back] feature of the nucleic vowel is spread to the coda /L/ as in (2).

(2) a. Front allophony



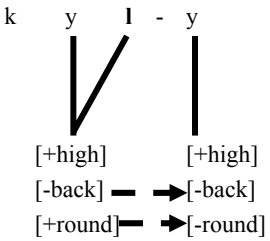
b. Back allophony



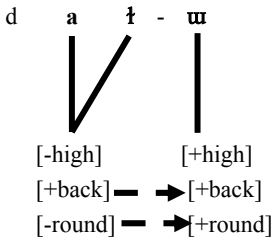
According to the rules of Turkish vowel harmony, in suffixation the last stem vowel provides the underspecified vowel of the suffix with two of its own features, namely [back] and [round] through spreading. In (3) and (4) the accusative suffix /-(j)I/ is used as an example. Thus, the [back] value of the stem's final vowel is spread further to the suffix's vowel, building a continuous string of either front or back segments across the morpheme boundary as in (4).

(3) a.	*kül-ü*	'ash-ACC'	[kyly]	b.	*kul-u*	'slave-ACC'	[kuɫu]
	göl-ü	'lake-ACC'	[gœly]		*kol-u*	'arm-ACC'	[koɫu]
c.	*kil-i*	'clay-ACC'	[kili]	d.	*kıl-ı*	'body hair-ACC'	[kɯɫɯ]
	kel-i	'bald (person)-ACC'	[keli]		*dal-ı*	'branch-ACC'	[daɫɯ]

(4) a. Front suffixation



b. Back suffixation



3.1.2. Two exceptions regarding /l/ in loanwords

In native stems, the allophony rules require that the coda /L/ have the same [back] value as the preceding vowel, while according to the rules of vowel harmony between the stem and its suffixes, the stem's final vowel alone determines the suffix vowel's [back] and [round] values. These two phonological rules apply for all native Turkish words as well as for some nativised loanwords. However, in Modern Standard Turkish the same rules can be violated or altered in many loanwords where the original DL form contains in its final rime a back vowel followed by a front /l/. As a result, exceptions to the aforementioned rules arise. Together with Persian loanwords, Arabic loanwords were historically among the first exceptions to these rules and make up a large portion of the exceptions regarding /l/. Later, these exceptions were further consolidated by the influx of French loanwords of the same

type. This borrowing pattern, which violates the allophony and vowel-harmony rules of Turkish, is still productive in Modern Standard Turkish today as proper names of this type are regularly integrated into the language, some of which become new exceptions.

3.1.3. Violation of the lateral allophony rules in loanwords

As we can see in (5b) the original front quality of /l/ in the DL is preserved in Turkish despite the fact that the preceding vowel is back. In (5b) *sol* has been borrowed from the Italian *sol* [sɔl]. *bol* has been borrowed from the French *bol* [bɔl]. *usul* comes from the Arabic [usˁuːl]. The lexical entries for such loanwords do not contain an underspecified /L/ as in native words in (5a) but a fully specified front /l/ as in (5b) whose palatal value is independent of the preceding vowel's value as in (6b). Thus, through this type of borrowing which *preserves* the DL's original lateral, the native lateral allophone [l] has acquired phonemic status as /l/ in Turkish. This leads to the minimal pairs in (5) and (6), which can only be distinguished by the front or back quality of the lateral in their surface forms.

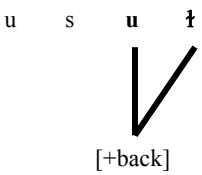
(5) a. Native words

sol	'left'	/soL/	[soɬ]
bol	'plentiful'	/boL/	[boɬ]
usul	'quiet'	/usuL/	[usuɬ]

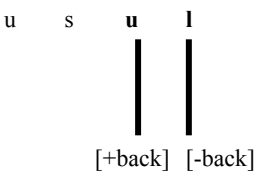
b. Loanwords

sol	'a musical note'	/sol/	[sol]
bol	'bowl'	/bol/	[bol]
usul	'method'	/usuːl/	[usul]

(6) a. Lateral allophony respected



b. Lateral allophony violated



3.1.4. The harmonisation of /l/ in the suffixation of loanwords

The second exception resulting from the preservation of the original front quality of /l/ in loanwords is the violation of the rules of vowel harmony between stems and suffixes. In suffixation the preserved original /l/ starts participating in stem-suffix harmony processes as a [-back] segment by spreading its [-back] value to the suffix's vowels as in (7b) and (8b). This phenomenon will be referred to as the *harmonisation of /l/*.

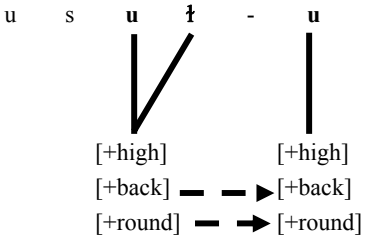
(7) a. Native words

bol-u	'plentiful-ACC'	[boɬu]
usul-u	'quiet-ACC'	[usuɬu]

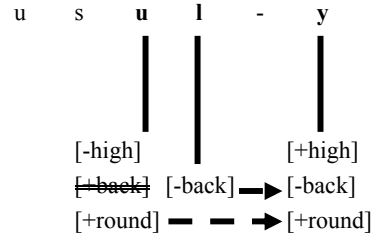
b. Loanwords

bol-ü	'punch-ACC'	[boly]
usul-ü	'method-ACC'	[usuːly]

(8) a. Regular suffixation pattern with non-harmonised /L/



b. Irregular suffixation pattern with harmonised /l/



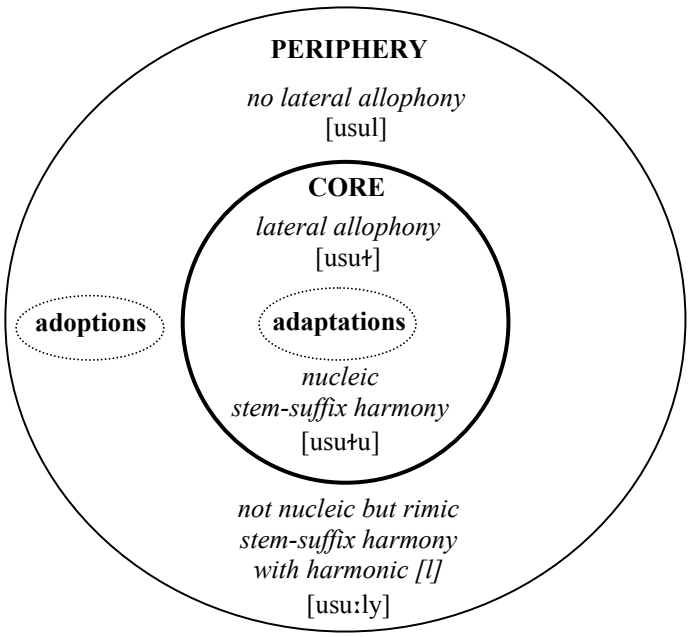
This results in a case of irregular suffixation where it is no longer solely the stem's last vowel (i.e. its last nucleus) as in the regular cases in (8a) but the whole final rime including the coda /l/ that determines the underspecified features of the suffix vowel as in (8b). To be precise, the last vowel continues to provide the suffix's [round] feature as in regular suffixation while the [back] feature is now supplied by the stem's last palatally classified segment, which in this case is the coda consonant /l/. The stem-suffix harmony process becomes rimic instead of nucleic as it is divided between two components of the rime, the nucleus and the coda. This integration strategy in (7b) and (8b) will be referred to as *harmonic preservation* because the [-back] feature of /l/ is not only preserved but also participates in harmonic processes between the stem and the suffix.

3.1.5. The core and the periphery of the Turkish phonological lexicon

A useful conception of the described violations of Turkish phonological rules in some loanwords is provided by the view that the phonological lexicon is stratified. Such a conception has been proposed by several researchers for the integration of borrowings (cf. Paradis & LaCharité 1997 and 2008; Itô & Mester 1999; and Friesner 2009). According to this view, the phonological lexicon consists of a *core* where all the rules of the RL phonology apply, and of a *periphery* where the violation of some rules is tolerated, *inter alia* in loanwords. The core consists of one single stratum while the periphery can potentially consist of different strata (see Itô & Mester 1999 for an example of several peripheral strata). In the case of Turkish, the rules for lateral allophony and vowel harmony apply fully to native words in the core whereas they can be violated in the periphery due to harmonic preservation in some loanwords. Here, stem-suffix harmony is rimic instead of nucleic due to the harmonisation of /l/ (see Figure 2). One major advantage of the stratified conception of the phonological lexicon is that it echoes the fundamental choice made in the phonological integration of borrowings, namely the choice between adaptation and adoption. Adaptations are placed in the RL core since they are made to fully fit the RL phonology whereas adoptions of deviant DL structures and patterns are placed in the periphery since they do not fully fit the RL phonology. Furthermore, if previous

adoptions go through adaptation at later stages of the process of spread, they can be said to have been moved from the periphery to the core of the phonological lexicon.

Figure 2. The status of words with a final /l/ in the Turkish phonological lexicon



Legend: In the core all native phonological rules apply, whereas in some exceptional cases their violation is tolerated in the periphery. As an integration strategy, adaptation is related to the core, whereas adoption is related to the periphery as indicated by the dotted ellipses. The examples in phonetic transcription are the same as examples 5–8 in the text.

3.2. Laterals in the donor languages

From the perspective of Turkish phonology, the crucial property for the classification of a word-final coda lateral as front or back is the absence or presence of secondary velarisation respectively. Phonetically speaking, DL laterals without velarisation are potentially more likely to be perceived as similar or identical to the Turkish front allophone [l], whereas velarised DL laterals are potentially more likely to be perceived as closer to the Turkish back allophone [ɬ].

3.2.1. Laterals in Arabic

Arabic is generally described as having only one lateral phoneme /l/, a lateral approximant lacking velarisation (cf. Watson 2002). Thelwall & Sa'adeddin (1999) describe the lateral phoneme /l/ in Arabic as having a variable place of articulation across dialects between dental and postalveolar. We know that the input variety of Arabic in the Ottoman context was Classical Arabic but we lack more detailed information about the exact pronunciation of the phoneme /l/ in the input. Nevertheless, in the most crucial respect we can assume that it must have lacked velarisation because this is a non-variable property of Classical Arabic. However, there are some exceptions to the lack of velarisation in Arabic. The first exception regards the word *Allah* '(the) God' [alˤːaːh] and its derivates, where a so-called emphatic [lˤ] involving velarisation is used (cf. Watson 2002: 16). Due to its limited use, this lateral is not considered a separate phoneme of Arabic and it does not appear in the word-final coda. The second case of exception has to do with a phonological process in Arabic called *emphasis spread*, whereby a so-called emphatic feature can spread from one segment to nearby segments. The extent and domain of emphasis spread varies from dialect to dialect and can in some cases lead to an emphatic realisation of the phoneme /l/ as [lˤ] (cf. Watson 2002: 273–279). Such emphatically realised laterals with velarisation are phonetically quite similar to the Turkish back allophone [ɬ].

3.2.2. Laterals in Swedish

All varieties of Swedish have only one lateral phoneme. This phoneme's phonetic realisation can vary from dialect to dialect and involve velarisation in some dialects (Garlén 1988: 74). However, in Standard Swedish spoken in the Mälar Valley around Stockholm, the lateral phoneme /l/ lacks velarisation and is described as a dental lateral approximant (cf. Engstrand 1999). Currently, there are no studies known to the author which have shown that the Standard Swedish /l/ varies in velarisation depending on the phonetic environment or on sociolinguistic factors. Although its place of articulation is the same as the Turkish back allophone's, namely dental, the Standard Swedish /l/ lacks velarisation just as the Turkish front allophone does.

4. Methodology

Different data collection methods were used for the two contexts of borrowing as they differ substantially in terms of the age of the borrowings. The investigation of the new Swedish borrowings through an experiment allowed more detailed data collection on the individual borrowers' backgrounds. An equally detailed data collection on individual borrowers was not possible for the historical Arabic loanwords, but other methods were used to overcome this difficulty.

4.1. Data on historical loanwords from Arabic

Three different types of data were obtained for the Arabic loanwords. Firstly, different sources were surveyed for information on when borrowing from Arabic into Turkish occurred, the role and status of Arabic in Ottoman society and the background of the likely group of borrowers in order to construct an adequate description of the sociolinguistic context of borrowing. Secondly, an etymological dictionary of contemporary Turkish (Nişanyan 2002) was used as a corpus containing 3285 Arabic loanwords. In the Nişanyan corpus, Arabic loanwords that contain a word-final coda lateral after a back vowel were identified. Then, the standard pronunciations and suffixation patterns of these loanwords were checked in the online dictionary of the Turkish Institute of Language (Türk Dil Kurumu 2010). The final type of data comes from a so-called transcription text by Viguier (1790). Since the writing system used in original Ottoman texts does not reveal whether the word-final coda /l/ is velarised or not and whether the following suffixes were front or back, it does not provide us with any evidence regarding the treatment of word-final coda /l/ in loanwords. In order to overcome similar problems, texts in Ottoman Turkish rendered in Latin transcription are commonly consulted in historical turkology. The phonetic quality of /l/ is not described in this type of texts either, but the quality of the word-final coda /l/ can be inferred from the vowels of the following suffixes. Some reservations can be expressed about using this type of inference as it is based on the assumption that the coda /l/ has the same palatal value as the vowels of the following suffix. Nonetheless, this method can still provide useful information.

4.2. Data on new borrowings from Swedish

Data on the phonological integration of new borrowings from Swedish were collected within the framework of an experiment. The first reason for choosing an experiment was the lack of a relevant corpus. Secondly, recordings of natural speech would not have supplied the amount of specific data needed for this investigation. Due to similar reasons, experimental data are commonly used in studies of loanword adaptation (cf. Silverman 1992; Peperkamp & Dupoux 2003 and Adler 2006). Hence, the only viable method was to use elicited data, but the experiment was designed and presented in a way that did not make the data elicitation transparent for the participants.

4.2.1. The participants

The participants were selected on the basis of their advanced functional proficiency in the standard varieties of Turkish and Swedish. Most of the participants were known to the researcher prior to data collection, which facilitated an initial informal assessment. Others were recruited through recommendations. The term *advanced functional proficiency* refers to a level of general proficiency that enables the participants to use both languages at an advanced level for the functional

requirements of everyday life. Additional to the researcher's prior assessment, data acquired through background interviews and through different language tasks in the experiment were used toward the final assessment of the participants' general proficiency.

Table 1. Overview of the participants' backgrounds

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Age at data collection (in years)	36	25	27	27	27	27	23	38	21	30	34	29
Length of residence in Sweden (in years)	32	25	25	26	26	16	23	27	13	30	13	24
Age of onset for Turkish	17†	0	0	0	0	0	0	0	0	0	3	0
Age of onset for Swedish (<: before the age of)	0	3	6	7	5	<6	<6	11	<6	7	0	4
Parents' mother tongues (S: Swedish, T: Turkish)	S-T	T	T	T	T	T	T	T	T	T	S-T	T

† This participant reported some early exposure to Turkish as well as low-to-intermediate proficiency throughout his childhood and early teenage years but high proficiency only after the age of seventeen (when the family moved to Turkey) which he reported as the onset for his acquisition of Turkish.

Data were collected from a total of twelve participants. Half of them were male and half were female. All participants had some form of tertiary education and were living in the Mälar Valley region at the time of data collection. An overview of the participants' backgrounds is presented in Table 1. The ages of the participants varied between twenty-one and thirty-eight and all but one were children of Turkish immigrants in Sweden. Ten of the participants had two Turkish-speaking parents whereas two had one Turkish-speaking and one Swedish-speaking parent. Not all participants were born in Sweden but all of them had spent a significant portion of their lives there. The range of residence in Sweden was between thirteen and thirty-two years. All but one of the participants reported that their age of onset for Swedish was seven at the latest. One participant had an age of onset for Swedish at eleven years of age. Ten of the participants had Turkish as their first acquired language. Two participants, who had one Turkish and one Swedish parent, had Swedish as their first acquired language. One of these reported an age of onset for Turkish at three years of age. The other participant reported some exposure to Turkish as well as low-to-intermediate proficiency throughout his childhood and early teenage years but high proficiency only after the age of seventeen when he moved to Turkey. With some reservations for this last participant, all participants can thus be viewed as early bilinguals who started acquiring both languages before puberty and have acquired advanced functional proficiency in both languages.

4.2.2. The composition of data collection

Table 2. Components of the data collection

Name of component	Description of component	Language used in component
1 Semi-structured background interview	Self-report on language background Self-report on language proficiency and use	mainly Turkish
2 Evaluation of nativeness in Turkish	Recording of natural speech: 1-3 minute-long elaborated comment on the topic "Where would you travel if you were given 10,000 US dollars?"	only Turkish
3 Evaluation of nativeness in Swedish	Recording of natural speech: 1-3 minute-long elaborated comment on the topic "Could you tell me about the last film you saw?"	only Swedish
4 Evaluation of specific phonetic-phonological proficiency in Turkish	Orally answered fill-in-the-blanks test designed to check the participants' command of exceptions in the periphery regarding the word-final coda laterals in established loanwords in Turkish	only Turkish
5 Evaluation of the degree of foreign accent in Swedish	Reading aloud of a one-page Swedish text containing proper names which display the three structures under investigation	only Swedish
6 Oral translation task	Online translation of the same Swedish text as in 5 into Turkish	only Turkish
7 Follow-up questions about the translation task	Specific questions on parts of the translated text with more explicit elicitation of integration	only Turkish

The data collection took between one hour and one and a half hours per participant. All data were recorded by computer with the help of the phonetic analysis program Wavesurfer. The data collection involved seven different components as can be seen in Table 2. A part of the recordings from Component 2 were later evaluated for nativelikeness of the participants' Turkish pronunciation by a linguist who is a native speaker of Turkish. Three short passages from the recordings in Components 3 and 5 were submitted to a panel of three first-year phonetics students, all native speakers of Standard Swedish, for an evaluation of the participants' nativelikeness in Swedish. The first passage consisted of natural speech. The second passage consisted of a short text recitation. The third passage was a slightly longer text recitation where the panel also had access to the recited text for comparison. For all three passages, the participants featured in a different order and the panel was asked to judge if the participants were native speakers of Swedish. For the last passage, the

panel was also asked to evaluate the participants' degree of foreign accent. The reason for using three different passages was to capture the participants' pronunciation in Swedish under different circumstances so that both natural speech and controlled speech would be included in the evaluation. In all evaluations, additional recordings from extra participants were included to diversify the material and to check for evaluator reliability.

As mentioned in sections 3.1.2-3.1.5, the periphery of the Turkish lexicon contains exceptions. Component 4 was designed to check if the bilingual participants had in fact mastered these exceptions in Turkish. To this end, they were given fifty sentences in Turkish, which included blanks and adjacent nouns in parentheses, which were to be used appropriately to fill in the blanks. Thus, the participants' pronunciation and suffixation of these exceptions was investigated. The translation text in Component 6 was designed in a way that would elicit both unsuffixed and suffixed integration of relevant Swedish proper names in Turkish phonology. In Component 7, thirty-one follow-up questions were used in more explicit elicitation to ensure that all relevant types of integration were included in the material in case some should be absent in the translation. Here, the participants were asked and reminded to answer the questions with exactly the same sentences by only substituting the question words with the answers. The recordings from Components 4, 6 and 7 were analyzed auditively and transcribed by the researcher, where only the loanwords' final rimes which included a coda /l/ were analyzed. Approximately five percent of this material was later submitted for a reliability check to a linguist who is a native speaker of Turkish and has advanced proficiency in Swedish. The reliability check showed that the two researchers' analyses were identical in 91 percent of all cases. Some of the results were finally subjected to statistical analysis with the help of the program SPSS.

