L1 Accessibility among Turkish-Dutch Bilinguals

Gülsen Yılmaz and Monika S. Schmid

Groningen University

Address for correspondence:

Monika S. Schmid, Engelse Taal en Cultuur, Rijksuniversiteit Groningen, Faculteit der Letteren, Postbus 716, 9700 AS Groningen, Nederland, Phone: +31-50-3632063

Email: m.s.schmid@rug.nl

This study is part of the project entitled 'Language, Multilingualism and Integration' VPR 06-30, funded by the NWO.

Abstract

This study investigates whether lexical knowledge in the first language (L1) of late Turkish-Dutch bilinguals becomes less accessible for the production of fluent speech and in controlled experimental tasks as a result of extended stay in the Netherlands. It is also considered to what degree extra-linguistic factors can account for this phenomenon. Data are collected from the first generation Turkish migrants (n=52) and from a monolingual reference group in Turkey (n=52) via a lexical naming task, a free speech task and a sociolinguistic background questionnaire. The results show that the bilingual group is indistinguishable from the monolinguals on the experimental task. However, in the free speech task, they not only are significantly more disfluent than the monolinguals but also make significantly less use of diverse, in particular low-frequency, vocabulary. Overall, the results signal that bilinguals were outperformed by the monolinguals in spontaneous language production but not on a controlled task. We interpret this finding to indicate a decrease of automaticity in the access to linguistic knowledge which impedes the rapid integration of information from all linguistic levels. Further analyses with respect to the relations between the L1 change and nonlinguistic factors are discussed within the Activation Threshold Hypothesis (ATH).

Keywords: disfluency, lexical access, ATH

Recent research into bilingualism has contributed to the understanding of the interaction of languages in the bilingual mind and of first language attrition (see the overviews in Köpke & Schmid, 2004; Kroll & De Groot, 2005). It has been widely suggested that the acquisition and use of an additional language impacts in complex ways on pre-existing language knowledge, leading to creation of a unitary system and a change in the way languages are processed (Cook, 2003; De Bot, 2007; Herdina & Jessner, 2002; Pavlenko, 2009; Van Hell & Dijkstra, 2002). While the precise nature of this phenomenon and its linguistic and psycholinguistic determinants have not been completely explored, there is a large body of converging evidence that bilinguals' knowledge, processing and use of their first language (L1) differ from that of monolinguals in a number of ways (Cook, 2002; Dijkstra & Van Heuven, 2002; Grosjean, 2001; Pavlenko, 2004; Schmid, 2010).

As far as adult native speakers are concerned, the effect mostly manifests itself as reduced control over L1 skills and access difficulties (Köpke, 2004). While monolinguals can deploy all their language related resources to the production and processing of one language, this task is more complex for bilinguals who have to manage the activation and inhibition of two systems. This impacts on the ease of language processing and speed of retrieval, resulting in interferences from the language that is not being used. Cross-language activation has been extensively documented in particular at the level of the lexicon (for a review, see Dijkstra, 2005). Adult bilinguals have repeatedly been found to be slower in retrieving words and to generate fewer words in verbal fluency tasks than their monolingual peers (see also Bialystok, 2009). They were also found to be slower in tasks that required them to name items in their

dominant language (Gollan, Montoya, Fennema-Notestine, & Morris, 2005; Ivanova & Costa, 2008).

This phenomenon has been extensively investigated among long term migrant populations. These are typically people who come to live in an L2 environment as adults with fully developed L1s and reside in L2 settings for a considerable period of time. On the surface, their language performance may not be distinguishable from that of monolingual speakers of their L1 in daily conversations unless they insert words or phrases from the L2 or have a noticeable foreign accent in their speech. However, controlled experimental procedures and in-depth analyses of free speech are able to reveal some subtle differences between bilingual immigrants and monolingual control populations. Particular symptoms in language performance, such as an increase of disfluency phenomena (Schmid & Beers Fägersten, 2010) imply that bilinguals have less control over their language system and manifest language processing difficulties. However, among post-puberty attriters, attrition phenomena have consistently been found to be rather limited (Köpke & Schmid, 2004).

The most vulnerable and quickly affected area is often assumed to be lexical access and fluency. Many adult bilinguals living in L2 environments make use of less rich vocabulary (De Bot & Clyne, 1994; Laufer, 2003; Schmid, 2011), employ more hesitations and pauses (Köpke, 1999; Schmid & Beers Fägersten, 2010), exhibit word finding difficulties (Schmid & Köpke, 2009; Yağmur, 1997), have difficulty in quickly retrieving words (Boyd, 1993; De Bot, 1996; Köpke, 2002), borrow lexical items from the L2 (Pavlenko, 2004) and use L2-like collocations and idioms (Jarvis, 2003; Laufer,

2003) during online speech. Similarly, in controlled experimental tasks such as lexical naming/matching and verbal fluency tasks, their performance has been found to be slower and less accurate (Ammerlaan, 1996; Hulsen, 2000; Yağmur, 1997).

The present study aims to explore whether or not adult bilinguals are at a disadvantage in accessing their native language knowledge as a result of living in an L2 environment for an extended period of time. The group under investigation has learnt L2 as adults after migrating to the Netherlands. We assume that differences between our migrant population and monolingual controls will be due to reduced accessibility to L1 knowledge which is, however, still represented in memory as opposed to having been entirely 'forgotten' (for a discussion of the role of memory in attrition see Ecke, 2004). However, in keeping with terminological conventions, we will refer to this process as L1 attrition. It should be stressed that this term carries no assumption regarding permanence of the bilingual phenomena observed.