5. Results and discussion

In this section, results regarding the two contexts of borrowing will be presented in diachronic order beginning with the historical Arabic loanwords followed by the contemporary Swedish borrowings. First, a categorised overview of the attested phonological integration strategies will be presented. Then the sociolinguistic context including background information about the original borrowers will be surveyed. Finally, the relationship between the attested integration strategies and phonological and sociolinguistic factors will be discussed.

5.1. Historical Arabic loanwords

5.1.1. Phonological integration strategies in Arabic loanwords

In the Nişanyan Corpus, 92 Arabic loanwords with an original back vowel followed by a front coda /l/ in the word-final rime were identified. The phonological integration strategies for these loanwords are evaluated in two morphological

environments, the simplex environment and the suffixed environment. In the simplex environment, two strategies are attested: 1) Preservation which entails the adoption of the original [-back] value of /l/ in Turkish as in (9a) and 2) Velarisation which entails the adaptation of the original [-back] value of /l/ to Turkish by being converted to [+back] as in (10a). In the suffixed environment, two accompanying strategies are attested. When the final coda /l/ is preserved in the simplex environment, it is followed by a [-back] suffix as in (9b). This pattern was previously referred to as harmonic preservation and is associated with the periphery (cf. sections 3.1.2–3.1.5). On the other hand, when the final coda /l/ is velarised, it is followed by a [+back] suffix as in (10b), which is the regular suffixation pattern in the core. The analysis of the corpus reveals that the dominant pattern in the phonological integration of Arabic loanwords is preservation as in (9), which is attested in 86 percent of all cases. This points to a clear tendency in Turkish to adopt the Arabic final coda /l/ in its original DL form.

(9) Dominant strategy in Arabic loanwords: Preservation (Adoption), mean = 86 %

	Arabic output: 'state'	[ħaːl]
Morphological environment		
Simplex	a.	hal
Suffixed (e.g. accusative)	b.	haːl-i
Underlying form in Turkish	c.	/haːl/

(10) Alternative strategy in Arabic loanwords: Velarisation (Adaptation), mean = 14 %

	Arabic output: 'fortune' [faːl]	
Morphological environment		
Simplex	a.	fał
Suffixed (e.g. accusative)	b.	fał-ɯ
Underlying form in Turkish	c.	/faL/

Certain orthographic conventions in Ottoman Turkish which are relevant in the integration process deserve some attention here. The rich consonant inventory of Arabic with two series of consonants, a neutral and an emphatic one, makes a good match for the rich vowel inventory of Turkish with two series of vowels, a front and a back one. Since the vowels of Turkish are not visible in the Arabic orthography, in writing, their palatal value needs to be inferred from the adjacent consonants' emphatic value. This creates a special sensitivity for the emphatic value of the word-final consonants. Therefore, in Ottoman Turkish there are conventions dictating whether an Arabic consonant is to be classified as front or back in Turkish (cf. Nişanyan 2002: 15). According to these conventions, the Arabic /l/ is classified as front. This orthographic convention can thus have contributed to the preservation of the front quality of the word-final /l/.

5.1.2. The role of phonological factors

A relevant question at this point is if the 14 percent of the cases that deviate from the dominant pattern have structural factors as their underlying cause. Could the phonological environment of /l/ have led to a preference for adaptation in these cases? In section 3.2.1, the spread of Arabic emphasis from other segments to the /l/ was suggested as a possible process whereby the word-final coda /l/ might become velarised in the Arabic output. Watson (2002: 273–279) indicates that two main factors are relevant in emphasis spread. The first is the domain of spread, which can be the same word or the same syllable as /l/. The second factor is the lexically emphatic segment from which emphasis spreads. This segment can be a pharyngealised coronal, a pharyngeal or the voiceless uvular stop /q/, which is classified by some phonologists as emphatic. If emphasis spread were to bias the integration pattern in Turkish towards velarisation, we should find higher frequencies of velarisation in at least some of these phonological environments. However, in all of the emphatic environments in Table 3 preservation is clearly the preferred strategy. A possible explanation for the attested lack of emphasis effects is that it is not present in all varieties of Arabic. Therefore, the Arabic output that Turkish speakers had access to may not have contained emphasis effects to begin with.

Table 3. Frequency of velarisation and preservation of the word-final coda /l/ in Arabic loanwords with respect to different phonological environments

Phonological environment of /l/	Tokens (total)	Velarisation (in percent)	Preservation (in percent)
Pharyngealised coronal within the same word	14	29	71
Pharyngealised coronal within the same syllable	11	18	82
Pharyngeal within the same word	23	9	91
Pharyngeal within the same syllable	12	8	92
/q/ within the same word	14	4	86
/q/ within the same syllable	8	25	75
After /a/	69	17	83
After /u/	23	4	96

Another phonological factor that could potentially affect the borrowers' preference for velarisation is the place of articulation of vowel preceding the /l/. In velarisation, the relevant articulatory dimension from the perspective of Turkish phonology is that the back part of the tongue is involved in the secondary articulation. However, velarisation also crucially involves a raising of the body of the tongue towards the velum. Therefore, back vowels that involve some raising could potentially create a bias towards velarisation. Classical Arabic has a low central vowel /a/ and a high

back vowel /u/ which are treated as back in Turkish. If the further back and higher place of articulation of /u/ were to create a velarisation bias, we should find a higher frequency of velarisation when /l/ is preceded by /u/ than when it is preceded by /a/. However, the data in Table 3 show that this is not the case. In summary, the survey of relevant phonological factors suggests that the underlying cause for the preference for velarisation in 14 percent of the cases is not likely to be the phonological environment of word-final coda /l/.

5.1.3. Elite bilingualism in connection with Arabic loanwords

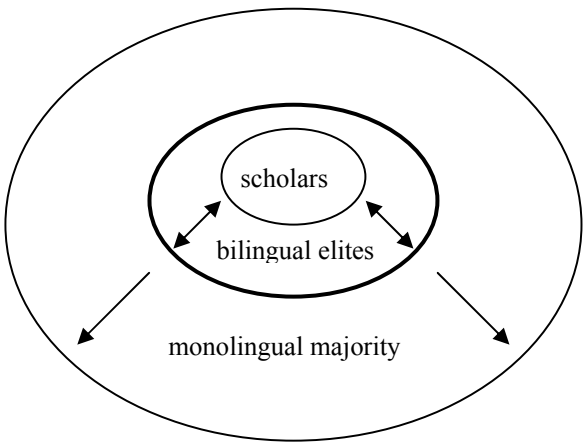
According to Prokosch (1996: 35) many Arabic loanwords were borrowed into Ottoman Turkish indirectly via Persian and therefore already contained some prior Persian adaptations. Since Persian and Arabic both have only one lateral phoneme which lacks velarisation, this does not affect the input to Turkish. He goes on to report that there were also learned loans which were borrowed directly from Arabic via written works. In the absence of detailed etymological dictionaries of Turkish documenting when specific words were borrowed, it is difficult to determine with certainty whether a particular Arabic borrowing came via Persian or not. Under the Ottoman empire an imperial high culture emerged from the mid-fifteenth century onwards, where Arabic came to play an important role especially among the elites (Kerslake 1998: 179–180). The Ottoman elites are often described as trilingual in Turkish, Arabic and Persian (Kerslake 1998: 180 and Lewis 2002: 9). Arabic was the dominant language in domains such as education, natural sciences, historiography, theology and law (Lewis 2002: 5–27). It is likely that there was some indirect and some direct borrowing prior to the imperial Ottoman era, but direct borrowing from written texts is likely to have increased during the imperial era culminating in the stylistically elaborate *inšā* period starting in the sixteenth century (see Kerslake 1998: 182). Therefore, it is appropriate to assume that the bulk of Arabic loanwords were borrowed after the fifteenth century. According to Thomason's borrowing scale (2001: 70–71), which stipulates four degrees of contact intensity in increasing order from Degree 1 (casual contact) to Degree 4 (intense contact) with accompanying lexical and structural borrowings, the intensity of Ottoman Turkish contact with Arabic is classified as Degree 2.

5.1.4. The original borrowers of Arabic loanwords

The most likely original borrowers of Arabic words were Muslim and Turkish-speaking Ottomans who had access to the above-mentioned Arabic-dominant domains. All of these domains require literacy, which was very low in the empire, and some degree of formal education. Therefore, the educated elites in the empire are the most probable original borrowers of Arabic loanwords (see the inner circle in bold in Figure 3). The kind of bilingualism that led to the borrowing of Arabic loanwords can therefore be classified as elite bilingualism among a small minority in the Turkish speech community. The descriptions provided by Yıldız & Abalı (2003)

suggest that the average educated Ottoman mainly had receptive command of Arabic grammar and vocabulary, which he/she used in reading and copying texts in Arabic. Those who proceeded to higher education and became members of the *ilmīye* class of professional scholars and clergymen were required to have more substantial and active knowledge of written Arabic (cf. Prokosch, 1997: 54). These descriptions suggest that most educated Ottomans had low-to-intermediate levels of functional proficiency in Arabic which was mostly receptive. Nevertheless, there was a small group of professional scholars and clergymen who had high proficiency in written Arabic, some of whom could also use it in oral communication (see the innermost circle in Figure 3). Uneducated members of the Ottoman Turkish speech community had very little direct contact with and no or very low proficiency in Arabic and consequently received the output of the elites as their input (see the outer circle titled "monolingual majority" in Figure 3). Hence, the intensity of contact with Arabic among the Ottoman elites can be classified as belonging to Degree 3 on Thomason's borrowing scale (2001: 70–71). The scholars teaching the elites in schools are likely to have set the standard for and closely monitored the phonological integration of Arabic loanwords among their students.

Figure 3. Likely spread of Arabic loanwords from more to less proficient speakers of Arabic in the Ottoman Turkish speech community



Legend: Unidirectional outward arrows show the direction of spread of Arabic loanwords. The bidirectional arrow represents feedback processes between different segments of the speech community.

There is very little information on the actual pronunciation of Arabic by Ottomans. Nonetheless, Prokosch (1997: 55) reports that the pronunciation used in schools was largely correct regarding the consonants but deviated from the classical norm in the vowels. Hence, an intermediate-to-advanced level of phonetic-phonological

competence seems most probable among the elite borrowers. On the other hand, the scholars and clergymen were more likely to have an advanced level. Based on these descriptions, a plausible hypothesis is that the high prestige of Arabic and the close scrutiny of highly proficient scholars motivated the elites to preserve the original /l/ as in (9). Thus, the Arabic phoneme /l/ was mapped onto the phonetically similar Turkish allophone [l]. This type of phoneme-to-allophone mapping is commonly attested in borrowing (cf. Aitchison 1991: 117; McMahon 1994: 210; Danchev 1995: 69 and Johanson 2002: 14) and constitutes a case where the original DL structure is relatively familiar to the RL's phonological system. Therefore, such cases do not require nativelike competence in the DL in order for adoption to be available to the borrowers as a strategy.

This preserved /l/ later became the input for the rest of the speech community with the normative connotation that the elite type of integration was to preserve the /l/ and to harmonise it by suffixing it with front suffixes. The motivation for following this elite norm might have been stronger for some members of the speech community than others, which consequently could have led to variation in the speech community. Some speakers could have adapted the elite's adoption by velarising the /l/. Therefore, the possibility that the data from the Nişanyan corpus (see examples 9 and 10) may partly mask existing variation in the contemporary Turkish speech community cannot be excluded as the corpus data are based on standard norms. The fact that the investigated phonological factors cannot explain the attested cases of velarisation and the discussion on the likely original borrowers suggest that the presence of velarisation is best explained by a later adaptation of the elite's adoptions in the broader Turkish speech community. Furthermore, the fact that the original borrowers' preference for adoption is still dominant today can be explained by their socioeconomic status as the elites of Ottoman society. In order to check if this reconstruction hypothesis is correct, we now need to look at a historical text.

5.1.5. Reconstruction of the diachronic development

Viguier (1790) is a Turkish textbook for French speakers and consists of three different types of text, namely lectures, dialogues and a French-Turkish dictionary. Here, only data from the lectures will be analysed as they constitute the only authentic text type based on speech by native speakers during lectures in school. In some of the lectures, Viguier also distinguishes between elite pronunciation by the scholars and vernacular pronunciation. In Viguier, eight words were identified producing a total of twenty-two tokens which have a word-final coda /l/ after a back vowel (rows 1 and 2 in Table 4).

Table 4. Suffixation of Arabic loanwords with word-final /l/ after a back vowel in Viguier (1790)

	Data type	Only front suffix	Only back suffix	Variation between front and back suffixes
1	8 words	5 (63 %)	0 (0 %)	3 (37%) *2 of these words have front suffix in elite speech but back suffix in vernacular speech*
2	22 tokens	16 (73 %)	6 (27 %)	-
3	Comparison with the words in the Nişanyan Corpus for Modern Standard Turkish	86 %	14 %	
4	Change from Viguier to Nişanyan: front > back	Words: 1 Tokens: 4	Words: 0 Tokens: 0	Tokens: 3/9 front>back
5	Same value in Viguier and Nişanyan	Words: 4 Tokens: 9	Words: 0 Tokens: 0	Tokens: 6/9

There is some variation in the distribution of these loanwords between front-suffixed ones and ambiguously suffixed ones. The predominance of front-suffixation in Viguier resembles the contemporary pattern found in Nişanyan (2002) as presented in row 3 in Table 4. Of the eight words, three display both front-suffixed and back-suffixed variants. For two of these words Viguier provides evidence of suffixation from both elite speech and vernacular speech. In elite speech front suffixes are preferred whereas in vernacular speech back suffixes are preferred. This indicates that harmonic preservation was more prevalent among elites than in the rest of the speech community. When we look at the tokens for these ambiguous words in rows 4 and 5 in Table 4, we see that the pattern of back suffixation, which we also find in Modern Standard Turkish, was more common in six out of nine tokens. This suggests that the variation might be due to ongoing language change where most but not all tokens of the same word are affected by the change process involving a transition from front to back suffixation.

The data also contain one word whose suffixation pattern deviates from the pattern in Modern Standard Turkish. In Viguier, the Arabic word /maːl/ has the accusative [mali] with front suffixation in four tokens but in Modern Standard Turkish it displays the opposite pattern with *mal* [mał] ‘goods, wealth’ in the nominative and *malı* [małɯ] in the accusative. Furthermore, in compound verbs in Modern Standard Turkish where the same word *mal* is followed by a vowel-initial auxiliary verb as in *mal olmak* [maːlołmak] and *mal etmek* [maːletmek], the final /l/ of *mal* is realised as front just as in Viguier (1790). This comparison provides further evidence for a process of language change whereby a historically preserved front /l/ among elites has later been velarised in the vernacular with the exception of

a few idiomatic expressions. The most likely explanation for this diachronic increase in velarisation is the frequency of use. More frequently used words would have maintained the front /l/ while it would have been velarised in less frequently used words, with idiomatic expressions being affected by this development to a lesser extent. Very important changes have taken place in the Turkish linguistic landscape since the foundation of the Turkish Republic in 1923. These changes are likely to have affected the frequency and use of Arabic loanwords. The Latin script replaced the Arabic-based one. Education reforms diminished the status of and proficiency in Arabic in the republican society. The language reform replaced many Arabic loanwords with native or newly coined alternatives and many of the remaining Arabic loanwords began to be used less frequently. Consequently, the intensity of contact with Arabic increased remarkably. In the case of loanwords, this also meant that it became more difficult to compare loanword forms with their Arabic originals and to base notions of correctness on such comparisons. Hence, these developments after 1923 are likely to have contributed to the existing trend towards velarisation in Arabic loanwords.

5.2. New Swedish borrowings

The translation experiment included seven proper names with a front word-final coda /l/ after a back vowel. Six of these names were expected to be integrated into Turkish as part of the task design and therefore occur at least twice per participant, while the seventh one was spontaneously included by some participants and displayed at least two tokens per participant. There were a total of 813 tokens corresponding to a mean occurrence of 68 per participant.

5.2.1. Phonological integration strategies in new Swedish borrowings

The nouns display some variation with a mean of phonetic quality preservation at 78.32 percent and a standard deviation of 16.99. The examples in (11) and (12) are based on the means for all seven nouns and do not necessarily reflect the results for the particular noun chosen as the example but only the *type* of integration strategy.

(11) Dominant strategy in Swedish borrowings: Preservation (Adoption), mean = 78 %

	Swedish output:	*Östermalm*	[œstɛrˈmalm]
Mophological environment			
Simplex		a.	œstɛrmalm
Suffixed (e.g. accusative suffix)	40 %	b1.	œstɛrmalm-i
	38 %	b2.	œstɛrmalm-ɯ
Underlying form in Turkish		c.	/œstɛrmalm/

(12) Alternative strategy in Swedish borrowings: Velarisation (Adaptation), mean = 22 %

	Swedish output: 'Östermalm'	[œstɛrˈmalm]
Morphological environment		
Simplex	a.	œstɛrmaɬm
Suffixed (e.g. accusative suffix)	b.	œstɛrmaɬm-ɯ
Underlying form in Turkish	c.	/œstɛrmaLm/

The dominant pattern is that the front quality of /l/ is preserved in both simplex and suffixed environments (see 11a and 11b). In the suffixed environment, three different strategies are attested. When the front quality is preserved in (11), this preservation can be broken down to two distinct patterns in suffixation. In (11b1) *harmonic preservation* is observed with a frequency of 40 percent among all suffixed cases. In (12b) *velarisation* is observed with a frequency of 22 percent. These two strategies are the same as the ones attested in Arabic loanwords and are both fully grammatical in Modern Standard Turkish. However, a third and innovative strategy is also observed in the Swedish data in (11b2) whereby the front /l/ is preserved but does not participate in the stem-suffix harmony processes, i.e. is deharmonised. Therefore, this strategy with a frequency of 38 percent will be referred to as *deharmonised preservation*. From the perspective of Modern Standard Turkish, deharmonised suffixation is strictly speaking ungrammatical.

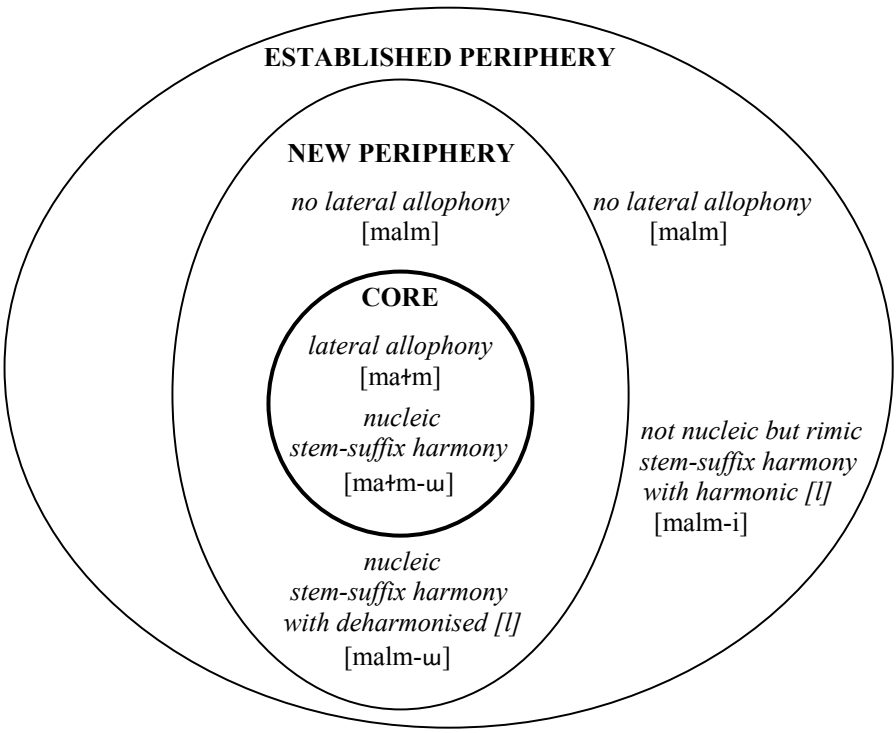
(13) Overview of attested integration strategies in new Swedish borrowings

STRATUM: Established periphery	STRATUM: New periphery	STRATUM: Core
FREQUENCY: 40%	FREQUENCY: 38%	FREQUENCY: 22%
a. Harmonic suffixation as in (11b1)	b. Deharmonised suffixation as in (11b2)	c. Regular suffixation as in (12b)
a l m - i	a l m - ɯ	a ɬ m - ɯ
[-high] [+high]	[-high] ~~[+back]~~ [+high]	[-high] [+high]
~~[+back]~~ [-back] → [-back]	[+back] - - - ▶ [+back]	[+back] - - - ▶ [+back]
[-round] - - - ▶ [-round]	[-round] - - - ▶ [-round]	[-round] - - → [-round]
Violation:	Violation:	Violation:
1) lateral allophony rules	1) lateral allophony rules	none
2) vowel-harmony rules		

As the overview in (13) shows, harmonic and deharmonised suffixation have the violation of the lateral allophony rules in common. However, deharmonised

suffixation involves one less violation than harmonic suffixation since it follows the rules of vowel harmony regarding stem-suffix harmony processes in the core. In this sense, deharmonised suffixation can be placed between the core and the established periphery in a new peripheral stratum. This is illustrated in Figure 4, where the periphery of the bilinguals' Turkish phonological lexicon is divided into two strata. The first stratum closer to the core is the new periphery with only one violation where deharmonised preservation can be placed. The outermost stratum is the established periphery in Modern Standard Turkish with two violations where harmonic preservation can be placed.