Language Processing, Fluency and Lexical Access

Speaking is a complex process that requires coordination among all levels of language knowledge. According to most models of speech production (e.g. Dell, 1986; Caramazza, 1997; Levelt, 1989)[1] it consists of three main stages: Conceptualization, formulation and retrieval. When the speaker has an intention to speak, she first needs to conceptualize or plan her message, and then to formulate her message in the appropriate syntactic structure. The structuralized message is then passed on to the articulatory system where it is phonologically encoded and retrieved so that the message can result

[1] These models provide explanations about how an individual word in isolation is produced and not about sentence production.

in spoken output. This process progresses through successive operations in the interconnected brain regions that are responsible and are activated simultaneously for speech production (Levelt, 1989; Levelt, Praamstra, Meyer, Helenius, & Salmelin, 1998).

Automaticity is an important component of this process. Spontaneous speech is produced without much effort in the L1; yet disfluencies occur at all stages of speech production: during conceptualization, planning, formulation, or articulation of the speech plan. Disfluencies affect around 5-10% of all words and one third of all utterances in spontaneous speech (Shriberg, 2001:153). Discontinuities in speech provide valuable information on the mechanisms underlying spoken production, such as how planning occurs and is executed, what planning difficulties are experienced, and how deviations from the intended plans are managed (Dell, 1986; Levelt, 1989). They are accepted as an integral part of speech and assumed to serve a variety of functions to ensure and better achieve the continuity of normal speech. For instance, when a word is difficult to access (e.g. because it is a low frequency word), it is more likely to be preceded by a filler sound (Levelt, 1983; Schnadt & Corley, 2006). The filled pause has been reported to be the most frequent type of interruption in fluent speech (Bortfeld, Leon, Bloom, Schober, & Brennan, 2001).[2] It is also possible for speakers to fail at the formulation of the correct structure in time or convey an unintended meaning which is then corrected or repaired by the monitoring systems (Levelt, 1983). In such circumstances, the speaker gains extra time by using pauses, repetitions of words or

[2] The filled pause appears to have a complex set of functions that go beyond the indication of lexical access problems, including semantic ones, to the extent that it has been considered a lexical word (Clark & Fox Tree, 2002). A full discussion is beyond the scope of the present paper.

phrases, abandoned utterances, reformulations or repairs, all of which cause discontinuity in the flow of the speech.

The lexicon lies at the heart of language processing. In order to speak, the first thing a speaker needs to do is to retrieve the target lexical elements from the lexicon, a process which takes place at the rate of 2-3 words per second (Levelt, Roelofs, & Meyer, 1999:4). The lexicon is a complex database consisting of entries for each word, each entry including information about the word's pronunciation, multiple meanings, grammatical class, and syntactic constraints, orthography, collocations, lexical and conceptual associations, frequency of occurrence and degree of formality (Nation, 1990). Lexical retrieval entails knowing all this information about a word as well as the ability to quickly retrieve it from memory.

As far as bilinguals are concerned, automaticity of retrieval is not merely complicated by the fact that they have a greater pool of items in their lexicon to handle; they also are faced with the challenge of managing their lexicon to be able to make appropriate language choices. Many studies agree that corresponding items from different languages are activated to some degree regardless of the language that is being used. They present evidence from cross-language picture-word interference, lexical decision and priming experiments where phonologically, orthographically or semantically related alternatives (as opposed to unrelated words) delay production in the target language (e.g. Caramazza, 1997; De Bot, 2004; Dell, 1986; Dijkstra & Van Heuven, 2002, Levelt et al., 1999; Van Hell & Dijsktra, 2002). In addition, evidence from brain imaging research indicates that lexical-semantic aspects of the processing of all languages

known to an individual make use of the same areas of cerebral cortex, suggesting very close mental connections between lexical operations relating to the languages (Franceschini, Zappatore, & Nitsch, 2003).

Based on these findings, it has been proposed that conceptual representations spread activation to the lexical representations in all languages, and that these links within phonetic and orthographic features, word forms, lemmas and concepts are managed by a complex mechanism of activation, inhibition and control involved with multiple semantic or syntactic possibilities across both languages (see overviews of De Bot, 2004; Francis, 2005; Green, 1998; Kroll & Sunderman, 2003; Paradis, 1997). This joint activation of both languages requires a mechanism which resolves crosslinguistic competition. According to various psycholinguistic models of bilingual processing (Costa, 2005; De Bot, 1992; Dijkstra & Van Heuven, 2002; Green, 1986; Grosjean, 1997; Poulisse & Bongaerts, 1994) language production is non-selective and processing among bilinguals requires more resources in order to speak in one language and suppress the non-target language.

ATH and L1 Attrition

The ease or effort involved in retrieving a word stored in the mental lexicon is thought to be determined by its activation threshold (e.g. De Bot, 2004; Dijkstra & Van Heuven, 2002; Green, 1998; Paradis, 1997). According to Paradis (1993, 2004), it is mainly the frequency of use and recency of activation that determines the activation threshold. Items that are more frequently activated have low activation thresholds and need less stimulation to be reactivated than items that are less frequently activated. In other

words, frequently recalled items become more accessible and they are easy to activate while infrequently used items are more difficult to access and need more neural impulses to be reactivated. Activation of the target item not only depends on its own activation level but the activation levels of other competing items which need to be inhibited (Green, 1986).

Previous findings on the limitations of L1 attrition effects make a complete loss of the native language or severe impairment in native language skills (once stabilized before the acquisition of an L2) seem extremely unlikely. Attrition in late bilinguals can be defined as a kind of forgetting within a psycholinguistics framework and equals reduced retrievability of language knowledge (Paradis, 2007). The ATH seems like a very promising theory in order to explain L1 problems experienced by bilingual adults because it assumes that L1 knowledge is not lost but becomes more difficult to access. Migrants are immersed in an environment where daily life is primarily governed by the L2 in the domain of public services, economic, social, cultural life and education. The use of L1 inevitably becomes restricted to fewer domains (often mainly to the context of home and family) and speech events with fewer interlocutors. Within the framework of the ATH, when items from the L2 are selected, items in the L1 are simultaneously inhibited. This means that the activation threshold of the items in the less often used L1 is raised. Depending on the patterns of use, different linguistic items within the L1 system will eventually require various degrees of stimulation in order to become activated and insufficient practice or stimulation will lead to language attrition (Paradis, 1997). Therefore, the most important predictive factor for language attrition within this framework stands out as language use (Paradis, 2004, 2007).