Figure 4. The status of words involving different integration strategies in the Swedish-Turkish bilinguals' Turkish phonological lexicon



5.2.2 The role of the phonological factors

One factor that could explain the choice between the preservation and velarisation of /l/ is the phonological environment of /l/ in the specific borrowings. In Table 5 we can see the seven words from the experiment with their phonetic transcriptions,

tokens and integration strategies. The words *Östermalm* and *Södermalm* are treated as one and the same phonological form here because their final rime is identical.

Table 5. Overview of the new Swedish borrowings integrated into Turkish in the experiment

Swedish borrowing	Meaning	Tokens (percent of all)	Swedish output form	Preservation of front /l/ (in percent)	Velarisation (in percent)
(Café) Emalj	'enamel' a place name	106 (13)	[ɛˈmalj]	96	4
Stockholm	a place name	255 (31.4)	[ˈstɔkːˌhɔlm]	89	11
Östermalm Södermalm	a place name a place name	227 (27.9)	[œstɛrˈmalm] [søːdɛrˈmalm]	78	22
saluhall	'market hall'	42 (5.2)	[ˈsɑːlʉˌhalːˌ]	71	29
Hudiksvall	a place name	60 (7.4)	[hɵdɪksˈvalː]	67	33
Gröndal	a place name	123 (15.1)	[grønˈdɑːl]	47	53
Total of tokens		813 (100)			
Mean of all words				75	25
Mean of all tokens		136		78	22
Standard deviation		87		17	

The word with the highest preservation score is *Emalj*. The nearly complete preservation in *Emalj* can be attributed to the effect of the palatal consonant /j/ following /l/. Thus, the Swedish dental /l/ receives a point of articulation that is further back than dental, closer to the post-alveolar articulation of the Turkish front /l/. This place of articulation leads to a closer phonetic match between the Swedish /l/ in this environment and the Turkish front /l/. These phonetic details seem to bias the participants towards preservation. We observe the opposite effect in *Gröndal* where the preservation frequency is lowest. The preceding vowel [ɑː] is the Swedish vowel with the farthest back place of articulation and involves a slight raising of the body of the tongue (Engstrand, 1999: 140). Therefore, there could be a slight velarisation of the /l/ in this environment in the Swedish input which is detected and utilised by the participants. However, no study on Swedish to date has investigated the precise pronunciation of /l/ in different environments. Therefore, it is uncertain if the input really contains some velarisation.

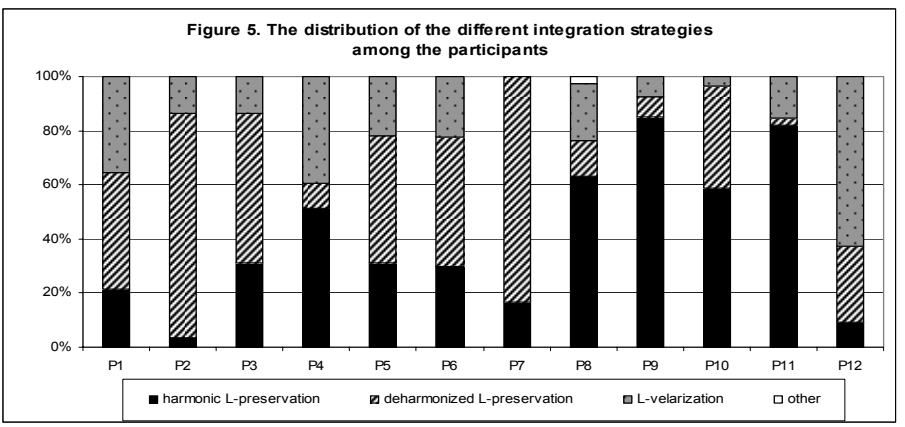
A possible contradiction to the latter conditioning effect is the word *Stockholm*, which has the second highest degree of preservation, despite the fact that we would expect the opposite effect if backness of the place of articulation and the raising of the body of the tongue in the preceding vowel [ɔ] were to play an equally important role here as in *Gröndal*. However, this type of velarisation bias might be neutralised by a stronger preservation bias here. *Stockholm* is namely the only word in the

experiment which is part of the monolingual lexicon of Modern Standard Turkish by virtue of being a European capital and has a preserved front /l/ in the standard pronunciation. This standard norm might be biasing the participants towards preservation. When the 255 tokens for *Stockholm* are removed from the data, the preservation mean of all tokens is not affected radically as it only falls from 78 to 72 percent. In the rest of the borrowings, /l/ is preceded by the short Swedish vowel [a] which has a central place of articulation and does not involve any raising. The little variation observed in the integration of the three borrowings with this vowel is therefore not likely to be due to any articulatory biases. In the great majority of the words and tokens, there is a clear and strong preference for preservation, which does not seem to stem from phonological factors but can be strengthened or weakened to a limited extent by phonetic details in the phonological environment.

5.2.3. Individual variation among the participants

Apart from variation depending on the phonological environment of /l/ in specific borrowings, there is also variation among the participants as regards their preference for different integration strategies in the suffixed environment. Figure 5 illustrates the distribution of the integration strategies among the participants. A fourth type of integration strategy called "other" is also attested here in one case for one single participant (participant 8). This involves the suffixation of a velarised [ɬ] with a front suffix and is disregarded in the analysis due to its very low frequency. All of the three other strategies are attested in all twelve participants but to varying degrees. This suggests that all three strategies are in competition with each other and can be viewed as part of every participant's phonological lexicon as previously suggested in Figure 4. In order to explain this individual variation, several background factors for the individual participants will be discussed in the following sections.

Figure 5. The distribution of the different integration strategies among the participants

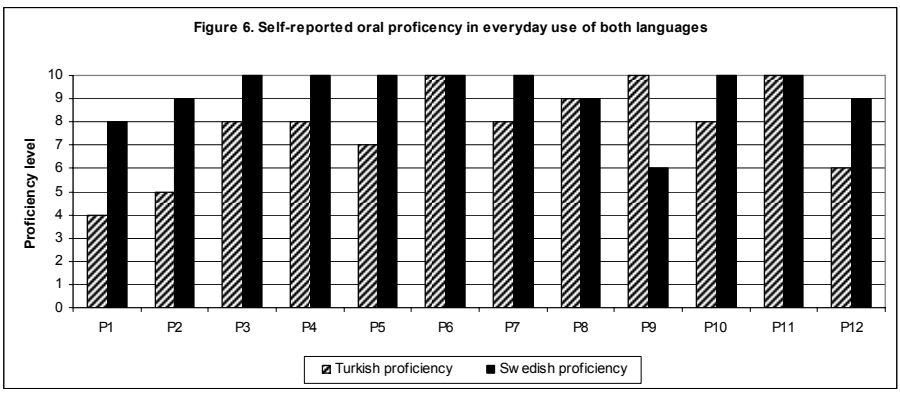


5.2.4. Immigrant bilingualism in the Swedish context

The Turkish-Swedish bilingualism attested in the Swedish context is due to the immigration of Turkish speakers to Sweden after the 1960s. The degree of community bilingualism is high among Turkish speakers, where most but not all members of the first generation have functional proficiency in Swedish. A characteristic trajectory for the language development of the second generation is that they begin as Turkish-dominant in early childhood but become either balanced bilinguals or Swedish-dominant later with increasing years of schooling. The strongest domains of use for Turkish are the family and religion while Swedish is stronger in other domains especially in academic and formal contexts. On Thomason's borrowing scale (2001: 70–71) the Swedish context can be categorised as having the highest degree of contact intensity i.e. Degree 4.

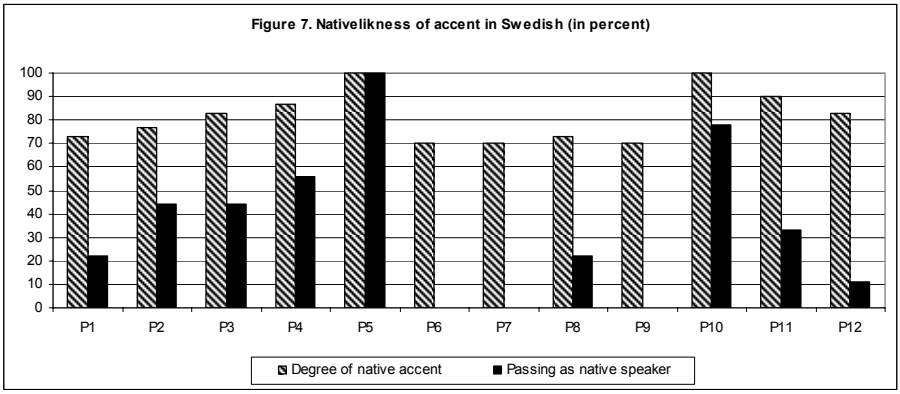
5.2.5. General proficiency levels in both languages

The proficiency levels were documented on the basis of self-reports where the participants were asked to evaluate their level in both languages by answering the question "How comfortably and effectively can you express yourself in Turkish and Swedish in everyday situations on a scale of 0–10?" The proficiency results are summarised in Figure 6. Using self-reporting as a form of evaluation has obvious drawbacks such as underestimation. In Figure 6, two individuals have a reported proficiency level lower than six and two others a reported level lower than seven for either of their languages despite the fact that they were all evaluated to have advanced functional proficiency in both languages on the researcher's overall assessment based on several components. Eight participants reported higher oral proficiency in Swedish than in Turkish, three reported the same oral proficiency for both languages and one participant reported higher proficiency for Turkish than for Swedish. The participants were asked to evaluate dominance relations in their written proficiency by answering the question "Is there a language in which you can express yourself best in written form or do you have the same level in all your languages?" Nine participants reported Swedish as their strongest written language, one participant reported the same level for both languages and two participants reported Turkish as their strongest written language. Although there is some variation among the participants, the general picture is one where Swedish is the dominant language both in the oral and written modalities.



5.2.6. Nativelikeness in both languages

The nativelikeness of the participants' pronunciation in both languages was evaluated based on audio-recordings. In the evaluation of their Turkish, the expert linguist evaluated all participants as native speakers of Turkish. The evaluation of their nativelikeness in Swedish was carried out by a panel. Two different measures of nativelikeness are presented in Figure 7. The first measure *degree of native accent* is based on the mean of the three panelists' evaluation of the participants' degree of foreign accent on a scale of 0–10 based on one task. Later the foreign accent score was subtracted from ten to obtain the score for 'degree of native accent'. The second measure *passing as a native speaker* is based on the evaluation of the participants' performance on three tasks by three different panelists. Thus, nine different scores were obtained for every participant, and the measure expresses in percent in how many of these nine instances the participants could pass as native speakers of Swedish. All participants obtained degree-of-native-accent scores equal to or above seven out of ten, while nine of the twelve participants could pass as native speakers according to the evaluation of at least one panelist on one of the tasks. Given that all the participants had started learning Swedish prior to puberty, it is not surprising that they have advanced-to-nativelike pronunciation in Swedish.



5.2.7. Specific phonological competence in the Turkish periphery

The command of a specific phonological property of Turkish, namely the harmonic suffixation pattern in established loanwords in the periphery was also investigated among the borrowers. The reason for checking for this type of specific competence in Turkish was the fact that bilinguals' knowledge of their first and second languages can diverge from monolingual speakers' knowledge in the respective languages. It should not be assumed that the bilinguals will have exactly the same competence in all aspects of Turkish phonology as monolingual speakers of Turkish do, especially in the current context where Turkish is a minority language dominated

by the majority language Swedish. The scores in Table 6 show in what percentage of all cases in the test the participants produced a standard suffixation pattern which is associated with the periphery (as in 7b and 8b). In cases where they did not produce such a pattern they velarised the /l/ and suffixed it with a [+back] suffix (as in 7a and 8a) which is not standard but can be associated with the core. Five out of twelve participants got full scores, three participants received scores just under 80 percent, while three participants scored just under 70 percent and one participant had a score just above 30 percent. The group mean was 80.56 percent with a standard deviation of 20.72 indicating advanced competence in the established periphery. However, the fact that seven out of twelve participants performed under the 80-percent level suggests that the established periphery regarding /l/ might have been weakened in the immigrant minority context. This would also explain why a new peripheral stratum closer to the core (see Figure 4) could arise in the first place.

Table 6. Harmonic preservation in established loanwords in the Turkish periphery (in percent of all cases)

Integration strategy	P1	P2	P3	P4	P5	P6	P7	P8	P9	P0	P1	P2
Standard harmonic preservation	33	78	100	67	78	100	67	100	100	78	100	67
Non-standard velarisation and back suffixation	67	22	0	33	22	0	33	0	0	22	0	33

5.2.8. Frequency and share of Turkish use

The participants were asked to report how often they used Turkish in everyday life and what the average share of Turkish was in their everyday language use compared to other languages such as Swedish. Table 7 summarises the results. Of the twelve participants, ten reported using Turkish on a daily basis while nine of these reported using it between 25 and 50 percent on an average day. This pattern points to a stable bond between the majority of the participants and their Turkish.

Table 7. Frequency and degree of Turkish

Use data	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Frequency of Turkish use	every day	every day	every day	every day	every day	every day	every day	every day	every day	every day	every week	every week
Share of Turkish in daily average language use (in percent)	25-40	25-40	25-40	25-40	less than 25	25-40	50	50	25-40	25-40	less than 25	less than 25

5.2.9. Explaining choice of integration strategy with individual background factors

We have previously seen that phonological factors could explain some of the variation among the different borrowings. The next question is if the data on individual background factors can also contribute to explaining the attested variation among the participants as seen in Figure 5. To answer this question, statistical correlation analyses were carried out in which the three attested integration strategies for the individual participants were used as the dependent variables (see rows 2–4 in Table 8). The independent variables were general oral proficiency in both languages, oral dominance in Swedish, nativelikeness of accent in Swedish, periphery competence in Turkish and share of daily use of Turkish (see columns 2–7 in Table 8). Oral dominance in Swedish was calculated by subtracting the general oral proficiency scores for Turkish from those for Swedish. The one-tailed Pearson correlation analysis was preferred here because the directionality of the correlations, i.e. whether the correlation will be positive or negative, is predictable from the context.

Table 8. Correlations between attested integration strategies and individual background factors (N=12, one-tailed Pearson)

Integration strategy	Oral proficiency in Swedish	Oral proficiency in Turkish	Oral dominance in Swedish	Nativelike-ness of accent in Swedish	Periphery competence in Turkish	Share of daily use of Turkish
Total preservation (adoption)	r = 0.054 p = 0.433	r = 0.403 p = 0.097	r = -0.324 p = 0.152	r = -0.022 p = 0.473	r = 0,390 p = 0,105	r = 0.404 p = 0.096
Harmonic preservation	r = -0.266 p = 0.202	r = 0.731** p = 0.003	r = -0.785** p = 0.001	r = 0.161 p = 0.309	r = 0,530* p = 0,038	r = -0.012 p = 0.486
Deharmonised preservation	r = 0.284 p = 0.186	r = -0.470 p = 0.061	r = 0.567* p = 0.027	r = -0.179 p = 0.288	r = -0,271 p = 0,197	r = 0.281 p = 0.188
Velarisation (adaptation)	r = - 0.026 p = 0.468	r = -0.416 p = 0.089	r = 0.350 p = 0.132	r = 0.040 p = 0.450	r = -0,418 p = 0,088	r = -0.445 p = 0.074

** Significance at the 0.01 level * Significance at the 0.05 level

The correlation results in Table 8 show that only three of the six investigated individual background factors deliver statistically significant correlations. Before we interpret these correlations, it should be noted here that there are significant internal correlations between some of the background factors. Since oral dominance in Swedish is a composite of oral proficiency in Turkish and Swedish, it correlates strongly with both. Periphery competence in Turkish also turns out to correlate

significantly (two-tailed Pearson: r = 0.815, p = 0.001) with oral proficiency in Turkish. This suggests that they are both measuring different aspects of the same phenomenon, namely overall competence in Turkish. The analysis shows that preference for harmonic preservation as an integration strategy correlates positively with oral proficiency in Turkish and with periphery competence in Turkish but negatively with oral dominance in Swedish at the 0.05 level. This means that the more a speaker uses harmonic preservation in established loanwords in Turkish, the more likely he/she is to prefer the same integration strategy in new borrowings. Furthermore, the higher a speaker evaluates his/her own oral proficiency in Turkish, either in absolute terms (oral proficiency in Turkish) or relative to oral proficiency in Swedish (oral dominance in Swedish), the more likely the speaker is to prefer harmonic preservation in new borrowings. Deharmonised preservation, on the other hand, correlates positively with oral dominance in Swedish at the 0.05 level. This means that the more a speaker is orally dominant in Swedish, the more likely he/she is to prefer deharmonised preservation. The statistical analyses do not show that velarisation can be explained by the investigated background factors.

Regarding oral dominance in Swedish as a relative measure, what matters more in the minority context is variation in oral proficiency in Turkish (standard deviation: 1.96) rather than variation in oral proficiency in Swedish (standard deviation: 1.22). The greater variation as measured in standard deviation is namely found in the minority language Turkish. The chances of developing advanced oral proficiency are thus greater in the majority language than in the minority language. Therefore, the overall picture that emerges from the interpretation of these significant correlations is that the more competent speakers of Turkish (who also happen to be more balanced bilinguals with less oral dominance in Swedish) show a preference for harmonic preservation, while the more Swedish-dominant speakers show a preference for deharmonised preservation.

Let us evaluate the three integration strategies in terms of their faithfulness to the original output of the donor language Swedish and their faithfulness to the phonological rules of the recipient language Turkish. Table 9 shows that harmonic preservation constitutes the optimal integration strategy because it is faithful to both Swedish and Turkish (in the established periphery) provided that the speaker is highly competent in the Turkish periphery. The other integration strategies, on the other hand, involve preferring faithfulness to one language over faithfulness to the other language. Deharmonised preservation is more faithful to Swedish, while velarisation is more faithful to Turkish (in the core). The results show that faithfulness to Swedish, i.e. preservation of /l/, is very dominant (78 percent), possibly due to the majority status of Swedish and the borrowers' advanced proficiency in Swedish. Once we establish that harmonic preservation facilitates optimal faithfulness to both languages, it seems natural that more balanced bilinguals prefer this strategy over others. Similarly, since deharmonised preservation involves preferring faithfulness to Swedish to faithfulness to Turkish, it also makes sense that more Swedish-dominant borrowers should prefer this strategy.

The background factor that provided the strongest correlations and the only correlation that was significant in both harmonic and deharmonised preservation in Table 8, was oral dominance in Swedish. In addition to its statistical robustness, this background factor has two further advantages. Firstly, it concentrates information from two proficiency factors in one single factor. Secondly, as a relative measure it is more reliable than the separate absolute proficiency measures as the speakers can be expected to evaluate more competently if they speak one language better than the other compared to how they evaluate their absolute level in both languages.

Table 9. Integration strategies in terms of their faithfulness to different strata in the phonological lexicons of Swedish and Turkish

Integration strategy	Faithfulness to original Swedish output	Faithfulness to phonological rules in the established Turkish periphery	Faithfulness to phonological rules in the Turkish core
Harmonic preservation	✓	✓	××
Deharmonised preservation	✓	×	×
Velarisation	×	–	✓

Legend: ✓: completely faithful, ×: not faithful to one rule, ××: not faithful to two rules, –: does not apply

6. Summary and comparison of the analysed results

One commonality between the cases is that the tendency to preserve the front quality of /l/, i.e. the preference for adoption rather than adaptation, is very strong in both contexts of borrowing (86 present in Arabic loanwords and 78 percent in Swedish borrowings). This is particularly striking because the phonetic quality of /l/ in the donor language output is not related to any phonemic contrasts in either Arabic or Swedish. Hence, adaptation of /l/ by velarisation would not lead to any loss of lexical contrasts between potential minimal pairs. Since the phonetic realisation [l] exists in Turkish, the issue of being able to perceive its original phonetic quality is not particularly tricky, even for speakers with no or low phonetic-phonological competence in the donor languages. Moreover, in both discussed cases the original borrowers have levels of phonetic-phonological competence on or above the intermediate level (see the last column in Table 11). These facts mean that adoption was an available strategy in these particular speech communities.

The analysis of the phonological factors has shown that they play a limited role in the two investigated cases. In the Arabic case, no phonological factor could be identified as relevant for the choice of integration strategy. In the Swedish case, the adjacent phonological environment of /l/ was shown to have some effect, but it did not influence the choice of strategy profoundly. Therefore, it seems that the clear

preference in the data for the preservation of the original /l/ is best explained by sociolinguistic factors in both cases. Table 10 summarises the sociolinguistic characteristics of the two contexts. General proficiency and phonetic-phonological competence in the donor language are also included here because they are often strongly determined by the sociolinguistic circumstances although they are not sociolinguistic factors per se.

Table 10. Main sociolinguistic characteristics of the two contexts of borrowing

DL *Type of bilingualism*	Status of DL	Degree of bilingual-ism in the RL community	Intensity of contact with DL (1–4)	Domains of use for DL	Modality of use for DL	Borrower profile	General proficiency in DL among borrowers	Phonetic-phonological competence in DL among borrowers
ARABIC *Elite bilingualism*	Minority language with high prestige	Low in general High among elites	Degree 2 in general Degree 3 among elites	Education Law Research Religion	Mainly receptive	Educated elites	Low-to-intermedi-ate	Intermediate-to-advanced
SWEDISH *Immigrant bilingualism*	Majority language	High	Degree 4	Nearly all except for family and religion	Receptive and productive	Second generation immigrants	Advanced-to-nativelike	Advanced-to-nativelike

Legend: DL = donor language, RL = recipient language (Turkish). The degree of intensity of contact is based on Thomason's increasing borrowing scale (2001: 70–71).

The strong preference for adoption rather than adaptation can be explained satisfactorily by the relatively high intensity of contact (see Table 10) and the high prestige that both Arabic and Swedish have in their sociolinguistic contexts. In the Swedish case this high prestige is matched by advanced-to-nativelike proficiency in the donor language because Swedish is the majority language. However, in the Arabic context the type of minority language that Arabic was did not lead to such high proficiency levels. Nevertheless, both donor languages can be claimed to have some kind of dominance over the recipient language Turkish among the borrowers. In the Arabic case, this can be called *weak dominance* because the high prestige is not matched by equally high proficiency levels in Arabic. In the Swedish case, we can speak of *strong dominance* or *dominance proper* because the high prestige is matched by equally high proficiency levels in Swedish (cf. Johanson, 2002: 9 for a similarly central role for dominance).

The main difference between the circumstances of borrowing is that adoption through harmonic preservation in the periphery was already an established alternative to adaptation in the Swedish case. In the Arabic case, this periphery was not yet established in the phonological lexicon. Therefore, in the Arabic case the

alternative to adaptation had to arise through the phonological integration process itself. From this perspective, especially given that harmonic preservation offers optimal faithfulness to both the donor language and the recipient language, it is surprising that this integration strategy is preferred in only 40 percent of all cases in the Swedish context. This was explained by the dominance of Swedish as a majority language. It was argued that the minority status of Turkish has consequences for some relevant aspects of phonological competence in Turkish among the bilinguals. The attested weakening of the established periphery of Turkish was demonstrated to reduce the productivity of that periphery for the participants. The study has shown that when the sociolinguistic motivation to adopt a front /l/ is coupled with the weakening of the established periphery, the result is a third and innovative integration strategy, namely deharmonised integration.

We do not have any evidence suggesting that deharmonised preservation was also used initially in the integration of Arabic loanwords. Due to the Arabic-based writing system and the lack of transcription texts that record the phonetic quality of /l/, it is almost impossible to detect such evidence in written sources. Therefore, the possibility that deharmonised preservation might have preceded harmonic preservation as the initial adoption strategy in the Arabic case cannot be fully discounted. Deharmonised preservation with its violation of lateral allophony rules could have been the first diachronic step towards harmonised preservation with its further violation of the rules of vowel harmony between stems and suffixes. Such a development would look exactly as in Figure 4, where the new periphery would have diachronically preceded the established periphery. Another possibility is that harmonic preservation emerged directly without a transitory phase of deharmonised preservation. The previously mentioned Ottoman orthographic convention whereby the Arabic /l/ is classified as a front segment and the prominent role of the written modality for Arabic in Ottoman society support the latter hypothesis. It is more likely that the word-final Arabic /l/ would have been harmonised directly based on these orthographic conventions. Therefore, Figure 2 probably constitutes a better representation of the diachronic development.

It is also tempting to ask what kind of preservation strategy would have emerged in the Swedish context if harmonic preservation had not existed as an established strategy to begin with. Would harmonic preservation still have emerged as in the Arabic case, or would only deharmonised preservation have emerged? The fact that the latter integration strategy *did* emerge despite the obvious advantages of the former points to the strength of deharmonised preservation in this Swedish-dominant context. Two further arguments suggest that only deharmonised preservation would have emerged in such a hypothetical scenario. Firstly, the orthographic support in the Arabic case is not present in the Swedish case. Secondly, as deharmonised preservation involves one less violation than harmonic preservation, it constitutes a less dramatic case of language change. Therefore, it is possible to conjecture that it was the intertwining of special phonological and sociolinguistic circumstances in the Arabic case that led to the emergence of a periphery in the Turkish lexicon as an

instance of contact-induced language change which had far-reaching consequences for the phonological system of Turkish such as altering the rules of vowel harmony.

7. Conclusion

Two findings of the present study have important repercussions for theories regarding the phonological integration of lexical borrowings. Firstly, the study found that phonetic details do play a role, albeit a limited one, in the perception of bilingual borrowers. This finding lends support to the perceptual stance and contradicts Paradis & LaCharité's (1997 and 2008) claim that phonetic details which are not related to phonemic contrasts in the donor language do not play a role in borrowing by bilinguals. This also undermines the proposal by Heffernan (2005) that there should be division of labour between the perceptual stance and the phonological stance stating that the former is valid for monolingual borrowing and the latter for bilingual borrowing. The conclusion we can draw from this finding is that any theory of phonological integration should allow for perceptual effects regardless of the competence of the borrowers in the donor language. A further word of caution for studies on bilingual borrowing regards the importance of checking for phonological competence in the recipient language if it is a minority language. The weakening of the established periphery in Turkish that was observed in the present study makes a strong case for the need to pay attention to the borrowers' competence in the recipient language as well as in the donor language (cf. Oñederra, 2009 for a similar case in Spanish-Basque bilinguals).

The second theoretically relevant finding is that sociolinguistic factors which are rooted in language dominance relations in the context of borrowing play a crucial role in bilingual borrowing, both when the degree of community bilingualism is low (the Arabic case) and when it is high (the Swedish case). In the Arabic case, the bilingual borrowers who were in the minority have still succeeded in setting the standard for the phonological integration for the larger speech community. This is exactly what Paradis & LaCharité (2008) found for English loanwords in Old Quebec French, where the degree of community bilingualism was low. However, it should be noted that the impact of the bilinguals is contingent upon their socioeconomic status in the recipient speech community. Paradis & LaCharité (2008) do not remark on the status of the bilinguals in their study. In the Arabic case in the present study, the borrowers belong to an elite minority with great sociolinguistic capital in the speech community. This points to the need to pay more attention to the socioeconomic status of the borrowers in studies on phonological integration. The central role played by different sociolinguistic factors in the present study is in line with previous research on bilingual borrowing (Poplack, Sankoff & Miller 1988; Thomason 2001; Sakel 2007; McMahon 1994 and Matras 2007). Several studies have shown that sociolinguistic factors are especially important for the prevalence of adoption over adaptation as an integration strategy (cf. Thomason 2001: 135 on early Russian loanwords in Yupik; Poplack, Sankoff & Miller, 1988

on English loanwords in French; and Sandfeld 1930 and Marioţeanu et al. 1977 on Greek loanwords in Romanian).

However, the greater impact of sociolinguistic factors compared to phonological factors in the present study does not necessarily lend support to the view that sociolinguistic factors can "trump" phonological factors given the right social circumstances of contact (cf. Thomason 2001: 85). In both cases of borrowing, it was shown that adoption was available as a strategy for the borrowers. Once adoption is available, sociolinguistic factors are free to trump phonological factors in the sense that adoption is preferred to adaptation. However, this does not mean that sociolinguistic factors could override phonological factors if the phonological structure in question were absolutely more marked or relatively more foreign to the recipient language than in the present study. If the borrowers had difficulty in perceiving and producing the foreign donor structures correctly, sociolinguistic factors could hardly be expected to result in adoption. As the present study has demonstrated, phonological and sociolinguistic factors are inextricably intertwined in the phonological integration process and neither type of factor should be underestimated or neglected. Positive attitudes towards the donor language are the primary driving force behind the borrowing of lexemes to begin with, which can also create a powerful incentive to adopt them in their original form. In this sense sociolinguistic factors do have a primacy. However, such a willingness to adopt is necessarily and crucially constrained by the borrowers' ability to perceive and produce donor-language structures in their original form. From this perspective, sociolinguistic factors such as dominance relations initially set the stage where the relevant phonological abilities in the borrowers develop. Later these abilities constitute the precondition for the sociolinguistic factors' impact on the choice between adoption and adaptation.

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References

Adler, Allison N. 2006. Faithfulness and perception in loanword adaptation: A case study from Hawaiian. *Lingua* 116, 1024–1045.

Aitchison, Jean 1991[2]. *Language change: progress or decay?* Cambridge: Cambridge University Press.

Aronoff, Mark & Anshen, Frank 2001. Morphology and the lexicon: Lexicalization and productivity. In: Spencer, Andrew & Zwicky, Arnold M. (eds.) *The handbook of morphology*. Oxford: Blackwell Publishers Ltd. 237–247.

Boersma, Paul & Hamann, Silke 2009. Loanword adaptation as first-language phonological perception. In: Calabrese, Andrea & Wetzels, W. Leo (eds.) *Loan phonology*. Amsterdam: John Benjamins Publishing Company. 11–58.

Calabrese, Andrea 2009. Perception, production and acoustic inputs in loanword phonology. In: Calabrese, Andrea & Wetzels, W. Leo (eds.) *Loan phonology*. Amsterdam: John Benjamins Publishing Company. 59–114.

Calabrese, Andrea & Wetzels, W. Leo 2009. Loan phonology: Issues and controversies. In: Calabrese, Andrea & Wetzels, W. Leo (eds.) *Loan phonology*. Amsterdam: John Benjamins Publishing Company. 1–10.

Croft, William 2000. *Explaining language change: An evolutionary approach.* Harlow, England: Pearson Education Limited.

Danchev, Andrei 1995. Notes on the history of word-final /g/ in English. In: Fisiak, Jacek (ed.) *Linguistic Change under contact conditions.* Berlin: Mouton de Gruyter. 55-79.

Engstrand, Olle 1999. Swedish. In: *Handbook of the International Phonetic Association. A guide to the use of the International Phonetic Alphabet.* Cambridge: Cambridge University Press. 140–142.

Friesner, Michael L. 2009. The adaptation of Romanian loanwords from Turkish and French. In: Calabrese, Andrea & Wetzels, W. Leo (eds.) *Loan phonology*. Amsterdam: John Benjamins Publishing Company. 115–130.

Garlén, Claes 1988. *Svenskans fonologi*. Lund: Studentlitteratur.

Heffernan, Kevin 2005. Phonetic similarity and phonemic contrast in loanword adaptation. *Toronto Working Papers in Linguistics* 24, 117–123.

Itô, Junko & Mester, Armin 1999. The phonological lexicon. In: Tsujimura, Natsuko (ed.) *A handbook of Japanese linguistics*. Oxford: Blackwell. 62–100.

Jacobs, Haike & Gussenhoven, Carlos 2000. Loan phonology: perception, salience, the lexicon, and OT. In: Dekkers, Joost & van der Leeuw, Frank & van der Weijer, Jeroen (eds.) *Optimality Theory: Phonology, syntax and acquisition*. Oxford: Oxford University Press. 193-210.

Johanson, Lars 2002. *Structural factors in Turkic language contacts*. London: Curzon.

Kerslake, Celia 1998. Ottoman Turkish. In: Johanson, Lars & Csató, Éva Á. (eds.) *The Turkic languages*. London: Routledge. 179–202.

Kim, Hyunsoon 2009. Korean adaptation of English affricates and fricatives in a feature-driven model of loanword adaptation. In: Calabrese, Andrea & Wetzels, W. Leo (eds.) *Loan phonology*. Amsterdam: John Benjamins Publishing Company. 155–180.

LaCharité, Darlene & Paradis, Carole 2005. Category preservation and proximity versus phonetic approximation in loanword adaptation. *Linguistic Inquiry* 36, 223–258.

Lewis, Geoffrey 2002. *The Turkish language reform. A catastrophic success*. Oxford: Oxford University Press.

Marioţeanu, Matilda Caragiu & Glosu, Stefan & Ionescu-Ruxandolu, Liliana & Todoran, Romulus 1977. *Dialectoligie română*. Bucharest: Editura Didactica şi Pedagogică.

Matras, Yaron 2007. The borrowability of structural categories. In: Matras, Yaron & Sakel, Jeanette (eds.) *Grammatical borrowing in cross-linguistic perspective.* Berlin: Mouton de Gruyter. 31–73.

McMahon, April M. S. 1994. *Understanding language change*. Cambridge: Cambridge University Press.

Nişanyan, Sevan 2002. *Sözlerin soyağacı: Çağdaş Türkçenin etimolojik sözlüğü*. İstanbul: Adam Yayınları.

Oñederra, Miren Lourdes 2009. Early bilingualism as a source of morphonological rules for the adaptation of loanwords: Spanish loanwords in Basque. In: Calabrese, Andrea & Wetzels, W. Leo (eds.) *Loan phonology*. Amsterdam: John Benjamins Publishing Company. 193–210.

Paradis, Carole & LaCharité, Darlene 1997. Preservation and minimality in loanword adaptation. *Journal of Linguistics* 33, 379–430.

Paradis, Carole & Prunet, Jean-François 2000. Nasal vowels as two segments: Evidence from borrowings. *Language* 76, 324–357.

Paradis, Carole & LaCharité, Darlene 2008. Apparent phonetic approximation: English loanwords in Old Quebec French. *Journal of Linguistics* 44, 87–128.

Peperkamp, Sharon & Dupoux, Emmanuel 2003. Reinterpreting loanword adaptations: the role of perception. In: Solé, Maria-Josep & Recasens, Daniel & Romero, Joaquin (eds.) *Proceedings of the 15th International Congress of Phonetic Sciences*. Barcelona: Universitat Autònoma de Barcelona. 367–370.

Poplack, Shana & Sankoff, David & Miller, Christopher 1988. The social correlates and linguistic processes lexical borrowing and assimilation. *Linguistics* 26, 47–104.

Prokosch, Erich 1996. Zur Konsonantenvokalharmonie im Osmanisch-Türkischen und im heutigen Türkischen: Der Vokalismus der Sprossvokale, der persischen İżāfet und der türkischen Suffixe an Fremdwörtern. *Grazer Linguistische Studien* 45, 33–43.

Prokosch, Erich 1997. Der Substandard des osmanischen Gelehrtenarabisch. *Grazer Linguistische Studien* 48, 53–68.

Sandfeld, Kristian 1930. *Linguistique balkanique*. Paris: Klincksieck.

Sakel, Jeanette 2007. Types of loan: Matter and pattern. In: Matras, Yaron & Sakel, Jeanette (eds.) *Grammatical borrowing in cross-linguistic perspective.* Berlin: Mouton de Gruyter. 15–29.

Silverman, Daniel 1992. Multiple scansions in loanword phonology: evidence from Cantonese. *Phonology* 9, 289–328.

Türk Dil Kurumu 2010. *Büyük Türkçe sözlük*. http://tdkterim.gov.tr/bts/

Thelwall, Robin & Sa'adeddin, M. Akram 1999. Arabic. In: *Handbook of the International Phonetic Association. A guide to the use of the International Phonetic Alphabet*. Cambridge: Cambridge University Press. 51–54.

Thomason, Sarah G. 2001. *Language contact. An introduction.* Washington, D.C.: Georgetown University Press.

Vendelin, Inga & Peperkamp, Sharon 2004. Evidence for phonetic adaptation of loanwords: An experimental study. *IV e Journées d'Études Linguistiques de l'Université de Nantes*, 127–131.

Viguier, Pierre-François 1790. Élémens de la langue turque. Constantinople: L'Imprimerie du Palais de France.

Watson, Janet C. E. 2002. *The phonology and morphology of Arabic*. Oxford: Oxford University Press.

Yıldız, Şerife & Abalı, Ünal 2003. Islamische oder Europäische Bildung? Fremdsprachliche Aspekte des türkischen Bildungswesens. *Jahrbuch Deutsch als Fremdsprache* 29, 55–93.

Yip, Moira 1993. Cantonese loanword phonology and Optimality Theory. *Journal of East Asian Linguistics* 2, 261–291.

Yip, Moira 2002. Necessary but not sufficient: perceptual loanword influences in loanword phonology. In: Kubozono, Haruo (ed.) *The Journal of the Phonetic Society of Japan, Special issue on aspects of loanword phonology* 6, 4–21.

Zimmer, Karl 1985. Arabic Loanwords and Turkish phonological structure. *International Journal of American Linguistics* 51, 623–625.

Zimmer, Karl & Orgun, Orhan 1999. Turkish. In: *Handbook of the International Phonetic Association. A guide to the use of the International Phonetic Alphabet.* Cambridge: Cambridge University Press. 154–156.

II

Study II

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III

(submitted manuscript)

Adoption in Loanword Phonology: Looking Beyond Linguistic Competence

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1 Introduction

Despite the upswing in research on loanword phonology since the 1990s, only a minority of the researchers who have published within this field have paid serious attention to the role of bilingualism (Poplack et al. 1988; Paradis & LaCharité 1997, 2008; LaCharité & Paradis 2005; Friesner 2009a; Aktürk-Drake 2011, 2014). Moreover, adaptation (i.e. the alteration of original structures) has received much more attention as a loanword integration strategy than adoption (i.e. the preservation of original structures). An important insight that has emerged from these bilingually oriented studies that discuss the choice between adaptation and adoption is that linguistic competence in the donor language has crucial importance but also that we need to look beyond linguistic competence in order to offer a more satisfactory explanation for the outcome of the loanword integration process.