Another essential factor related to language attrition is the role of motivation. Paradis (2007:128) equates the predictive value of motivation in successful second language acquisition with its impact on the rate of attrition. A positive emotional attitude towards one's native language and culture will lower the activation threshold enabling easy access and therefore be conducive to the maintenance of the native language. In an immigrant context, if the motivation to learn an L2 is largely instrumental, that is, if the migrant desires to learn it predominantly in order to be able to function in the host society, instead of having a desire to become a part of that society and adopt its values and culture, this too enhances their native language performance and encourages maintenance. On the other hand, if individuals would like to have access to the social life and culture and to become a part of the target language community (i.e. integrative motivation), then this is likely to affect L1 development in the opposite direction. Therefore, the type and the degree of motivation towards both languages would be expected to impact the usage of languages and the degree of L1 attrition.

Among the previously suggested external factors that potentially impact on attrition are amount of use and contact with the language (De Bot, Gommans, & Rossing, 1991; Köpke, 1999; Soesman, 1997) and emotional and attitudinal factors (Ben-Rafael & Schmid, 2007; Schmid, 2002), in accordance with the predictions made by the ATH. However, more recent investigations (Dostert, 2009; Keijzer, 2007; Schmid, 2007; Schmid & Dusseldorp, 2010; Varga, 2012) consistently point out that L1 use does not explain fluency or lexical diversity in free speech and cultural/emotional preferences do

not predict the language performance, either (Hulsen, 2000; Yağmur, 1997; Waas, 1996). In short, which external or psychosocial factors contribute to this process is still a mystery (see Köpke & Schmid, 2004 for an overview of non-linguistic factors and Schmid & Dusseldorp, 2010 for a detailed multivariate analysis of these factors' predictive role).

The Study

The present study investigates L1 performance in a migrant context within the psycholinguistic framework of ATH laid out above. Since bilingual migrants inevitably have to divide their speaking time between their two languages, they can not use their native language as frequently as they used to prior to migration and they are expected to experience retrieval difficulties and gradually become less fluent in their speech. More specifically, the study intends to find out whether or not late Turkish-Dutch bilinguals experience difficulties concerning lexical access in their native language as result of prolonged stay in the L2 environment. The key constructs of language performance addressed here are word retrieval ability, vocabulary richness and sophistication, and disfluency. What is also within the scope of this study is the sociolinguistic factors (i.e. language use patterns, ethnic affiliations and attitudes towards the host culture) that might possibly impact how the L1 develops in a migrant setting. The following questions were addressed:

1. Do late bilingual Turks have a disadvantage in accessing their L1 lexicon?
2. Do late bilingual Turks have a less diverse L1 lexicon compared to monolinguals in spontaneous speech?

3. Do late bilingual Turks tend to use more common or basic L1 lexical items compared to monolinguals in spontaneous speech?
4. Do late bilingual Turks exhibit a higher proportion of L1 disfluency phenomena in their spontaneous speech compared to monolinguals?
5. Can nonlinguistic factors (i.e. language use, attitudes, cultural preference) explain the change (if any) in spoken language performance among the late bilinguals?

The population under investigation here (n=52) belongs to the first generation Turkish community in the Netherlands, which is among the biggest non-western groups of migrants in this country. Although immigrant Turkish in Europe is a relatively well-researched language, investigations mainly centre around native and bilingual language development of the second or intermediary generations with a focus on language dominance across generations (Huls & Van de Mond, 1992), contact-induced change (Doğruöz & Backus, 2007, 2009) and code-switching patterns (see the overview in Backus, 2004; Gürel & Yılmaz, 2011). Where L1 attrition among late bilinguals has been researched, it was through controlled tests such as verbal fluency, relativization (Yağmur, 1997) and grammaticality judgement tasks (Gürel, 2002). Some examples of the investigation of adult first generation Turkish migrants' spontaneous speech are presented in Backus (1992) and (2004), Aarssen, Backus & Heijden,(2006), Boeschoten (2010) and Yılmaz (2011).

Members of this community are usually described as holding strong ethnic and linguistic affiliations as asserted by Boeschoeten, Dorleijn and Leezenberg (1993:111) "…Turks have most clearly established themselves as a recognizable cultural and

linguistic factor in the country…" This is echoed in the statements from our participants, who reported that they primarily use L1 in the family and are sensitive regarding preserving the mother tongue as a medium of communication at home with their children. Their social life is mostly governed by L1 contacts, too. Presence of many Turkish organizations possibly ensures continuous L1 contact, as well. It is very likely that endogamous marriage patterns among the Turkish community increase the proportion of familial use of L1 as a natural consequence. Frequent and long holidays in the hometown, improved communication technologies, presence of Turkish organizations and easy access to L1 media possibly help them further to preserve their ties with home and their motivation to use the L1 as reported in Backus (2005). On the other hand, utility of L1 outside these domains and professional L1 use was rather limited. However, this does not prevent the L1 from carrying a high prestige among the community members.