To paraphrase Friesner (2009a), loanword phonology cannot be reduced to foreign accent. Even when borrowers have the competence to produce a specific word accurately in the donor language (which is often their second language), they are sometimes known to alter its pronunciation when they produce the same word as a loanword in their first language, which is the recipient language (Friesner 2009b; Aktürk-Drake 2014). Several authors have, therefore, argued that we also need to take sociolinguistic factors into consideration (Thomason 2001; Paradis & LaCharité 1997, 2008; Friesner 2009a, 2009b; Aktürk-Drake 2011, 2014). Hence, two questions seem to be of central importance for the choice between adaptation and adoption:

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1. Do the borrowers/users of loanwords have the linguistic competence to produce a specific donor-language structure accurately?
2. Provided that the borrowers/users have this competence, do they also have sufficient sociolinguistic incentive to transfer such accurate production to the recipient language in loanwords?

2 Objectives

This paper will investigate the prevalence of adoption in loanwords in several different bilingual groups of Turkish speakers. The structural focus is word-initial onset clusters that are present in the original forms of French and English loanwords that are established words in contemporary Turkish. As native Turkish words lack onset clusters altogether, the main question regarding the integration of such clusters in loanwords is if Turkish speakers will *adapt* the clusters by breaking them up through epenthesis or if they will *adopt* them as innovations by preserving them as clusters.

The two theoretical objectives of the paper are as follows: Firstly, it will be investigated how much linguistic competence and sociolinguistic incentive contribute to a speaker's rate of cluster adoption. This will mainly be done by exploring the effect of three explanatory variables in a multiple regression analysis: linguistic competence, language dominance and language use. Secondly, the role of different *types of bilingualism* in Turkish and a language with onset clusters (henceforth a *cluster language*) will be discussed by looking at the loanword integration patterns of different bilingual groups. Two major bilingual groups of Turkish speakers will be investigated: *elite bilinguals* in Turkey and *heritage bilinguals* in Sweden. Moreover, these two major groups consist of two minor groups each: early versus late successive bilinguals in Turkey, and bilinguals in Sweden with an even versus mixed trajectory of language development. There is also a monolingual control group in Turkey.

Based on the findings of previous studies the following five hypotheses will be tested:

Hypothesis 1: The monolinguals in Turkey will display significantly lower rates of cluster adoption than the bilinguals in Turkey. This is based on the assumption that competence in a cluster language is a prerequisite for cluster adoption (*Assumption 1*).

Hypothesis 2: The heritage bilinguals in Sweden will display significantly higher rates of cluster adoption than the elite bilinguals in Turkey. This is based on the assumptions that the heritage bilinguals will have both higher competence (*Assumption 2a*) and higher incentive (*Assumption 2b*) to adopt clusters.

Hypothesis 3: The early successive bilinguals in Turkey will display significantly higher rates of cluster adoption than the late successive bilinguals in Turkey. This is based on the assumption that the former group will have higher linguistic competence due to higher exposure to a cluster language and higher initial motivation to acquire it (*Assumption 3*).

Hypothesis 4: The even-trajectory heritage bilinguals in Sweden will display significantly higher rates of cluster adoption than the mixed-trajectory heritage bilinguals in Sweden. This is based on the assumption that the latter group will have lower incentive to adopt clusters due to having partly grown up in a majority-language context in Turkey (*Assumption 4*).

Hypothesis 5: Regression models that include a competence variable and at least one sociolinguistic variable that measures the incentive to adopt clusters will outperform regression models that only include a variable that measures competence. This is based the assumption that competence alone cannot account for the outcome of loanword integration in an adequate way (*Assumption 5*).

The theoretical bases for the above hypotheses and the assumptions behind them will be discussed in detail in the next section.

3 Background

3.1 Loanwords with original word-initial onset clusters in Turkish

Turkish is one of many languages in the world that do not allow any onset clusters in their native inventory (Maddieson 2011). However, since the 14th century contact with mainly Greek, Italian, French and English has resulted in the borrowing of a great number of words with original onset clusters into Turkish. In Nişanyan's (2007) etymological dictionary of Turkish with just under 16 000 entries, the number of loanwords with original word-initial consonant clusters amount to 514 (i.e. 3.3 percent of the entire dictionary). Of these, 75 percent are indicated by Nişanyan (2007) to have been borrowed between the years 1800 and 1960, predominantly from French and

English. Hence, most of these established loanwords have been part of Turkish speakers' lexicons for several generations.

French was the most popular foreign language in Turkey roughly between 1850 and 1950 but since the1950s English has gradually replaced it. According to TNS Opinion & Social's survey Special Eurobarometer 243 (2006), one percent of Turkey's population report that they can converse in French and 17 percent in English. 34 percent of the latter group (i.e. only 6 percent of the total population) report that their English is good or very good. Hence, despite increasing popularity, good knowledge of the most common foreign language English is still limited to a very small minority of Turkey's population today.

Regarding the contemporary Turkish pronunciation of loanwords with original word-initial onset clusters, one attested option is to *adapt* the clusters through the insertion of an epenthetic vowel between the cluster consonants as in Output 1 in Example 1. Another attested option is to *adopt* the cluster as in Output 2 in Example 1.

(1)	Donor language	Original input		Turkish orthography	Output 1 adaptation	Output 2 adoption
a.	English	<step>	[step]	<step>	[s**i**tep]	[step]
b.	French	<sport>	[spɔʁ]	<spor>	[s**ɯ**por] or [s**u**por]	[spor]
c.	French	<credit>	[kʁedi]	<kredi>	[k**ɯ**redi]	[kredi]
d.	French	<plan>	[plɑ̃]	<plan>	[p**i**lan]	[plan]

The epenthetic vowel is always one of the four high vowels of Turkish: [i], [y], [ɯ] and [u]. Usually, the precise choice of vowel is dictated by harmony processes. The palatal rules of Turkish vowel harmony require that the epenthetic vowel has the same palatal value as the subsequent vowel in the stem, as can be seen in 1a–b. However, not only vowels but also some consonants are palatally classified in Turkish. The consonants [k] and [g] behave as [+back] while [l] behaves as [−back]. When such a palatally classified consonant is part of the onset cluster, as can be seen in 1c–d, this onset consonant's palatal classification overrules the palatal classification of the subsequent vowel in determining the palatal value of the epenthetic vowel. The labial rules of Turkish vowel harmony can also influence the roundness of the epenthetic vowel but this is only applied optionally, as can be seen in the two variants in Output 1 in 1b.

To date no empirical studies have been carried out on how Turkish speakers actually pronounce words with original onset clusters. Turkologists and Turkish linguists who discuss whether onset clusters can be considered licit syllable structure in contemporary Turkish (based on introspection and limited observations) are not in agreement. Some claim that onset clusters are licit in Turkish (Ergenç 2002; Özsoy 2004; Demircan 2009) while others claim that they are still illicit (Lewis 2000; Göksel & Kerslake 2005; Benzer 2010). İskender (2008) is the only author who seems to allow for the possibility of variation and suggests that knowledge of cluster languages may be responsible for this variation.

We do not know for certain how such cluster loanwords were pronounced historically by the first borrowers. What we know is that the orthography of many cluster loanwords initially included an epenthetic vowel in the Turkish Latin alphabet that was introduced in 1928, either as the only orthographic variant or as one of two variants (the other being a non-epenthesised version). However, since the orthography reform of 1965, the non-epenthesised variant has been established as a strong orthographic norm in most loanwords of this type, thus marking a prescriptive shift from adaptation to adoption, at least in orthography.

3.2 Factors that influence the linguistic competence to adopt clusters

What is meant by a speaker's linguistic competence to adopt clusters (henceforth *cluster competence*) in this paper is that he/she has acquired the ability to accurately produce consonant clusters in the word-initial onset position. As Thomason (2001:69) puts it, 'since you cannot borrow what you do not know, control of the source language's structure is certainly needed before structural features can be borrowed.' Concepts similar to linguistic competence are commonly used as explanatory variables in research concerning contact-induced change (McMahon 1994; Thomason 2001; Johanson 2002; Matras 2007). This established importance attributed to linguistic competence constitutes the basis for Assumption 1. Based on this, we would also expect a positive correlation between a speaker's cluster competence and his/her cluster adoption rate in loanwords.

Furthermore, it is assumed here that cluster competence is obtained through the acquisition of a cluster language as a second language (L2). If a bilingual speaker has a nativelike accent in a cluster language, we can safely

assume that this will also include accurate production of onset clusters. Therefore, non-structural factors that are generally known to have robust effects on the nativelikeness of accent in a second language are highly relevant for the competence to adopt.

With regard to nativelikeness of accent in L2 pronunciation, Piske et al. (2001) find the following three factors to have the greatest impact: age of onset to L2 acquisition, foreign language aptitude and motivation. Since foreign language aptitude varies considerably in larger populations (Abrahamsson & Hyltenstam 2008) we would not expect any significant differences between the major groups in this study. Therefore, this factor is not investigated in the present study.

Motivation is typically influenced by the prestige and status of the language to be acquired. Individual differences notwithstanding, motivation can be expected to be higher concerning the acquisition of a second language that enjoys majority language status in comparison to the acquisition of a foreign language that is not the majority language (Oxford 2002:247). We would, therefore, expect the bilinguals in Sweden to have had higher motivation in their cluster-language acquisition than the bilinguals in Turkey. As we shall see in Section 4, the cluster language was, nevertheless, a part-time second language in bilingual schools for the early successive bilinguals in Turkey. Consequently, the early successive bilinguals in Turkey may also have had greater motivation during the initial period of their cluster-language acquisition than the late successive bilinguals, albeit probably not as high as the heritage bilinguals in Sweden. This line of reasoning constitutes the first basis for Assumption 2a and Assumption 3.

The *age of onset* to L2 acquisition has been consistently shown to be a robust predictor of the nativelikeness of L2 pronunciation (Piske et al. 2001; Munro & Mann 2005). However, there is no agreement in the literature as to whether acquisition needs to start within a stipulated *critical period* such as before puberty (for an overview see Abrahamsson & Hyltenstam 2009) or whether the probability of nativelike pronunciation decreases linearly with increasing biological age (Flege 1995; Hytenstam & Abrahamsson 2003). Different cut-off points for a critical period for nativelike pronunciation have been proposed by different researchers but what all studies on this subject have in common is that they claim that pronunciation is the language component that is most sensitive to age-of-onset effects (Piske et al. 2001: 195). As we shall see in Section 4, most bilingual participants in Turkey report

ages of onset to cluster-language acquisition later than age 7 while most bilingual participants in Sweden report ages of onset below age 3. Consequently, according to both the linear-decrease view and a critical- period view with a cut-off point before age 7, we would expect to find differences in cluster competence between the bilinguals in Turkey and Sweden. This constitutes the second basis for Assumption 2a.

Another potentially relevant non-structural factor is the *degree of exposure* to the second language. Although the evidence concerning the effects of the degree of exposure in the second-language acquisition literature is not conclusive (Piske et al. 2001:197–201), several studies point to the beneficial effects of higher degrees of exposure for progressing towards a more nativelike pronunciation (Derwing 2008:350; Flege 2012). In the present study, we would expect higher degrees of exposure for the bilinguals in Sweden than for those in Turkey due to the fact that the former have spent most of their lives in a second-language environment. Despite generally lower exposure, we may still find some variation in the degree of exposure among the bilinguals in Turkey due to their different initial acquisition contexts. The early successive bilinguals are likely to have had a higher degree of exposure than the late successive bilinguals because the latter have gained access to a second-language environment much later in life, as we shall see in Section 4. This constitutes the second basis for Assumption 3.

Last but not least, it is tacitly assumed in Hypothesis 4 that the mixed-trajectory heritage bilinguals with their sufficiently low age of onset to Swedish acquisition in a second-language context, with long exposure and high motivation, would have attained nativelike accents in Swedish just like the even-trajectory heritage bilinguals in Sweden. We would therefore not expect to find any significant difference in competence between these minor groups in Sweden.

3.3 Factors that influence the sociolinguistic incentive to adopt clusters

Most researchers who have investigated sociolinguistic factors in loanword phonology have focused on factors at the societal level that influence a speech community's likelihood to adopt donor-language structures in loanwords. These include the *degree of community bilingualism* (Croft 2000: 201–207; Thomason 2001:70–71; Johanson 2002:5–6; Sakel 2007:19, 25; Paradis & LaCharité 2008), the *socio-political status* of the donor language

as a minority or majority language (Poplack et al. 1988; Thomason 2001), the *socioeconomic dominance* relationship between donor and recipient language communities (Thomason 2001:66) as well as *attitudes towards language mixing* including borrowing (Poplack et al. 1988; Thomason 2001).

Paradis & LaCharité (2008) claim that a high degree of community bilingualism increases the likelihood of adoption as opposed to adaptation. Thomason's (2001:66) formulation of the *intensity of contact* as 'the amount of cultural pressure exerted by one group of speakers on another' should also be mentioned here. According to her borrowing scale, certain types of structural features become more likely to be borrowed as the intensity of contact increases (Thomason 2001:70–71). Thus, her reasoning is also generally in line with Paradis & LaCharité's (2008) claim that increasing degrees of societal bilingualism make adoption more likely. Furthermore, Poplack at al. (1988) have found that adoption is more common when the recipient language is a minority language in a context where the donor language is the majority language.

Hence, the general consensus in the literature based on these factors is that adoption is more likely when the donor language is a majority language in the context of borrowing as well as spoken as an L2 and viewed favourably by a large portion of the recipient-language community. Put differently, the more present (or even indispensable) the donor language is in the everyday lives of the recipient-language speakers, the less conspicuous it will be to borrow structures from it in loanwords. Perhaps it will even be the norm or desirable to do so, especially if most interlocutors have similar bilingual backgrounds.

These findings in the literature indicate that sociolinguistic factors play an important role (alongside competence factors) and constitute the general basis for Assumption 5. What is viewed in this study as elite bilingualism in the Turkish context is the presence of a small urban minority of Turkish speakers with typically high socioeconomic status who have acquired an international lingua franca as a foreign or second language through secondary and tertiary schooling. The aforementioned 6 percent of Turkey's population who report good or very good knowledge of English are part of this elite bilingual group. In contrast, the type of heritage bilingualism that we find in Sweden is characterised by the minority status of Turkish, the low socioeconomic status of Turkish immigrants (especially in the first gene-

ration) and the high prevalence of Swedish-Turkish bilingualism in the Turkish-speaking community (especially in the second generation). Given these facts and the above mentioned sociolinguistic factors on the societal level that influence the speakers' sociolinguistic incentive to adopt clusters (henceforth *cluster incentive*), we would expect to find higher cluster incentive among Turkish speakers in Sweden than in Turkey. This reasoning constitutes the basis for Assumption 2b as well as for the tacit assumption behind Hypothesis 3, that we will not find a significant difference between the cluster incentive of the early and late successive bilinguals in Turkey.

Since the literature mostly focuses on sociolinguistic factors on the societal level, a relevant question to ask regarding the incentive variables that are to be entered into the regression model is how we can operationalise sociolinguistic incentive on the individual level. Many of the above outlined sociolinguistic factors can be seen as different expressions of *dominance relations* between the donor and recipient languages on the societal level, as well as between their speaker communities. Consequently, an appropriate counterpart on the individual level would be a speaker's language dominance. In the bilingualism literature, two of the most common ways of measuring bilingual speakers' language dominance are comparing their proficiency levels in both languages (i.e. calculating the difference between the levels) and determining the portion of each language in the speakers' overall language use (Romaine 1995:12–19; Grosjean 2010:34–35). In this paper, it is assumed that the aforementioned societal factors exert substantial influence on an individual speaker's language proficiency and use. Therefore, it seems reasonable in the present study to operationalise cluster incentive through language dominance and language use on the individual level. A few earlier studies have used similar measures on the individual level and how found that they play an important role for the outcome of loanword integration (Poplack et al. 1988; Friesner 2009a).

As we have seen in Section 3.2, high degree of exposure due to spending a substantial amount of time in a context where a language is spoken as a majority language is generally accepted as having a beneficial effect on a bilingual speaker's absolute proficiency in that language. Since all heritage bilinguals in Sweden have acquired their Swedish in the majority context, we would expect them to have a uniformly high Swedish proficiency according to the aforementioned tacit assumption behind Hypothesis 4. On the other hand, among these heritage bilinguals those with an even trajectory of

language development have acquired their Turkish almost exclusively in a minority context while those with a mixed trajectory have acquired it partly in the majority context in Turkey. Therefore, we can expect the mixed-trajectory group to have obtained a higher proficiency level in Turkish than the even-trajectory heritage bilinguals. Given that we assume these two groups to have similarly high proficiency in Swedish, we would expect the even-trajectory bilinguals' higher Turkish proficiency to also result in higher dominance in Swedish in comparison to the mixed-trajectory bilinguals. Consequently, this presumably higher L2 dominance should lead to higher cluster incentive in even-trajectory bilinguals. This line of reasoning constitutes the basis for Assumption 4. Furthermore, it is tacitly assumed that having resided in a minority-language context in Sweden for a long time will lead to similar degrees of L1 use in both these groups of heritage bilinguals.

4 Method

4.1 The participants

The data in this study come partly from a larger study on Turkish heritage speakers in Sweden, which also includes data from a control group in Turkey. In the present paper, those speakers in this control group who reported no or very little knowledge of a foreign language are treated as monolinguals. In addition to these monolinguals, bilingual speakers were recruited in Turkey especially for the purposes of this paper. This provides us with a total sample of 65 participants, consisting of 12 monolinguals and 24 bilinguals in Turkey as well as of 29 bilinguals in Sweden. The main characteristics of these three major groups are summarised in Table 1.

The criterion for bilingualism in this paper is to have spent a total of one year minimum in an environment (abroad, in a bilingual institution of education, at work, etc.) where the speaker used a cluster language on a daily basis as a means of oral communication (i.e. in a second-language environment). The criterion for monolingualism is to report either no proficiency in a foreign language or a proficiency level that is equal to or lower than three on an ascending scale from zero to ten.

When we look at the three major groups' cluster-language acquisition backgrounds (rows 5 and 6 in Table 1), we observe considerable differences between them. Firstly, in terms of age of onset the bilinguals in Turkey can

Table 1. Overview of the main characteristics of the three major groups.

		Group 1 Monolinguals in Turkey	Group 2 Bilinguals in Turkey	Group 3 Bilinguals in Sweden
1	Number of participants	12	24	29
2	Portion of speakers with tertiary education	75%	100%	93%
3	Portion of speakers with at least one parent with tertiary education	0%	83%	41%
4	Age at time of data collection	M=29 SD=6.1	M=23 SD=4.1	M=29 SD=5
5	Age of onset to acquisition of a cluster language	100% > age 10	83% > age 10 (max: 14)	76% ≤ age 3 (max: 11)
6	Age of onset to L2 environment in a cluster language	n/a	58% ≥ 18	76% ≤ 3
7	L2 or FL proficiency in the strongest cluster language (scale: 0–10)	M=2.3 SD=1	M=7.8 SD=1.3	M=9.6 SD=0.5
8	L1 proficiency (scale:0–10)	–	M=9.4 SD=0.5	M=7.2 SD=1.4

Legend: M = mean, SD = standard deviation, n/a = not applicable, – = no data collected, L2 = second language, FL = foreign language

be viewed as successive bilinguals, whereas the bilinguals in Sweden tend to be simultaneous bilinguals because they started acquiring both languages prior to age 3. Secondly, all bilinguals in Sweden have acquired their cluster language Swedish in an L2 environment from the start, whereas slightly more than half of the bilinguals in Turkey started their cluster-language acquisition in a foreign-language (FL) environment first and were exposed to an L2 environment later in life. This part of the group will therefore be referred to as *late successive bilinguals* because they started fulfilling the bilingualism criterion later. Their initial foreign-language environment was usually a monolingual school that had a rather limited number of hours of foreign-language teaching carried out by Turkish speakers. In contrast, the other bilinguals in Turkey (i.e. the *early successive bilinguals*) acquired their cluster language in an L2 environment from the beginning because they attended bilingual schools in Turkey. These are schools in which there is early and intensive teaching in a cluster language by native speakers and where roughly half of the subjects are taught in that language, with the other half being in Turkish. Thus, the early successive bilinguals had part-time

access to an L2 environment because they spent an important part of their time in bilingual schools.[1]

For all members of the bilingual group in Sweden, Swedish was the first acquired and strongest cluster language. All members of the bilingual group in Turkey reported English as their strongest cluster language, and for most of them English was also the first acquired cluster language. However, four of them had acquired German as their first cluster language from age ten onwards, and English as their second cluster language from age twelve onwards, in bilingual German-Turkish schools in Turkey.

As we can see in row 2 of Table 1, a majority of the speakers in all three groups had received tertiary education. When we look at their parents' education, which is usually seen as a good indicator of socioeconomic status in Turkey, we see marked differences between the groups. Not a single monolingual speaker in Turkey has a parent with tertiary education. This pattern illustrates the common correlation between higher socioeconomic status and bilingualism in an international lingua franca in Turkey (hence the term 'elite bilingualism').

As mentioned before, based on differences in their L1 or L2 acquisition and language development trajectories, it is possible to divide the participants of the two major bilingual groups further into two minor groups each. All relevant characteristics of the resulting four minor groups are summarised in Table 2.

The bilingual group in Turkey can be divided into the two minor groups late successive bilinguals and early successive bilinguals depending on whether or not they have come into contact with an L2 environment after age 18 or before age 12, respectively (see the third row in Table 2). Although all bilingual participants in Turkey have ages of onset to the acquisition of a cluster language below age 14 (see the second row in Table 2), according to the aforementioned criterion for bilingualism they are not considered to have become bilinguals before they have spent time in an L2 environment. This distinction provides us with 14 late successive bilinguals and 10 early successive bilinguals.

The bilingual group in Sweden can, in turn, be divided into the two minor groups *mixed-trajectory heritage bilinguals* and *even-trajectory heritage bilinguals* depending on whether or not the speakers have had an even trajectory in their bilingual development without interruptions due to moves be-

Table 2. Overview of some characteristics of the four minor groups.

	Group 2a Late successive bilinguals in Turkey	Group 2b Early successive bilinguals in Turkey	Group 3a Mixed-trajectory heritage bilinguals in Sweden	Group 3b Even-trajectory heritage bilinguals in Sweden
Number of participants	14	10	10	19
Age of onset to acquisition of a cluster language as FL or L2	86 % < age 12 (max: 14)	100 % < age 12	40 % < age 3 60 % ages 5–11	100 % < age 3
Age of onset to L2 environment in a cluster language	100 % > age 18	100 % < age 12	same as on the row above	same as on the row above
L2 proficiency in the strongest cluster language (scale: 0–10)	M=7.3 SD=1.4	M=8.6 SD=0.8	M=9.4 SD=0.6	M=9.7 SD=0.4
L1 proficiency (scale:0–10)	M=9.4 SD=0.5	M=9.5 SD=0.5	M=7.5 SD=1	M=7.1 SD=1.5

Legend: M = mean, SD = standard deviation, n/a = not applicable, – = no data collected

tween Sweden and Turkey. This distinction provides us with one minor group of 19 even-trajectory heritage bilinguals who have all grown up in Sweden from a very early age (i.e. ages lower than 3) and without intervals of residence in Turkey that were longer than one year. The group with 10 mixed-trajectory heritage bilinguals have also mainly resided in Sweden but they have either arrived in Sweden later than the other group (6 speakers), more specifically between ages 5–11, and/or resided in Turkey later during their childhood or adolescence between one year and five years (6 speakers). The mixed-trajectory heritage bilinguals have spent an average of 5 years of their pre-adult lives (between ages 3 and 18) in Turkey. In the period directly preceding data collection, on the other hand, they had spent an average of 20 years of their lives in Sweden.

4.2 The material

The first part of the material consisted of a questionnaire on the participant's biographical information as well as questions on language proficiency and use. The monolinguals were asked to report their overall proficiency in a foreign language on a single ascending scale from zero to ten. Using the same scale, the bilinguals were asked to report their proficiency in all of their languages concerning five different language skills: speaking, listening,

conversation, reading and writing.[2] Their overall proficiency scores were later calculated by taking the mean of the scores for these five skills (henceforth *L1 proficiency* and *L2 proficiency*). In addition, an *L2 dominance* score was calculated by subtracting their overall proficiency score in the L1 Turkish from their proficiency score in the strongest cluster language, henceforth referred to as L2 (i.e. English in Turkey and Swedish in Sweden).

Regarding language use, L1 use data were preferred to L2 use data here because more detailed L1 use data were available within the framework of the aforementioned project on Turkish as a heritage language in Sweden. The bilingual participants were first asked to indicate their ten most frequent interlocutors. Then they reported for each interlocutor if they used only Turkish, mostly Turkish but also another language/other languages, Turkish as much as another language/other languages, mostly another language/other languages but also Turkish, or no Turkish with that person. In coding, these five options were assigned descending numeric values from four to zero (four for only Turkish and zero for no Turkish). In order to calculate the percentage of *L1 use* within the participant's total language use with all interlocutors, the numeric values for all ten interlocutors were added (maximum value: 40) and multiplied with 2.5.

The data on onset clusters regarding loanwords in Turkish were collected through elicitation. Elicited data were preferred to natural-speech data mainly in order to ensure that a balanced sample of onset clusters of different types were present in the recordings. To this end, both the sonority distance between the onset consonants and the size of the clusters were controlled. For reasons of space, the differences in the pronunciation of these different types of onset clusters will, however, not be reported in this paper.

The object of the elicitation was made as little transparent as possible for the participants by using an oral fill-in-the-blanks task. In this task, the participants were given 150 linguistically demanding sentences in Turkish in written form. The sentences had one blank slot each and an adjacent word in parenthesis that needed to be suffixed orally for the successful completion of the sentence. The task contained 29 different loanwords, a few of which occurred two or three times, resulting in a total of 37 tokens. Only 10 of the tokens occurred in the blank slot while those remaining were dispersed across the rest of the sentences in order to disguise the object of the investigation.

The selection of the loanwords to be included took several factors into consideration such as cluster type, word frequency and phonetic similarity across the investigated languages, as can be seen in the appendix. The included loanwords were mostly generic nouns borrowed from French or English (and a few international words of non-English origin, which are likely to have been borrowed via French or English) but there were also 7 non-generic nouns, which were either place or brand names. All loanwords were well established as they have been in use for at least a couple of decades, in most cases for more than half a century. There was considerable variation in their frequency of use in Turkish according to a dictionary of word frequency in written Turkish (Göz 2003) ranging from one single token to 554 tokens (M: 132, SD: 157).[3]

As can be seen in the appendix, the loanwords included in this study either come from English, the strongest L2 of the bilinguals in Turkey, or have phonetically similar, ergo transparent, counterparts in the bilinguals' L2s English and Swedish, respectively. This is because they are cognates with the corresponding word in the L2s. Furthermore, their standard orthography in Turkish with a cluster reflects their original pronunciation. Consequently, it is assumed that the bilingual participants of this study have *implicit* knowledge about the fact that the loanwords that they are producing have word-initial onset clusters in their original forms, even though they may not explicitly know what the actual donor language is in each case. In this sense, cluster adoption in this study means pronouncing clusters in loanword forms in the L1 Turkish just as the speakers would in similar words in their L2s.

The numeric value for the dependent variable *L1 cluster rate* for each participant expresses in what percentage of the 29 loanwords with original word-initial onset clusters the participant actually produced a cluster in his/her L1 speech. In words with several tokens, the mean value of all tokens was taken as the overall cluster value for that word. In the two bilingual major groups, the participants' pronunciation of the same types of onset clusters as found in the L1 data was also tested in their L2. The bilingual participants were given a one-page text in the respective L2 that included 50 words with word-initial onset clusters. They were asked to read this text aloud. The L2 clusters were of the exact same types as in the L1 data but the distribution of the words among these types was not the same. Therefore, in

the analysis, weighting with coefficients was used in order to calculate *L2 cluster rates* that would be directly comparable with the L1 cluster rates.

The recording of both L1 and L2 data was done with the help of a portable computer, a table-top microphone and the computer program Wavesurfer. The recordings were then analysed auditively by the author. In order to provide a reliability check for the author's analysis, approximately eight percent of the L1 data (5 out of 65 speakers) were also analysed by a Turkish linguist and, again, approximately eight percent of the L2 data in English (2 out of 24 speakers) and Swedish (2 out of 29 speakers) were analysed by a Swedish linguist with advanced proficiency in English. The coding in all analyses entailed documenting if the speakers produced a cluster or not. The different linguists' analyses concurred in 93 percent of the cases in the L1 data and in 90 percent of the cases in the L2 data. Hence, it was concluded that the author's initial analysis was sufficiently reliable to serve as the basis for this study.

5 Results

5.1 L1 cluster rates

Table 3 summarises the results for the dependent variable L1 cluster rate, which expresses in what percentage of all cases a speaker has produced an onset cluster in the L1 Turkish. On the left hand side of the table, the means and distribution values for the different groups are presented. On the right hand side, we can see the results of one-way ANOVA analyses which help us determine if the major and minor groups' L1 cluster rates are significantly different from one another. Firstly, the general p values for the intergroup comparisons are presented in the rows 'Major groups' and 'All groups' (which include the monolinguals as well as the four minor groups). Secondly, the results of Tukey post-hoc tests between particular groups are presented succinctly. To give an example, in the row for Monolinguals in Turkey we can see the post-hoc test results for the comparisons between this group (Group 1) and the other two major groups; 1–2 indicates the comparison between Major group 1 and Major group 2, while 1–3 means a comparison between Major groups 1 and 3. To avoid redundancy, the values for the post-hoc tests are only given for the first instance of an intergroup comparison (i.e. for 1–3 but not again for 3–1). Significant differences between groups are rendered in bold style in the table.

Table 3. L1 cluster rates for different groups of speakers.

	N	Mean L1 cluster rate (%)	Standard deviation	Range	p value with one-way ANOVA and in Tukey post-hoc tests between indicated groups			
Major groups					**Major groups ANOVA p = .000**			
1. Monolinguals in Turkey	12	42.29	15.94	19.83–73.21	1–2: .387	**1–3: .000**		
2. Bilinguals in Turkey	24	54.68	20.31	24.14–90.79	**2–3: .000**			
3. Bilinguals in Sweden	29	88.12	10.60	58.62–100				
All groups					**All groups ANOVA p = .000**			
1. Monolinguals in Turkey	12	42.29	15.94	19.83–73.21	1–2a: 1.000	**1–2b: .016**	**1–3a: .000**	**1–3b: .000**
2a. Late successive bilinguals in Turkey	14	46.12		25.86–68.97		**2a–2b: .006**	**2a–3a: .000**	**2a–3b: .000**
2b. Early successive bilinguals in Turkey	10	66.66	20.99	24.14–90.79			2b–3a: .303	**2b–3b: .000**
3a. Mixed-trajectory bilinguals in Sweden	10	78.81	10.90	58.62–94.83				3a–3b: .081
3b. Even-trajectory bilinguals in Sweden	19	93.02	6.47	75.86–100				

Note: In the last column, differences between particular minor groups are presented in each cell with the numbers of the two particular groups compared in that cell followed by the p value.

The observed L1 cluster rate ranges and means for all the groups show that we generally have relatively high L1 cluster rates, with the lowest rate at 19.83 percent, which is found among the monolinguals, and a relative clustering in the upper half of the spectrum. Despite these generally high rates, we also observe gradually ascending L1 cluster rate means from Group 1 towards Group 3a. However, not all of the groups turn out to be significantly different from one another.

Table 4. L2 cluster rates for different groups of bilingual speakers.

	N	Mean L2 cluster rate (%)	Standard deviation	Range	p value with one-way ANOVA and in Tukey post-hoc tests between indicated groups		
Major groups					**Major groups ANOVA p = .003**		
2. Bilinguals in Turkey	24	95.16	7.05	72.71–100			
3. Bilinguals in Sweden	29	99.44	1.63	92–100			
Minor groups					**Minor groups ANOVA p = .000**		
2a. Late successive bilinguals in Turkey	14	92.61	8.38	72.71–100	**2a–2b: .010**	**2a–3a: .009**	**2a–3b: .000**
2b. Early successive bilinguals in Turkey	10	98.73	1.22	96.67–100		2b–3a: 1.000	2b–3b: .936
3a. Mixed-trajectory bilinguals in Sweden	10	98.83	2.53	92–100			3a–3b: .952
3b. Even-trajectory bilinguals in Sweden	19	99.76	0.79	96.73–100			

Note: In the last column, differences between particular minor groups are presented in each cell with the numbers of the two particular groups compared in that cell followed by the p value.

5.2 L2 cluster rates as a measure of cluster competence

Table 4 summarises the different bilingual groups' cluster competence as measured by their L2 cluster rates, which expresses in what percentage of all cases a speaker has produced an onset cluster in the L2 in words with word-initial onset clusters.

As the group means show, all bilingual minor groups display very high L2 cluster rates with means above 92 percent across the board, where even the lowest attested value, which is found among the late successive bilinguals in Turkey, is quite high at 72.71 percent. As in Table 3 before, we observe a gradually ascending trend in group means from Group 2a towards

Table 5. L2 dominance scores for different groups of bilingual speakers.

	N	Mean L2 dominance score (−10 to +10)	Standard deviation	Range	p value with one-way ANOVA and in Tukey post-hoc tests between indicated groups		
Major groups					**Major groups ANOVA p = .000**		
2. Bilinguals in Turkey	24	−1.6	1.3	−1.0 to 5.0			
3. Bilinguals in Sweden	29	2.4	1.4	0 to 5.8			
Minor groups					**Minor groups ANOVA p = .000**		
2a. Late successive bilinguals in Turkey	14	−2.1	1.4	−1.0 to 5.0	2a–2b: .153	**2a–3a: .000**	**2a–3b: .000**
2b. Early successive bilinguals in Turkey	10	−0.9	0.9	−0.4 to 2.2		**2b–3a: .000**	**2b–3b: .000**
3a. Mixed-trajectory bilinguals in Sweden	10	1.9	1.1	0 to 3.0			3a–3b: .480
3b. Even-trajectory bilinguals in Sweden	19	2.6	1.5	0.2 to 5.8			

Note: In the last column, differences between particular minor groups are presented in each cell with the numbers of the two particular groups compared in that cell followed by the p value.

Group 3b but, again, not all groups are significantly different from one another.

5.3 L2 dominance scores as a measure of cluster incentive

Table 5 summarises the different bilingual groups' cluster incentive as measured by their L2 dominance scores, which express on a scale from 10 to −10 the difference between their self-reported proficiency in their strongest L2 and their L1.[4] Positive values indicate dominance (i.e. higher proficiency) in L2 while negative scores indicate dominance in L1.

The general pattern is that all bilingual participants show a strong tendency to be dominant in the majority language of their country of residence. The bilinguals in Turkey tend to be dominant in their L1 Turkish while the

Table 6. L1 use scores for different groups of bilingual speakers.

	N	Mean L1 use score (%)	Standard deviation	Range	p value with one-way ANOVA and in Tukey post-hoc tests between indicated groups		
Major groups					**Major groups ANOVA p = .000**		
2. Bilinguals in Turkey	24	80.58	16.90	23–100			
3. Bilinguals in Sweden	29	41.80	22.54	0–100			
Minor groups					**Minor groups ANOVA p = .000**		
2a. Late successive bilinguals in Turkey	14	80.07	19.99	23–100	2a–2b: .999	**2a–3a: .000**	**2a–3b: .000**
2b. Early successive bilinguals in Turkey	10	81.30	12.32	64–100		**2b–3a: .000**	**2b–3b: .000**
3a. Mixed-trajectory bilinguals in Sweden	10	36.27	24.01	0–75			3a–3b: .715
3b. Even-trajectory bilinguals in Sweden	19	44.71	21.82	8.30–100			

Note: In the last column, differences between particular minor groups are presented in each cell with the numbers of the two particular groups compared in that cell followed by the p value.

bilinguals in Sweden tend to be dominant in their L2 Swedish. Accordingly, the differences between the major groups in the two countries turn out to be significant while the differences between the minor groups within either country are not significant. Moreover, the different groups' ranges and means show that we have a bilingual sample that clusters around the zero level on both sides, where most speakers are moderately dominant in one of their two languages.

5.4 L1 use scores as a measure of cluster incentive

Table 6 summarises the different bilingual groups' cluster incentive as measured by their degrees of L1 use, which express the percentage of L1 Turkish

Table 7. Correlation values between the different variables among all bilinguals (one-tailed Pearson).

	L2 cluster rate	L2 dominance	L1 use
L1 cluster rate	r = .622 p = .000	r = .764 p = .000	r = −.587 p = .000
L2 cluster rate		r = .549 p = .000	r = −.425 p = .001
L2 dominance			r = −.723 p = .000

use within a speaker's language use with his/her ten most frequent interlocutors.

The general pattern is that the degree of L1 Turkish use is very dependent on the country of residence, just as we have seen with language dominance. The bilinguals in Turkey tend to use their Turkish on average twice as much as the bilinguals in Sweden. Again, the differences between the countries turn out to be significant while the differences between the minor groups within the countries are not significant.

5.5 Correlations and regression analyses

After having seen the results group by group, let us break down the groups and look at all bilinguals together. Before we turn to the regression analyses, we should first look at the correlations between the different variables.

In Table 7, we see that the p values for all variables are below the 5 percent level. We also observe relatively high correlation values for all three variables (clearly above the 0.3 level), making them good candidates to be included as independent variables in a regression analysis. Furthermore, the directions of all correlations between the dependent and independent variables are as we would expect them to be: negative for L1 use and positive for the other two independent variables. When we investigate the internal relationship between the three independent variables in Table 7, we see that most of the variables correlate moderately (i.e. with correlation values between 0.3 and 0.7), while the variables L2 dominance and L1 use display a strong correlation above the 0.7 level.

In order to test Hypothesis 5, a hierarchical multiple linear regression analysis is presented in Table 8. This entails adding the independent variables one model at a time in order to check if the addition of a particular independent variable delivers a better regression model than the previous one

Table 8. All bilinguals' hierarchical multiple regression results with four predictor variables entered in four steps.

Included independent variables	F	Sig. F	Sig. F Change	R Square	R Square Change	B	SE B	β	Sig. B
Model 1:	F(1, 51) = 32.225	.000	.000	.387	.387				
L2 cluster rate						2.693	.474	.622	.000
Model 2:	F(2, 50) = 44.877	.000	.000	.642	.255				
L2 cluster rate						1.259	.438	.291	.006
L2 dominance						5.729	.960	.604	.000
Model 3:	F(3, 49) = 29.506	.000	.571	.644	.001				
L2 cluster rate						1.250	.442	.289	.007
L2 dominance						5.362	1.269	.565	.000
L1 use						−.045	.101	−.055	.657
Alternative Model 1:	F(1, 51) = 71.313	.000	.000	.583	.583				
L2 dominance						7.244	.858	.764	.000
Alternative Model 2:	F(2, 50) = 26.413	.000	.001	.514	.127				
L2 cluster rate						1.970	.472	.455	.000
L1 use						−.323	.089	−.393	.001

with fewer variables. The enter method was used in all regression analyses and cases were excluded pairwise. Due to the exact formulation of Hypothesis 5, the first independent variable that was introduced in Model 1 was L2 cluster rate as a measure of cluster competence. This was followed by the introduction of sociolinguistic variables that measured cluster competence, one incentive variable at a time. Due to its higher correlation value in Table 7, L2 dominance was introduced in Model 2 as the first sociolinguistic variable, followed by L1 use in Model 3. Alternative models that do not follow this sequence were also included in the final row of Table 8 in order to test if a different sequence of independent variables made a significant difference.