With respect to their attitudes towards their culture and the culture of the host society, Turks seemed to be much more comfortable with the Turkish culture than with the Dutch one. The participants reported that they had spent time within their own communities and preferred not to interact very closely with their Dutch neighbours and colleagues. It is also possible that dissenting attitudes within some segments of the Dutch society may contribute to the social segregation of the migrants. For instance, one of the participants expressed his concerns about deliberate attempts of discrimination as the following:

(1) "I don't appreciate the fact that my Dutch next door neighbour has been ignoring my presence here as a family living in a decent neighbourhood along with many other Dutch families." (TR, male)

While the broad picture is own culture and own language oriented, such generalization would not be completely fair to all members of the community since there are increasing numbers of migrants who feel close to Dutch society culturally and linguistically. For instance, the number of mixed marriages is on the increase and Dutch brides and grooms are warmly welcomed in Turkish families. While homesickness is a general characteristic, they mostly prefer to stay in the Netherlands because they consider it as their home. Some participants reported that they did not feel that they belonged to the Turkish culture because it had changed a great deal since they migrated. There are increasing initiatives to improve L2 skills in order to increase chances of employment as well as better mixing with the Dutch society. For instance, the Turkish organizations in the Netherlands create communication opportunities between the Turks and the Dutch through sports and cultural activities.

In sum, while maintaining the mother tongue and culture is noticeably important as a symbol of identity for this population, the recent trends towards developing closer intercultural and interethnic relations despite the differences between the two cultures is clearly visible.

Methodology

Participants

One hundred and four informants participated in this study. They consisted of Turkish-Dutch bilingual migrants in the Netherlands who had learnt Turkish as their mother tongue (n = 52) and their control counterparts in Turkey (n = 52). They had varying levels of Dutch proficiency and actively used both languages in their daily lives in a variety of domains. All bilingual participants migrated to the Netherlands after the age of 15 and spent at least 10 years in the Netherlands. In setting the minimum age and length of residence criteria, we wanted to make sure that they had a fully developed L1 system at the time of migration (Bylund, 2009; Köpke & Schmid, 2004; Schmid, 2011), and we decided that 10 years of stay in the L2 environment would be enough for the L1 to be affected (Beganović, 2006; Hutz, 2004; Köpke & Schmid, 2004; Schmid, 2011). A maximum of 65 years of age was set in order to eliminate any impact of aging on language performance (Goral, 2004). The reference group in Turkey consisted of monolingual speakers of Turkish who were matched with the experimental group on age, gender, birthplace and level of education on a one-to-one basis. To illustrate, for a thirty-seven year old high school graduate female participant from the city of Kayseri, a high school graduate female control who was between thirty-two and forty-two (allowing a plus-minus five year tolerance) in Kayseri was tested (see Table 1 for groups characteristics).

Insert Table 1 here

Procedure

Our data comprised sociolinguistic interviews, elicited free speech (based on Schmid, 2010) and reaction time (RT) measures from a lexical naming task. Each participant was tested individually at their homes or in an office. All steps of the data collection sessions were recorded.

The sociolinguistic interviews.

The personal background interview consisted of semi-structured autobiographical interviews, comprising (among other things) various questions on speakers' L1 and L2 use patterns, linguistic and cultural preferences and social networks. Specifically, the participants were asked to indicate what language they usually speak with their spouses, partners, siblings, (grand)children, parents, relatives, friends and acquaintances and to quantify the amount of use in each language in various contexts (i.e. family, social, workplace). They were also asked how important it was for them that their children learnt and maintained their L1, how often they corrected their children's Ll and whether they sent them to Saturday schools. They were further asked about their cultural orientations and attitudes toward their home and host countries. For instance, they were asked with which culture and language they felt more at home and more comfortable, whether they regret coming to the Netherlands and whether they felt homesick and would like to go back to their hometowns if possible. For all of these questions, participants were asked to choose a value from a 5 point-scale. For instance, for the amount of L1 and L2 use, they were asked to choose among: 0 = never L1 and all the time L2; 0.25 = seldom L1 and mainly L2; 0.50 = half the time L1 and half the time L2; 0.75 = mainly L1 and seldom L2; 1 = only L1 and never L2.

In order to reduce the large number of background variables elicited by the sociolinguistic questionnaire, we created two compound variables consisting of a number of factors that were then averaged for each migrant (following the procedure suggested by Schmid & Dusseldorp, 2010). The first pertained to interactive L1 use in all situations. This contained predictors relating (where applicable) to the use of the L1 with the partner now and previously (4 items), with children now and previously (4 items), with friends (3 items), with parents and siblings (4 items) and during visits to Turkey (1 item). A reliability analysis established the internal consistency of this scale with a Cronbach Alpha of .890. The second variable pertained to cultural affiliation and comprised 4 items relating to the preferred language and culture as well as the importance of maintaining the L1 and passing it on to the next generation. Reliability for this scale was lower than for the L1 use variable, but still good at .637. A last predictor to be included in the present study was the frequency of use of the L1 for professional purposes. This factor has previously been shown to be important for maintaining the L1 (e.g. Schmid, 2007). Table 2 shows the distribution of these predictors across the bilingual population. The participants tend to use L1 0.79 of their time and L2 0.21of their time. They tend to value and identify more (0.70) with their own culture compared to host society culture (0.30). They tend to make use of much less L1 (0.20) than L2 (0.80) at their work places.

Insert Table 2 here

Free speech.

Free speech was elicited by means of a conversation around topics of daily life, trips to the home country and experiences as migrants. The interviewer tried to ensure a spontaneous informal conversation by encouraging a natural exchange and helping the participants focus on the topic of the conversation. The sessions typically lasted about 20-30 minutes. All interviews were transcribed according to CHAT conventions (see http://childes.psy.cmu.edu). Hesitation phenomena were classified into four types: filled pauses, retractions or self-corrections, repetitions of discourse and false starts, all of which were coded according to the CHILDES standards as exemplified below. For each speech sample, individual categories of hesitation phenomena were counted and subsequently recalculated per 1,000 words. Here is a brief explanation with examples of different classes of disfluency:

Filled pauses or voiced pauses are signalled by vocalizations which do not contribute to lexical information but disrupt the flow of speech. They may take slightly different forms such as *ah*, *uh*, *eh*, *um* or *mm*. They are coded under the category of filled pause with the marker @fp regardless of the phonological variant.

(2) ikinci aah@fp sene için hazırlık ıh@fp dersanelerine gittim.
I attended the preparatory uh@fp courses for the second uh@fp year.

Retractions are reformulations where the speaker self-corrects the content, the structure or misarticulation in order to maintain syntactic and semantic coherence of an utterance she has just produced. Different types of repair strategies include error repairs, word or

phrase insertions, substitutions and deletions. In example (2), an error repair has been illustrated:

(3) <istedikleri çocuklardan> [//] eeh@fp çocukları istedikleri gibi yetiştirememişlerdir.
<the things they wanted from the kids> [//] uh@fp they couldn't raise the kids the way they wanted.

Repetitions consist of the echoing a previously uttered word or multiple words or phrases in the discourse as in (3) without any alteration in the form that had been produced.

(4) <iki sene sonra> [/] zaten iki sene sonra ellibeş ders aldım üniversiteden.
<after two years> [/] already after two years, I took fifty-five lessons at the university.

False starts are retractions that occur at the beginning of an utterance where an unintended word or part of a word has been produced and corrected immediately.

(5) ço öbür Türk çocukları…
&chi other Turkish children…

It should be noted that other disfluency phenomena such as lexical fillers (phrases or words that have weak or no semantic content such as *yani, işte*, which can roughly be

translated as “I mean”, “you know” or ”well” in English) or prolongations (vowel speech sounds at word-final positions that are stretched out for longer than a normally paced speech) are not investigated here. No systematic analysis of the silent pauses was performed on this data, either due to time constraints.

In order to measure lexical proficiency, both the variety of the vocabulary used in the speech samples (lexical diversity) and the level of sophistication (frequency) of the words that were used by each speaker were measured.[3] After excluding names and other proper nouns, a complete list of the words that occurred in the corpus was created within Computerized Language Analysis (CLAN) (MacWhinney, 2000). Content words (open class items, i.e. nouns, verbs, adjectives, adverbs) and function words (i.e. pronouns, prepositions, conjunctions, intensifiers, numbers, question words and pragmatic vocalizations) were manually identified in the total corpus of 85,196 words. There were 1,965 function words and 83,231 content words. Since function words typically recur frequently for structural reasons, all function words were excluded from the lexical diversity analysis. Homophones (phonetically identical words with different meanings) were traced back to the context in which they appeared and were counted as separate items. Then, each of the content words was lemmatized manually to eliminate inflectional variation. In the process of lemmatization, items that shared the same lemma but had various inflectional morphology (i.e. tense, case, number, person etc.) were counted as the same item, and items that were derived from other words were counted separately. To illustrate, the words *kitap* (book), *kitaplar* (book-Pl), *kitapta* (book-Loc) and *kitabım* (book-1SgPos) were all coded under the lemma *kitap* (book)

3 All transcriptions were checked for inconsistencies in spelling to prevent an artificial increase in word types.

while *kitapçı* (the man who sells books) was coded as a separate lemma. This led to a total number of 4,772 content lemmas in the corpus.

Very commonly used lexical diversity measures are based on the ratio of different words (types) to the total number of words (tokens), known as the Type-Token Ratio (TTR). A generally acceptable variant of the TTR measure is the so-called Guiraud Index (GI) created by dividing the number of word types by the square root of the number of word tokens (Guiraud, 1960; MacWhinney, 2000). A high index means that the speaker has a wide range of words at her disposal and a low index means a limited number of different words. A lemmatized version of the transcripts was created and the GI was then calculated on the basis of these texts.

In order to distinguish a speaker who predominantly uses basic, high frequency words from a speaker who is able to use more advanced words, word frequency was calculated. The general assumption is that basic words would occur more often while advanced words would occur relatively less frequently; hence the lower the frequency of a word, the more advanced or difficult that particular word is. Conversely, the higher the frequency of the word, the easier the word is (e.g. Read, 2000). However, at this moment there is no reliable spoken or written language corpus-based frequency list for Turkish. As our corpus represents a total number of 85,196 words, used by more than 100 native speakers of Turkish on similar topics, we decided to use this corpus as the basis for establishing word frequencies. For every lemma that each speaker used, it was assessed how often this word had occurred in the entire corpus. This allowed us to calculate the average frequency of content lemmas which each speaker used.

It is relevant to note here that the purpose of the semi structured interview is to allow the participants to speak as naturally as possible. All participants were asked the same questions and encouraged to speak as much as they wanted to ensure the spontaneity of conversation, which sometimes led the conversation to move into different directions and topics. In order to control for that, the percentage of unique items (items that occurred only once in the entire corpus and only used by a particular person) was calculated for each person. The low level of mean percentages among both monolinguals and bilinguals indicated that the corpus included a very small number of discourse or person specific items (2.47% and 1.25% for the controls and the attriters, respectively).

Picture (lexical) naming task.

In addition to the free speech samples described above, participants' speed and accuracy on a lexical naming task was assessed as a measure of their lexical retrieval ability (Glaser, 1992; Levelt, 2001; Levelt et al., 1999). Participants were presented with a set of experimental stimuli of 156 pictures of high (HF), medium (MF) and low frequency (LF) selected from the standardised set originally developed by Snodgrass and Vanderwart (1980). Due to the lack of a standard word frequency measure in Turkish, the frequency ratings were based on the familiarity index in Snodgrass and Vanderwart (1980). All items were checked for cultural appropriateness, and culture specific items were excluded. No cognate items across Turkish and Dutch were included. No semantically or phonologically related items followed one another (i.e. 'cow' not followed by 'goat' or *kuş* ('bird) not followed by *kuyu* ('well'). The stimuli were

presented in four randomized orders, which were counterbalanced among the participants. An HP laptop computer and serial response box with voice key controlled the presentation of the stimuli and the collection of response times.