The first two values regarding F on the left hand side of Table 8 provide us with measures for the significance of every model *as a whole*. All models included in the table are significant in this way. In addition, the measure 'Sig. F Change' tells us if adding a particular variable leads to a significant *change* from the preceding model. While Models 1 and 2, as well as the Alternative Models 1 and 2, led to significant changes, Model 3 did not. In order for such a significant change to be an improvement, we also have to check if the R Square Change in the middle column was positive and how

large the change was. R Square is the value that tells us what percentage of the variance in the dependent variable can be explained by the independent variables included in a specific model.

The best model (in terms of highest R Square value) according to the results in Table 8 was Model 2, which included both L2 cluster rate and L2 dominance that together can explain 64.2 percent of the variance in the data. This was followed by Alternative Model 1 with L2 dominance as the single variable, which on its own could account for 58.3 percent of the variance. Looking at the beta values in the penultimate column, we can also state that the independent variable that made the greatest contribution to all models in Table 8 is L2 dominance. In the best model, Model 2, L2 dominance contributed twice as much to the variance ($\beta = .604$) in L1 cluster rate as the other independent variable L2 cluster rate ($\beta = .291$).

Let us now look at how the same models performed when the sample was limited to only bilinguals in Turkey or in Sweden, respectively.

The only models in Tables 9 and 10 where we observed a significant F change were those with one single independent variable. For the Turkey group in Table 9, the best model was Model 1, where cluster competence measured by L2 cluster rate could explain 31.4 percent of the variance on its own. In contrast, the best model for the Sweden group in Table 10 was Alternative Model 1, where cluster incentive as measured by L2 dominance could explain 19.7 percent of the variance on its own.

5.6 The distribution

In Figure 1 we can see the precise distribution of all bilingual participants' cluster adoption rates (i.e. L1 cluster rates) and L2 dominance scores as the best measure of their cluster incentive. Furthermore, the speakers' levels of cluster competence are indicated by three different colours, and their countries of residence are indicated by two different shapes.

When we look at the distribution of the 31 speakers with perfect cluster competence (represented by black circles and triangles in Figure 1), we see that the lowest cluster adoption rate among them was 50 percent in one speaker in Turkey, with an L2 dominance score of −1.2, while the highest rate was 100 percent in four L2 dominant speakers in Sweden, with minimum L2 dominance scores between 2.8 and 4.8. In addition to these four full adopters, we have another 10 bilinguals with the same perfect com-

Table 9. The Turkey bilinguals' hierarchical multiple regression results with four predictor variables entered in four steps.

Included independent variables	F	Sig. F	Sig. F Change	R Square	R Square Change	B	SE B	β	Sig. B
Model 1:	F(1, 22) = 10.057	.004	.004	.314	.314				
L2 cluster rate						1.613	.509	.560	.004
Model 2:	F(2, 21) = 5.528	.012	.329	.345	.031				
L2 cluster rate						1.311	.592	.455	.038
L2 dominance						3.194	3.195	.205	.329
Model 3:	F(3, 20) = 3.588	.032	.700	.350	.005				
L2 cluster rate						1.308	.604	.454	.043
L2 dominance						2.640	3.555	.170	.466
L1 use						−.095	.243	−.079	.700
Alternative Model 1:	F(1, 22) = 5.226	.032	.032	.192	.192				
L2 dominance						6.810	2.979	.438	.032
Alternative Model 2:	F(2, 21) = 5.128	.014	.573	.332	.018				
L2 cluster rate						1.516	.530	.526	.009
L1 use						−.167	.221	−.139	.457

Table 10. The Sweden bilinguals' hierarchical multiple regression results with four predictor variables entered in four steps.

Included independent variables	F	Sig. F	Sig. F Change	R Square	R Square Change	B	SE B	β	Sig. B
Model 1:	F(1, 27) = 5.845	.023	.023	.178	.178				
L2 cluster rate						2.739	1.133	.422	.023
Model 2:	F(2, 26) = 4.279	.025	.133	.248	.070				
L2 cluster rate						1.709	1.288	.263	.196
L2 dominance						2.279	1.469	.308	.133
Model 3:	F(3, 25) = 3.154	.042	.345	.275	.027				
L2 cluster rate						2.117	1.358	.326	.132
L2 dominance						2.461	1.483	.332	.109
L1 use						.085	.089	.182	.345
Alternative Model 1:	F(1, 27) = 6.612	.016	.016	.197	.197				
L2 dominance						3.283	1.277	.444	.016
Alternative Model 2:	F(2, 26) = 3.142	.060	.469	.195	.017				
L2 cluster rate						3.122	1.256	.481	.020
L1 use						.067	.091	.142	.469

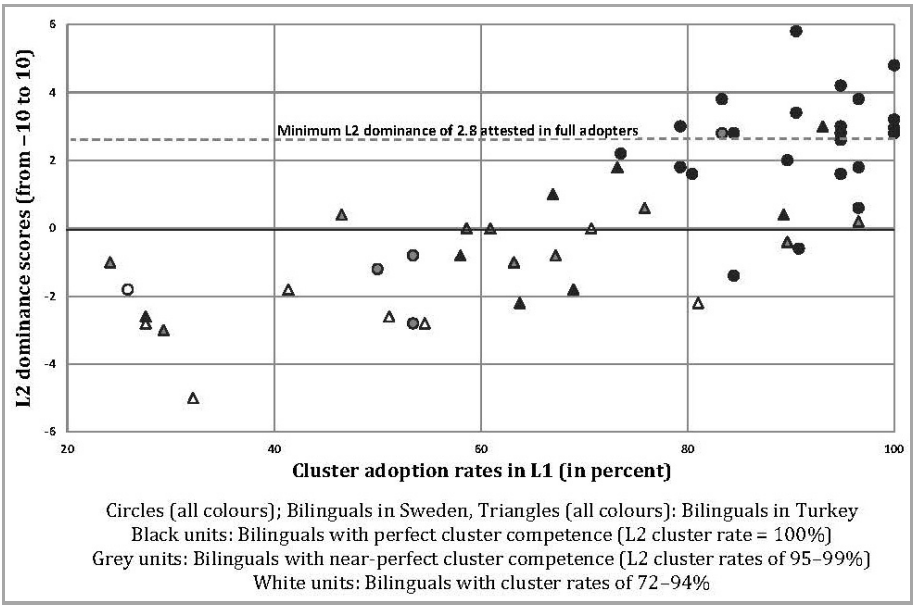

Figure 1. The relationship between cluster adoption and L2 dominance among the 53 bilingual participants.

petence and a minimum L2 dominance score of 2.8 (as indicated by the dotted horizontal line in Figure 1), in whom we did not observe full adoption, but nonetheless high cluster adoption rates between 79.31 and 96.55 percent. When we ran a linear regression analysis with L2 dominance as the only independent variable among these 31 perfect-competence speakers, L2 dominance could explain 39.5 percent of the variance in their L1 cluster rates (R Square = .395, p = .000).

6 Discussion

The five hypotheses that were introduced in Section 2 as well as the main assumptions and the tacit assumptions behind them that were theoretically motivated in Section 3, are summarised in Table 11 and presented together with the relevant results from Section 5.

The overview in Table 11 shows that three of the five hypotheses (i.e. Hypotheses 2, 3 and 5) are confirmed by the results, while the remaining two must be rejected. Let us first discuss Hypotheses 2, 3 and 4 where we can also empirically test the assumptions behind them based on this study's results.

Table 11. Overview of hypotheses, assumptions and results.

Hypo-thesis	Description of hypothesis regarding L1 cluster rate	Result regarding L1 cluster rate	Status	Assumptions about indepen-dent variables	Result	Status
H1	G1<G2	G1=G2 (in Table 3)	**rejected**	theoretical		
H2	G2<G3	G2<G3 (in Table 3)	confirmed	A2a: L2 cluster rate in G2<G3	in Table 4: G2<G3	confirmed
				A2b: L2 dominance in G2<G3	in Table 5: G2<G3	confirmed
				L1 use in G2<G3	in Table 6: G2<G3	confirmed
H3	G2a<G2b	G2a<G2b (in Table 3)	confirmed	A3: L2 cluster rate in G2a<G2b	in Table 4: G2a<G2b	confirmed
				tacit assumption: L2 dominance in G2a=G2b		
				L1 use in G2a=G2b	in Table 5: G2a=G2b	confirmed
					in Table 6: G2a=G2b	confirmed
H4	G3a<G3b	G3a=G3b (in Table 3)	**rejected**	A4: L2 dominance in G3a<G3b	in Table 5: G3a=G3b	**rejected**
				tacit assumption: L2 cluster rate in G3a=G3b	in Table 4: G3a=G3b	confirmed
				L1 use in G3a=G3b	in Table 6: G3a=G3b	confirmed
H5	Regression models based only on cluster competence will be out-performed by models that also take cluster incentive into account	(in Table 8) R Square in Model 1 < R Square in Model 2 or in Alternative Model 2	confirmed	theoretical		

Legend: G1 = monolinguals in Turkey, G2 = elite bilinguals in Turkey, G3 = heritage bilinguals in Sweden, G2a = late successive elite bilinguals in Turkey, G2b = early successive elite bilinguals in Turkey, G3a = mixed-trajectory heritage bilinguals in Sweden, G3b = even-trajectory heritage bilinguals in Sweden. '<' and '>' indicate significant difference between groups while '=' indicates no significant difference

6.1 Hypotheses 2, 3 and 4

The confirmation of Hypothesis 2 in row 2 of Table 11 means that the heritage bilinguals in Sweden adopt onset clusters at a significantly higher rate than the elite bilinguals in Turkey, because the former group has both significantly higher cluster competence as measured by L2 cluster rate (Assumption 2a) and significantly higher cluster incentive as measured by both L2 dominance and L1 use (Assumption 2b). According to the results in Table 3, the difference between their L1 cluster rate means is as big as 33 percentage points. Hence, we can conclude that the combination of higher linguistic competence and higher sociolinguistic incentive creates conditions that are distinctly favourable for adoption among heritage bilinguals for whom the cluster language is the majority language.

The confirmation of Hypothesis 3 in row 3 of Table 11 means that the early successive bilinguals in Turkey display significantly higher cluster adoption rates than the late successive bilinguals in Turkey, because the former group has higher cluster competence as measured by L2 cluster rates. According to the results in Table 3, the difference between their L1 cluster rate means is 20 percentage points. Since the tacit assumption that the two groups have significantly similar cluster incentive (as measured by both L2 dominance and L1 use) is confirmed by the results in Tables 5 and 6, we can be certain that the decisive difference between these two minor groups in Turkey is in competence rather than in incentive. As was argued in section 3.2, this higher competence in the early successive bilinguals is most likely due to an overlap of competence-boosting factors such as high degree of exposure to a cluster language and high initial motivation to acquire it, thanks to early immersion in the part-time second-language environment of bilingual schools in Turkey.

As regards the rejected Hypothesis 4 in row 4 of Table 11, checking the results of the underlying assumptions helps us understand on what grounds the hypothesis must be rejected. According to our tacit assumptions, we should not find any significant difference in cluster competence or in the incentive variable L1 use between the even-trajectory heritage bilinguals and the mixed-trajectory heritage bilinguals in Sweden. This is because both these minor groups have had a high degree of exposure to a cluster language from relatively early ages onwards, and because they have resided in Sweden for a long period prior to data collection. These tacit assumptions are confirmed by the results in Tables 4 and 6. However, the main assumption

that the mixed-trajectory group should have lower cluster incentive than the even-trajectory group due to higher L2 dominance (Assumption 4) is disproven by the data in Table 5 as we find no significant difference between the groups in this variable.

Since Assumption 4 was the reason for putting forward Hypothesis 4, we can also explain its rejection through the rejection of this main assumption. Hence, we can conclude that we do not find significantly higher cluster adoption rates among the even-trajectory heritage bilinguals in Sweden than among the mixed-trajectory heritage bilinguals because there is no significant difference between the two groups' cluster competence or cluster incentive. Although we had to reject Hypothesis 4, the fact that the proposed explanatory approach enabled us to empirically check the assumptions behind it can be taken as a confirmation of the theoretical solidity of this approach.

Nevertheless, we still need to explain the rejection of Assumption 4. The reason for assuming lower cluster incentive in mixed-trajectory heritage bilinguals was the expectation that they would be less dominant in the L2 Swedish because they had spent more time in a majority-language context in Turkey while they were growing up. It seems that the mixed trajectory of language development with an average of 5 years of residence in Turkey between ages 3 and 18 makes no difference for these bilinguals' current L2 dominance, which is significantly similar to that of even-trajectory heritage bilinguals. Here we should remind ourselves that the mixed-trajectory bilinguals have resided in Sweden much longer than in Turkey and have spent an average of 20 years of uninterrupted residence in Sweden prior to data collection. This long and recent residence in Sweden seems to have 'assimilated' potentially lower L2 dominance levels that may have existed in this group in earlier periods to the same high level as we find in the even-trajectory group in Sweden. Hence, we can conclude that relatively early arrival and long recent residence in the minority-language context produces a rather homogeneous pattern in all four investigated variables in all heritage speakers of Turkish in Sweden regardless of the heterogeneity in the speakers' language development trajectory.

In the three hypotheses that have just been discussed, the study has supplied us with data on all four variables and has thus given us ample opportunity for testing the theoretical approach in this paper. This approach is based on linguistic competence (measured in individuals by L2 cluster

rate) and sociolinguistic incentive (measured in individuals by both L2 dominance and L1 use). Competence is, in turn, determined by motivation, degree of exposure and age of onset while incentive is determined by the socio-political status of the languages, the degree of community bilingualism and the socioeconomic status of the language communities. Based on the discussion in this section, we can conclude that the present multi-layered approach provides us with substantial explanatory power.

6.2 The effects of bilingualism based on group comparisons (Hypothesis 1)

The most surprising result in this paper is the rejection of Hypothesis 1 in row 1 of Table 11 as we find no significant difference between the L1 cluster rates of the monolingual group and the bilingual group in Turkey. According to the results in Table 3, the monolingual group's L1 cluster rate mean is as high as 42 percent with a range of 20–73 percent. Even the only speaker who reported zero proficiency in a foreign language has an L1 cluster rate of 34 percent.

The theoretical assumption behind this hypothesis is that cluster competence is a prerequisite for cluster adoption. Furthermore, it was assumed that Turkish speakers obtain cluster competence through the acquisition of a cluster language as a foreign or second language because their first language Turkish lacks onset clusters. Since even monolinguals display some clusters in cluster loanwords in Turkish, the most plausible explanation is that *rudimentary* cluster competence is acquired through the first language Turkish, thanks to the existing loanwords with original onset clusters. Consequently, onset clusters must have been present to some extent in the L1 input in Turkish. This rudimentary cluster competence would then be complemented later through the acquisition of a cluster language. One possibility is that certain *types* of clusters are already acquired through the L1 while other types of clusters are only mastered by those speakers who go on to acquire cluster languages as an L2.

Such rudimentary cluster competence in monolinguals can perhaps be understood with the help of Thomason's (2001:66) notion of *duration of the contact period*. She mentions this as a factor that promotes contact-induced change because the longer the contact persists 'the more time there is for the speakers of one or both groups to become bilingual' (Thomason, 2001:66). Contact with French and English as the main donors of loanwords with

word-initial onset clusters has been going on since the middle of the 19th century. Moreover, the intensity of contact has risen slowly during this century and a half. Therefore, it is likely that the original bilingual borrowers of these loanwords, and their subsequent bilingual users, would have adopted (at least certain) clusters in their pronunciation of these loanwords, whereby such clusters would have also been present in the L1 input to monolinguals. Thus, competence in some types of clusters might have 'trickled down' from bilinguals to monolinguals via the medium of the L1 Turkish through several generations.

Based on such presumed effects of the long duration of contact with cluster languages, and based on the disagreement in the literature regarding the licitness of onset clusters in contemporary Turkish that we saw in Section 3.1, we can conclude that it was incorrect to view Turkish as a language that lacks onset clusters altogether and, therefore, also wrong to exclude the possibility that some rudimentary cluster competence is obtained through the acquisition of Turkish as a first language.

Although this preceding account goes some distance in explaining why monolinguals have unexpectedly high cluster adoption rates, it still does not explain why the bilinguals' rates are not significantly higher than the monolinguals. When we look at the cluster adoption rates of the two bilingual minor groups in Turkey in Table 3, we notice that it is only the late successive bilinguals who are significantly similar to the monolinguals, while the early successive bilinguals do, in fact, have significantly higher L1 cluster rates than both the monolinguals and the late successive bilinguals. According to Table 4, the early successive bilinguals also have significantly higher L2 cluster rates than the late successive bilinguals.

Hence, the late successive bilinguals' presumed lower degree of exposure, and lower motivation in the initial phase of their cluster-language acquisition, fails to lift them to the same ceiling level in cluster competence that we observe in the early successive bilinguals as well as in the heritage bilinguals in Sweden in Table 4. Since the monolinguals' L2 cluster rates were not measured (for obvious reasons), we cannot claim with certainty that the late successive bilinguals' cluster competence would turn out to be significantly similar to that of the monolinguals', although this is still quite likely to be true. Hence, we fail to find a significant difference between the monolinguals and bilinguals in Turkey not because these two major groups are similar in their entirety but because *one* of the minor groups of bilinguals

in Turkey, (i.e. the late successive bilinguals) is significantly similar to monolinguals in cluster adoption rates.

Based on the discussion in this section, we can conclude that the *type* of bilingualism in Turkey that makes a difference in cluster adoption rates is early successive bilingualism because it significantly enhances cluster competence. Since the two minor bilingual groups in Turkey have significantly similar cluster incentive, we can claim that the 'increase' in cluster adoption rates by roughly 20 percentage points from late to early successive bilinguals is mainly a *competence-based effect of bilingualism*.

According to Table 4, the early successive bilinguals in Turkey display significantly similar cluster competence to that of the mixed-trajectory heritage bilinguals in Sweden, who in turn have similarly high competence as the even-trajectory bilinguals in Sweden. What these three bilingual minor groups with similarly high cluster competence have in common is that they started acquiring a cluster language in a second-language environment before age 12. In this sense, they can be viewed collectively as *early bilinguals*. Therefore, the aforementioned competence-based effect is mainly due to early bilingualism.

In order to explore the effects of bilingualism further, we can compare the even-trajectory heritage bilinguals in Sweden with the early successive bilinguals in Turkey as these two groups have similar competence (in Table 4), albeit the former having significantly higher cluster incentive (in Tables 5 and 6). Therefore, it would be safe to attribute any significant difference in cluster adoption rates mainly to differences in incentive. According to Table 3, the even-trajectory heritage bilinguals in Sweden have a cluster adoption mean that is significantly higher by approximately 26 percentage points than the early successive bilinguals in Turkey. We could call this difference an *incentive-based effect of bilingualism*. Thus, we can conclude that early bilingualism boosts cluster adoption rates significantly (by an average of 20 percentage points in this study) due to competence-based effects. Similarly, heritage bilingualism leads to another significant boost (of 26 percentage points on average in this study) due to incentive-based effects.

6.3 The contribution of competence and incentive based on regression models (Hypothesis 5)

Both the conclusion of the preceding section based on group comparisons, and the results of the regression analysis in Table 8 based on data from indi-

vidual bilingual speakers, confirms Hypothesis 5. This means that taking sociolinguistic incentive into account alongside linguistic competence delivers more satisfactory results than focusing only on competence.