The participant's response was measured in milliseconds (ms), and the participants had a maximum of 3000 ms to respond. The moment from the onset of the stimulus till the onset of the word was registered as the RT. The experimenter noted the responses on a sheet during the experiment (which was taped to allow later checking). Following Bates, D'Amico, Jacobsen, Székely, Andonova and Devescovi (2003), a response was coded as valid if it was the target name and had a valid RT (no false starts, hesitations, or coughs). All other responses were categorized as invalid, including incorrect responses or correct responses with invalid RTs (i.e. false starts, hesitations, coughs), responses which were not loud enough to trigger the voice key as well as correct responses which were not within 3000 ms and trials where there was no response at all. While the participants were instructed very clearly about how to do the task and a practice block was administered to allow them to get used to the task, the rate of invalid responses remained relatively high among both groups. This is partly due to the fact that not only incorrect responses were excluded but some correct answers that were preceded by hesitations or that were not detected by the microphone had to be excluded for the reliability of the results.

Results

A number of t-tests and correlations were carried out on the data in order to asses whether the immigrant population experiences any difficulties in accessing L1

knowledge. In order to see if there is a difference between the two groups, individual categories of hesitation in the spoken data were compared. Second, RT results from the lexical naming experiment are presented. Finally, correlations between the spoken performance and non-linguistic factors were investigated.

Lexical Diversity and Frequency

In order to determine whether or not there is a change in the level of richness and sophistication of spoken vocabulary of bilinguals, the lexical diversity measure GI and average frequency of content words (lemma) used in the total corpus were calculated and are summarized in Table 3. The analyses reveal that bilinguals make use of a significantly smaller vocabulary in their speech, signalling that their lexicon in free speech is not as rich or diverse as that of the monolinguals ($p<0.001$). In their vocabulary choice, they tend to prefer more basic, easier lexical items (average frequency=725.43) than monolinguals (average frequency=661.52, $p<0.001$). The usage of unique items is low across both groups but higher among the monolinguals (2.47 vs. 1.25 among bilinguals; $p<0.001$).

Insert Table 3 here

Table 4 presents a number of standard fluency measures that was carried out per 1,000 words in the spoken data: filled pauses, false starts, self-corrections or retractions, and repetitions. The comparisons between the two groups establish highly significant differences in all four categories. The bilingual group employs all of the hesitation phenomena significantly more often than the monolinguals.

Insert Table 4 here

At this point it is also interesting to note that the proportions of individual hesitation categories seem to have remained extremely stable upon becoming bilingual, as shown in Figure1 and Table 5 below. The two groups' disfluency phenomena show parallel patterns of distribution. In both groups, more than half of all hesitation phenomena consist of filled pauses (58% and 53%) and false starts make up about one fourth of all hesitation (25% and 27%). Repetitions were the least frequently occurring category among both groups (10% and 2%) followed by retractions (12% and 15%).

Insert Figure 1 here

Insert Table 5 here

Lexical Accessibility

The second analysis concerns the performance of the bilingual and monolingual populations on the lexical naming task. In this analysis, only valid responses were included and RTs shorter than 250 ms and those which deviated more than two standard deviations from the mean were excluded, as we assumed that they might have been due to malfunctions of the microphone. Table 6 displays the mean RTs in ms for the HF, MF and LF items on the picture naming task. Objects with HF names were named faster than objects with low frequency names among both groups. The t-test results yield no significance between the two groups. It is evident from the figures in Table 6 that the bilingual group is almost equally fast as the monolinguals in recalling the lexical items of all frequency levels and this can be taken as a sign of their maintained automaticity in accessing the L1 lexicon.

Insert Table 6 here

Correlations Between Extra-linguistic Factors and Spoken Language Performance

The analyses indicate that the amount of interactive L1 use, L1 use at the workplace and preferred culture do not seem to be connected to changes relating to fluency in the L1 of migrants at all as measured by their usage of false starts, retractions, repetitions and filled pauses as seen in Table 7.

Insert Table 7 here

Table 8 shows the correlations between extra-linguistic factors and the performance on the lexical naming task as measured by RT (HF, MF and LF words) and valid responses. L1 use at the workplace is related to RT on the LF lexical items ($p<0.05$) and PNT accuracy ($p<0.05$). The people who use L1 professionally more often tend to respond more quickly to infrequent or difficult items and have significantly more correct items on the lexical naming task. There are no other correlations between non-linguistic variables and L1 performance.

Insert Table 8 here

In summary, the results of the picture naming task showed that bilinguals are as good as monolinguals at recalling words when they were able to focus on the task. However, in spontaneous speech, their vocabulary choice turned out to be less diverse and sophisticated than monolinguals. In addition, their speech includes significantly more hesitation phenomena. Overall, the predictive value of extra linguistic factors turned out to be very limited as the figures in tables 7 and 8 show. The results of the present study do not give any indication of a relationship between L1 performance and attitudinal parameters.

Discussion

The purpose of this study was to explore if Turkish-Dutch bilinguals have any difficulty in first language lexical access. We wanted to assess whether they could maintain the same level of language ability in terms of fluency, lexical richness and sophistication over an extended stay in the L2 Dutch environment. One of the issues that frequently came up during the interviews with the Turkish participants living in the Netherlands was that they indicated experiencing problems remembering particular words. They said that their speech lost its productivity and creativity. They also reported that their speech did not flow as smoothly as it used to. On the one hand, they did not feel any difficulties in communication with monolinguals but they reported that they were somehow recognized as immigrants because of the way they spoke when they went to their hometowns (also reported in Boeschoten, 2000; the issue of a developing foreign accent in attriters has been addressed by De Leeuw, Schmid, & Mennen, 2010 and Hopp & Schmid, forthc.). It is possible that this perception is based to some extent on features such as unconventional word combinations (most of the time loan translations) and/or deviant use of specific lexical items, alongside slight changes in pronunciation, intonation etc. Nevertheless, immigrant participants in this study had no difficulty talking to the researcher during the interview and they acted as fully competent speakers of Turkish. However, what was clearly evidenced by the analyses was that they had reduced control over their L1 in terms of their capacity to use language in real-time.[4]

[4] An anonymous reviewer points out that the difference between our findings on controlled and free tasks may to some extent be due to the design of the priming experiments which favour a monolingual mode more than spontaneous interaction, and raises the question whether the bilingual speakers investigated here would also show the same impact of crosslinguistic interference if they had been placed in a monolingual setting in the interview. It was not possible for practical purposes to test the migrant participants while they were back in their home country, which would have placed them in such a setting. However, the set up of the experiment was completely monolingual: all tasks were administerid in the L1 by the first author of this paper, who does not speak Dutch.

Our data suggest that when attriters can focus their attention on retrieval of individual items from the L1 lexicon, they perform at the monolingual norms regardless of the level of difficulty (frequency) of the words. Therefore, as far as the lexical naming task is concerned, Turkish immigrants' language performance did not differ from their monolingual counterparts. The migrant group's overall performance in accessing L1 items seems to be immune to change despite the presence of the L2 and relatively decreased use of their L1 in the L2 environment contrary to what ATH would predict.

However in free speech, the results from the lexical diversity and frequency measures suggest that Turkish immigrants have a more restricted pool of vocabulary at their disposal for active use, which is not as rich and sophisticated as that of monolinguals. This might be due to the fact that the L1 is mainly used among the family members and in the social sphere for the bilinguals. Communication in these domains likely consists of more basic and common words and only a small part of vocabulary is mobilized in these domains. As can be expected within the ATH, it is mainly the more often activated parts of their lexicon that the immigrants tend to use in spontaneous speech and the availability of difficult and less frequently used items has decreased.

On-line speech is also found to be significantly more halting and insecure, indicated by more extensive hesitation and hedging strategies, signalling problems in on-line production. It is also interesting to note that the distribution of all the hesitation markers

---

While the naming task is a controlled experiment, the free speech and the questionnaire parts were very close to natural conversation.

appears quite similar across both groups. For instance, filled pauses are observed to be the most common class among both groups as reported by previous research (e.g. Bortfeld et al., 2001), followed by false starts, retractions and repetitions. In other words, although oral production might have become more effortful for them, the bilinguals' performance resembles that of the monolinguals in the usage of hesitation phenomena. This finding indicates that both bilinguals' and monolinguals' speech are associated with a similar processing difficulty during planning and execution (Dell, 1986; Levelt, 1989). This is in line with ATH, as there seems to be no severe impairment but an increase in the levels of disfluency. The possibility that some of the increases are due to other phenomena than access problems, for example the transfer of hesitation strategies from the L2 to the L2 (as was suggested by Schmid & Beers Fägersten, 2009) cannot be discounted, and the precise distribution of hesitation phenomena within the sentences may be an interesting objective for further study.

Further analyses of sociolinguistic factors did not allow us to establish any systematic relationships between L1 change and these attrition phenomena. Among the factors that were expected to impact the L1 processing was L1 use and cultural attitudes. Unfortunately, such factors cannot be objectively and independently measured, and experimental designs have to rely on self-reports which always carry with them the possibility that they may be somewhat unreliable or not entirely accurate. In order to minimize this possibility, the responses were elicited within a longer, detailed conversation that allowed participants to reflect upon and consider their answers, not just fill in a questionnaire, and we are confident that they gave the best information that they could. It is somewhat surprising to discover that extensive social use of L1 (i.e.

daily communication with family members and friends) does not seem to be related to fluency and lexical diversity. This might be due to the fact that daily conversations around limited topics encourage the use of basic words repeatedly and this does not contribute to language performance in the desired ways (i.e. fluent speech, rich and sophisticated lexicon). Likewise, L1 use at the workplace did not substantially impact on language performance. In this case, the reason might be that professional use of L1 is rather limited, with only four participants stating that they use Turkish in the workplace very frequently. These consist of shop owners or people who socialize with colleagues from the same L1. For those speakers, however, access to relatively infrequent (i.e. more difficult) words appears to have been easier, possibly because professional language use adds another semantic dimension from that of L1 use in the home. Overall, contrary to the assumptions of the ATH, lexical performance on both the speeded naming task and in free speech was not facilitated by frequent L1 use.

Another interesting finding which is in contrast to the predictions made by the ATH, is the lack of any relations between motivational factors and language performance. Members of the Turkish migrant community are usually described as holding strong ethnic and linguistic affiliations (Akıncı & Yağmur; 2003; Leezenberg, 1993:111). The interviews with participants for this study confirmed their attachment to their linguistic and cultural ties, too. However, participants with more positive attitudes towards the Turkish language and culture did not outperform those who felt more at home in the Dutch context on any of the language measures. This finding is in line with results from other recent attrition studies (Dostert, 2009; Schmid, 2007; Varga, 2012, among others) as well as Yağmur's (1997) study of Turkish in Australian context.

In summary, it appears that after an extended stay in an L2 environment, bilingual migrants can still approximate the performance of monolingual natives on a dedicated task, such as the Picture Naming Task used in this study. In free speech, however, their lexical access appears to be somewhat impaired, as is evidenced in a higher proportion of hesitation markers and a less diverse productive vocabulary. In the absence of any substantial impact of factors pertaining to rehearsal or attitudes, this appears to be less an effect of the process that is commonly understood to underlie attrition (a decline associated with a lack of practice, i.e. a kind of 'atrophy') and more a simple bilingualism effect: when there is more information to choose from, it takes longer to find it.