The results based on all bilingual participants in Table 8 show that two-variable regression models that include L2 cluster rate as a measure of competence, and either L2 dominance (in Model 2) or L1 use (in Alternative Model 2) as a measure of incentive, have significantly higher R Square values. This means that these two models explain significantly more of the variance in cluster adoption rates, than Model 1, which includes L2 cluster rate as its single independent variable. In fact, the inclusion of L2 dominance increases the portion of the variance explained by the model by as much as 25.5 percentage points, from Model 1 to Model 2 in Table 8.

The best model (in terms of highest R Square value) according to the results in Table 8 is Model 2, which includes both L2 cluster rate and L2 dominance, and which can together explain 64.2 percent of the variance in the data. If we substitute L2 dominance with L1 use as the incentive variable, as in Alternative Model 2, the model is still significant but can only account for 51.4 percent of the variance. If we, instead, include both incentive variables as in Model 3, the resulting model is not significant anymore. In Table 7, we had seen that the correlation between these two incentive variables is above 0.7, which suggests, just as theorised a priori, that they may be different measures for the same phenomenon (i.e. cluster incentive). This high correlation is partly responsible for the failing of Model 3.

In the best model with all bilinguals (Model 2 in Table 8), L2 dominance as a measure of incentive contributes roughly twice as much to explaining the variance in cluster adoption rates ($\beta = .604$) as the other independent variable L2 cluster rate ($\beta = .291$) does as a measure of competence.[5] This echoes the observation in preceding section that the incentive-based effects of bilingualism are greater than the competence-based effects when we compare relevant groups of bilinguals. Among the bilinguals in Turkey in Table 9, the best model is Model 1 where cluster competence is the best predictor on its own ($\beta = .560$). In contrast, among the bilinguals in Sweden in Table 10, the best model is Alternative Model 1 where cluster incentive is the best predictor on its own ($\beta = .444$). Hence, the context of elite bilingualism in Turkey is sensitive to competence-based effects while the context of heritage bilingualism in Sweden is rather sensitive to incentive-based effects.

The relatively speaking greater incentive-based effects that we have found in this section, as well as in the preceding section, are partly due to the particular sample in this study, where we have relatively little variation in the uniformly high L2 cluster rates but considerable variation in incentive, mainly due to the big differences between the groups in Turkey and Sweden. This means that the current sample is well suited for looking beyond competence and for making the impact of incentive visible. However, this could lead to an underestimation of the role of competence in loanword phonology if we were to generalise the aforementioned conclusion to all cases of loanword integration. We can conclude that in the present bilingual sample, with uniformly high competence means, both competence and incentive make significant contributions to cluster adoption rates but that the contribution of incentive is greater than that of competence.

6.4. Necessary and sufficient conditions for full adoption based on distribution data

Finally, we should discuss what the data tell us about what is necessary for full adoption (i.e. an L1 cluster rate of 100 percent). Let us put the groups' and regression models' approximations aside and look at the actual distribution in the data in Figure 1. In Section 5.6 we saw that four speakers with perfect cluster competence and a minimum L2 dominance score of 2.8 displayed full cluster adoption. This suggests that perfect competence and at least moderate L2 dominance are *necessary* for full adoption.

Nevertheless, are these conditions also *sufficient* for full adoption? If we take the two necessary conditions for full adoption, 11 speakers in Figure 1 fulfil them both without displaying full adoption. Nonetheless, these conditions lead to a minimum adoption rate of 79.31 percent, which can be viewed as guaranteeing high adoption rates. Furthermore, we saw in Section 5.6 that L2 dominance can only account for approximately 40 percent of the variance in cluster adoption rates among speakers with perfect competence. All in all, it seems that the necessary conditions regarding competence and dominance are not quite sufficient for explaining when full adoption occurs.

6.5 Methodological issues and considerations for future research

Despite the relative strength of the discussed approach, the difficulty in determining the sufficient conditions for full adoption in the preceding sec-

tion suggests that we either have reliability problems with some variables or that we have neglected to take other relevant variables into account.

Let us look at the reliability issue first. Not using natural speech data but rather text-based oral tasks in order to measure cluster rates in L1 and L2 can potentially provide the speakers with the opportunity to pay more attention to the way they speak. The formal setting of data collection might also create an incentive for them to opt for a more formal and standardlike pronunciation. Hence, this might lead to a positive cluster bias in both languages and decrease the reliability of our measurements. Such a bias may be partly responsible for the rather high L2 cluster rates that we observe, especially among the late bilinguals in Turkey, as well as for the surprisingly high L1 cluster rates among the monolinguals in Turkey. In other words, the method used in this study may lead to a certain overestimation of cluster competence and cluster adoption rates among the speakers in Turkey. Therefore, when possible, natural speech data should be included in future research. This is more likely to be feasible for L2 data than for L1 data due to the presumably higher frequencies of the investigated structures in the donor language (i.e. the L2) than in the recipient language, where they only feature in faithfully integrated loanwords.

Using L2 dominance and L1 use in order to measure cluster incentive may not have provided us with the full picture of an individual speaker's incentive to adopt clusters. The rationale for operationalising sociolinguistic incentive through these two variables was that they would provide appropriate expressions of the existing societal dominance relations between the donor and recipient languages on the individual speaker's level. Thus, these two variables are expected to enable us to tap into the *macro-sociolinguistic* context that constitutes the background for an individual speaker's *micro-sociolinguistic* incentive.

As much as the speakers are affected by the macro-sociolinguistic context, on the micro-sociolinguistic level, they also have *agency* and may develop *attitudes* toward structural borrowing that are partially independent of the prevalent norms and practices in the macro-sociolinguistic context or even opposed to them. This is precisely why Thomason (2001:61) calls attitudes the 'wild card' in contact-induced language change. Consequently, the particular operationalisation of individual speakers' incentive that is used in this paper may have a *macro-sociolinguistic bias.* Therefore, it might underestimate the speakers' agency and, thus, miss the impact of their more idio-

syncratic attitudes. After all, not every single speaker, who is dominant in a cluster language, must necessarily also have a positive attitude towards borrowing clusters from it. Therefore, in future research, direct or indirect measurements of individual speakers' relevant attitudes should be considered when measuring incentive, either as a substitute or as a complement to data on language dominance and use.

7 Conclusion

This paper has investigated the adoption of onset clusters in the word-initial position of established loanwords in Turkish, a language whose native inventory lacks onset clusters. Different bilingual speakers and bilingual groups in different social contexts were examined in order to illustrate the role played by bilingualism in loanword phonology. The results have shown that the context of heritage bilingualism in Sweden, where the recipient language Turkish is an immigrant-minority language and where the majority of Turkish speakers are bilingual in Swedish, is much more conducive to adoption than the context of elite bilingualism in Turkey, where the recipient language is the majority language and where only a small elite minority are bilingual in the second language English. This result is in line with pervious findings in the literature but differs from earlier studies in that it provides a detailed analysis of the complex mechanism that produces this outcome.

The main factors in the analysis were linguistic competence and sociolinguistic incentive. It was argued that the favourable conditions for adoption in the heritage context were owed to an overlap between high competence and high incentive, whereas the elite context was, instead, characterised by high competence but relatively low incentive. Thus, incentive was shown to be very sensitive to the general socio-political context (i.e. minority vs. majority status of the recipient language). The competence factor does, in contrast, cut across the contexts as it is more specifically sensitive to early bilingualism, which can be attested in both elite and heritage contexts.

The analysis of all individual bilingual speakers' adoption rates has shown that taking sociolinguistic incentive into account through such variables as second-language dominance and first-language use alongside linguistic competence provides us with regression models that have greater explanatory power than models that are only based on competence. This finding provides us with statistical proof for an observation that is well established in the literature. The best linear regression model among those

tested in this paper turned out to be the one with the two independent variables L2 cluster rate (measuring competence) and L2 dominance (as the best measure of incentive). Moreover, the contribution of the incentive variable was greater than that of the competence variable. This finding proves that it is crucial to look beyond linguistic competence in order to provide a satisfactory account of the loanword integration process, especially in bilingual contexts with high linguistic competence such as in this study.

Further analysis of the attested distribution in cluster adoption rates among all bilinguals has shown that the necessary conditions for full cluster adoption in the present sample are perfect cluster competence combined with at least moderate dominance in a second language that has onset clusters. However, these two necessary conditions do not seem to be sufficient for full adoption in all speakers. Nevertheless, they guarantee high adoption rates in all speakers who fulfil them in this study.

Appendix

Overview of the included loanwords with original word-initial onset clusters in Turkish.

	Donor language and year of borrowing	Tokens	Turkish word	Turkish pronunciation (prescribed norm)	English counterpart	American English pronunciation	Swedish counterpart	Swedish pronunciation
1	French 1900–1930	2	program	progˈram	program	ˈproʊgræm	program	prɔˈgram:
2	French 1900–1930	1	proje	proˈʒe	project	ˈprɑʤɛkt	projekt	prɔˈɧɛkt
3	French 1930–1959	1	prosedür	proseˈdyr	procedure	prəˈsiːʤər	procedur	prɔseˈdʉr
4	French 19th C	1	plan	plan	plan	plæn	plan	plɑːn
5	French 1900–1930	1	plaj	plaʒ	playa (slang: beach)	pæljə	playa (slang)	plajːa
6	French 19th C	1	blok	blok	block	blɑk	block	blɔkː
7	French 1930–1959	1	trafik	traˈfik	traffic	ˈtræfɪk	trafik	traˈfiːk
8	English 19th C	2	tramvay	tramˈvay	tramway	ˈtræmweɪ	tram (slang)	tramː
9	French 1900–1930	1	kriz	kriz	crisis	ˈkraɪsɪs	kris	kriːs
10	French 19th C	1	kredi	ˈkredi	credit	ˈkrɛdɪt	kredit	kreˈdiːt
11	French 1900–1930	2	gri	griː	grey	greɪ	grå	groː
12	Venetian	3	Fransız	ˈfransɯz	French	frɛnʧ	fransk	fransk
13	international via English	1	Sri Lanka	sriˈlanka	Sri Lanka	sriˈlæŋkə	Sri Lanka	ˌsriˈlaŋka
14	international via English	1	Slovenya	sloˈvenja	Slovenia	sləˈviːniə	Slovenien	sluˈveːnjɛn
15	international via English	1	Slovakya	sloˈvakja	Slovakia	sləˈvækiə	Slovakien	sluˈvɑːkjɛn
16	French 1900–1930	1	spor	spoɾ	sport	spɔrt	sport	spɔʈː
17	French	1	sporcu (agentive)	spoɾˈʤu	sportsman	ˈspɔrtsmən	sportare	[2]ˈspɔʈːare
18	English 1930–1959	1	step	step	step (exercise)	stɛp	step	stɛpː
19	English 1930–1959	1	standart	/stanˈdard/ [stanˈdart]	standard	ˈstændərd	standard	ˈstandaɖ

	Donor language and year of borrowing	Tokens	Turkish word	Turkish pronunciation (prescribed norm)	English counterpart	American English pronunciation	Swedish counterpart	Swedish pronunciation
20	international via English	3	Stockholm	ˈstokholm	Stockholm	ˈstɑkhoʊm	Stockholm	²ˈstɔkːˌhɔlm
21	English 1930–1959	1	star	star	star	stɑr	as in Star Wars Star Trek	stɑːr
22	French 1900–1930	1	stat	/stad/ [stat]	stadium	ˈsteɪdiəm	stadion	ˈstɑːdjɔn
23	French 19th C	2	skandal	skanˈdał	scandal	ˈskændəl	skandal	skanˈdɑːl
24	English 1930–1959	1	skor	skor	score	skɔːr	score (slang)	skoːr
25	English after 1960	1	sprey	sprej	spray	spreɪ	sprej	sprɛjː
26	international via English	1	Spring (model of Renault)	/spring/ [spriŋk]	spring	sprɪŋ	spring	sprɪŋ
27	international via English	1	Sprite	sprajt	Sprite (pop drink)	spraɪt	Sprite	sprajt
28	English after 1960	1	stres	stres	stress	strɛs	stress	strɛsː
29	English 1930–1959	1	striptiz	stripˈtiz	striptease	ˈstrɪptiːz	striptease	ˈstrɪpːˌtiˈs

References

Abrahamsson, Niclas, and Kenneth Hyltenstam. 2008. The robustness of aptitude effects in near-native second language acquisition. *Studies in Second Language Acquisition* 30(4). 481–509.

Abrahamsson, Niclas, and Kenneth Hyltenstam. 2009. Age of onset and native-likeness in a second language: listener perception versus linguistic scrutiny. *Language Learning* 59(2). 249–306.

Aktürk-Drake, Memet. (2011). Phonological and sociolinguistic factors in the integration of /l/ in Turkish in borrowings from Arabic and Swedish. *Turkic Languages*, 14. 153−191.

Aktürk-Drake, Memet. (2014). The role of perceptual salience in bilingual speakers' integration of illicit long segments in loanwords. *Lingua*, 143. 162−186.

Benzer, Ahmet. 2010. Türk hece yapısındaki değişmeler. *Turkish Studies* 5(1).830–842.

Croft, William. 2000. *Explaining language change: an evolutionary approach.* Harlow, England: Pearson Education Limited.

Demircan, Ömer. 2009. *Türkçenin ses dizimi*. Istanbul: İstanbul Der Yayınları.

Derwing, Tracey M. 2008. Curriculum issues in teaching pronunciation. *Phonology and second language acquisition,* ed. by Jette G. Hansen Edwards and Mary L. Zampini, 347–370. Amsterdam: John Benjamins.

Ergenç, İclâl. 2002. *Konuşma dili ve Türkçenin söyleyiş sözlüğü*. Istanbul: Multilingual Yabancı Dil Yayınları.

Flege, James Emil. 1995. Second-language speech learning: theory, findings, and problems. *Speech Perception and Linguistic Experience: Issues in Cross-language research*, ed. by Winifred Strange, 229–273. Timonium, MD: York Press.

Flege, James Emil. 2012. The role of input in second language (L2) speech learning. *VIth International Conference on Native and Non-native Accents of English, Łódź, 6–8 December 2012*. 3 July 2014. Online: http://jimflege.com/files/Flege_Lodz_2012.pdf

Friesner, Michael L. 2009a. The adaptation of Romanian loanwords from Turkish and French. *Loan phonology*, ed. by Andrea Calabrese and Leo W. Wetzels, 115–130. Amsterdam: John Benjamins.

Friesner, Michael L. 2009b. *The social and linguistic predictors of the outcomes of borrowing in the speech community of Montreal*. PhD dissertation, University of Pennsylvania.

Göksel, Aslı, and Celia Kerslake. 2005. *Turkish. A comprehensive grammar.* London: Routledge.

Göz, İlyas. 2003. *Yazılı Türkçenin kelime sıklığı sözlüğü*. Ankara: Türk Dil Kurumu Yayınları.

Grosjean, François. 2010. *Bilingual. Life and reality*. Cambridge, MA: Harvard University Press.

Hyltenstam, Kenneth, and Niclas Abrahamsson. 2003. Maturational constraints in SLA. *The Handbook of Second Language Acquisition*, ed. by Catherine J. Doughty and Michael H. Long, 539–88. Oxford: Blackwell.

İskender, Halil İbrahim. 2008. *Vowel-Zero Alternation in Turkish*. MA Thesis at Boğaziçi University, Istanbul, Turkey.

Johanson, Lars. 2002. *Structural factors in Turkic language contacts*. London: Curzon.

Lewis, Geoffrey. 2000. *Turkish grammar*. Oxford: Oxford University Press.

LaCharité, Darlene, and Carole Paradis. 2005. Category preservation and proximity versus phonetic approximation in loanword adaptation. *Linguistic Inquiry* 36(2). 223–258.

Maddieson, Ian. 2011. Syllable Structure. *The World Atlas of Language Structures Online*, ed. by Matthew S. Dryer and Martin Haspelmath, chapter 12. Munich: Max Planck Digital Library. 22 December 2011. Online: http://wals.info/chapter/12

Matras, Yaron. 2007. The borrowability of structural categories. *Grammatical borrowing in cross-linguistic perspective*, ed. by Yaron Matras and Jeanette Sakel, 31–73. Berlin: Mouton de Gruyter.

McMahon, April M. S. 1994. *Understanding language change*. Cambridge: Cambridge University Press.

Munro, Miles, and Virginia Mann. 2005. Age of immersion as a predictor of foreign accent. *Applied Psycholinguistics* 26(3). 311–342.

Nişanyan, Sevan. 2007. *Sözlerin soyağacı: çağdaş Türkçenin etimolojik sözlüğü.* 3. basım. Istanbul: Adam Yayınları.

Oxford, Rebecca L. 2002. Sources of variation in language learning. *Oxford handbook of applied linguistics*, ed. by R. Kaplan, 245–252. Oxford, UK: Oxford University Press.

Özsoy, Sumru. 2004. *Türkçe'nin yapısı – I. Sesbilim*. Istanbul: Boğaziçi Üniversitesi Yayınevi.

Paradis, Carole, and Darlene LaCharité. 1997. Preservation and minimality in loanword adaptation. *Journal of Linguistics* 33(2). 379–430.

Paradis, Carole, and Darlene LaCharité. 2008. Apparent phonetic approximation: English loanwords in Old Quebec French. *Journal of Linguistics* 44. 87–128.

Piske, Thorsten; Ian R. A. MacKay; and James Emil Flege. 2001. Factors affecting degree of foreign accent in an L2: a review. *Journal of Phonetics* 29. 191–215.

Poplack, Shana; David Sankoff; and Chris Miller. 1988. The social correlates and linguistic processes lexical borrowing and assimilation. *Linguistics* 26.47–104.

Romaine, Suzanne. 1995. *Bilingualism*. Second Edition. Oxford: Blackwell Publishers.

Sakel, Jeanette. 2007. Types of loan: matter and pattern. *Grammatical Borrowing in Cross-Linguistic Perspective* ed. by Yaron Matras and Jeanette Sakel, 15–29. Berlin: Mouton de Gruyter.

Thomason, Sarah G. 2001. *Language contact. An introduction.* Washington, D.C.: Georgetown University Press.

TNS Opinion & Social. 2006. *Special Eurobarometer 243 – Wave 64.3: Europeans and their languages.* Brussels: Survey requested by the Directorate General of Education and Culture and coordinated by the Directorate General Press and Communication of the European Commission. 11 August 2014. Online: http://ec.europa.eu/public_opinion/archives/ebs/ebs_243_sum_en.pdf

Notes

[1] Such schools are typically so-called *foreign private schools* where a double curriculum is followed so that upon graduation the pupils' diplomas are valid both in Turkey and in another country such as the USA, Germany, Austria, etc.

[2] These five skills are the language skills that are included in the self-assessment grid of the Common European Framework of Reference for Languages (CEFR). http://www.coe.int/t/dg4/education/elp/elp-reg/Source/assessement_grid/assessment_grid_english.pdf (retrieved 05.07.2014)

[3] This dictionary includes only generic words and does, therefore, not provide frequency information on the 7 non-generic nouns included in this study.

[4] Following the established practice in the bilingualism literature, the term L2 dominance is used here in the narrow sense (i.e. for the difference between L2 proficiency and L1 proficiency).

[5] The fact that L2 dominance is partly based on self-reported proficiency levels in the speaker's two languages means that it is not a 'pure' measure of sociolinguistic incentive as it also contains a measurement of the speaker's linguistic competence, albeit a subjective one as opposed to L2 cluster rate, which is an objective measure of competence. This raises the potential question as to whether the greater predictive power of L2 dominance as an independent variable is due to its basis in both competence and incentive. The presented two-variable regression analysis with an objectively measured competence variable and L2 dominance as a measure of incentive is very useful in this respect because the beta values for the two variables help us single out their unique contributions. Hence, the high beta value of L2 dominance proves that this variable does not merely 'remeasure' competence by revealing its impact when objective competence is held constant.

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