Conclusion

The findings from this study suggest that L1 lexical representations can remain intact despite an extended stay in an L2 environment, but that the mechanisms involved in accessing and integrating this information in real-time can become somewhat compromised. The monolinguals investigated here had more fluent speech, suggesting a higher degree of automaticity in language production where retrieval proceeds smoothly and a wide range of different items are available for active use. For bilinguals speaking appears more effortful, suggesting that the two languages compete for memory and processing resources (Green, 1986; Seliger & Vago, 1991). Bilinguals can mobilize a smaller amount of vocabulary and have more frequent delays and repairs that disrupt the fluency of their speech. The findings of this study clearly indicate a change as a result of general processing mechanisms (e.g. activation, inhibition) and bilinguals may

experience online processing problems, which can be called as attrition at the performance level (Sharwood Smith, 1983). In this respect, the ATH still appears a promising explanation as to how late bilinguals' control over their language system declines as a result of a complex inhibition and activation patterns. However, this framework can not account for the lack of a relationship between language use and attitudinal factors on the one hand and language performance change on the other. Moreover, it is difficult to interpret those changes as deterioration or attrition as they constitute an integral part of bilingual language development (e.g. Backus, 2004; Cook, 2003).

References

Aarssen, J., Backus, A., & Heijden, H. van der (2006). Turkish in the Netherlands. In H. Boeschoten & L. Johanson (Eds.), *Turkic languages in contact* (pp. 220-240). Wiesbaden: Harrassowitz Verlag. (Turcologica, 61).

Akıncı, M. A., & Yağmur, K. (2003). Language use and attitudes of Turkish immigrants in France and their subjective ethnolinguistic vitality perceptions. In A. S. Özsoy (Ed.), *Proceedings of the 10th international conference on Turkish linguistics* (pp. 299-309). Istanbul: Boğaziçi University.

Ammerlaan, A. A. (1996). *"You get a bit wobbly …": Exploring bilingual lexical retrieval processes in the context of first language attrition*. Doctoral dissertation, Nijmegen University.

Backus, A. (1992). Patterns of language mixing: A study of Turkish Dutch bilingualism. Wiesbaden: Harrassowitz.

Boeschoten, H. (2010). Convergence and divergence in migrant Turkish. P.145-154 In K. Mattheier (Ed), *Dialect and migration in the changing Europe* (pp. 145-154). Frankfurt am Main: Peter Lang.

Backus, A. (2004). Turkish as an immigrant language. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 689-724). Oxford: Blackwell.

Backus, A. (2005). Code-switching and language change: one thing leads to another? *International Journal of Bilingualism, 9*, 307-340.

Bates, E., D'Amico, S., Jacobsen, T., Székely, A., Andonova, E., Devescovi, A., Herron, D., Lu, C. C., Pechmann, T., Pléh, C., Wicha, N., Federmeier, K., Gerdjikova, I., Gutierrez, G., Hung, D., Hsu, J., Iyer, G., Kohnert, K., Mehotcheva, T., Orozco-Figueroa, A., Tzeng, A., & Tzeng, O. (2003). Timed picture naming in seven languages. *Psychonomic Bulletin & Review, 10*(2), 344-380.

Beganović, J. (2006). *First language attrition and syntactic subjects: A study of Serbian, Croatian, and Bosnian intermediate and advanced speakers in Dutch*. Master's thesis, University of Edinburgh.

Ben Rafael, M., & Schmid, M. S. (2007). Language attrition and ideology: two groups of immigrants in Israel. In B. Köpke, M. S. Schmid, M. Keijzer & S. Dostert (Eds.), *Language attrition: Theoretical perspectives* (pp. 205-226). Amsterdam: John Benjamins.

Bialystok, E. (2009). Bilingualism: The good, the bad and the indifferent. *Bilingualism: Language and Cognition, 12*, 3-11.

Boeschoeten, H., Dorleijn, M., & Leezenberg, M. (1993). Turkish, Kurdish and other languages from Turkey. In G. Extra & L. Verhoeven (Eds.), *Community languages in Europe* (pp. 108-142). Amsterdam: Swets and Zeitlinger.

Bortfeld, H., Leon, D., Bloom, J. R., Schober, M. F., & Brennan, S. E. (2001). Disfluency rates in conversation: Effects of age, relationship, topic, role, and gender. *Language and Speech 44*(2), 123-147.

Boyd, S. (1993). Attrition or expansion? Changes in the lexicon of Finnish and American adult bilinguals in Sweden. In K. Hyltenstam & A. Viberg (Eds.), *Progression and regression in language* (pp. 386-411). New York: CUP.

Bylund, E. (2009). Maturational constraints and first language attrition. *Language Learning, 59*(3), 687-715.

Caramazza, A. (1997). How many levels of processing are there in lexical access? *Cognitive Neuropsychology*, *14*, 177-208.

Clark, H. H. & Fox Tree, J. E. (2002). Using *uh* and *um* in spontaneous dialog. *Cognition, 84,* 73-111.

Cook, V. (2002). Background to the L2 user. In V. Cook (Ed.), *Portraits of the L2 user* (pp. 1-28), Clevedon: Multilingual Matters.

Cook, V. (Ed.) (2003). *Effects of the second language on the first.* Clevedon: Multilingual Matters.

Costa, A. (2005). Lexical access in bilingual production. In J. F. Kroll & A. M. B. De Groot (Eds.), *Handbook of bilingualism: Psycholinguistic approaches* (pp. 308–25). New York: Oxford University Press.

De Bot, K. (1992). A bilingual production model: Levelt's speaking model adapted. *Applied Linguistics, 13*, 1-24.

De Bot, K. (1996). Language loss. In H. Goebl, P. H. Nelde, Z. Stary & W. Wock (Eds.), *Contact linguistics* (pp.579-585). Berlin: De Gruyter.

De Bot, K. (2004). The multilingual lexicon: Modeling selection and control. *International Journal of Multilingualism*, *1*, 17-32.

De Bot, K. (2007). Dynamic systems and attrition. In B. Köpke, M. S. Schmid, M. Keijzer & S. Dostert (Eds.), *Language attrition. Theoretical perspectives* (pp. 53-68). Amsterdam: John Benjamins.

De Bot, K., Gommans, P., & Rossing, C. (1991). L1 Loss in an L2 environment: Dutch immigrants in France. In H. W. Seliger & R. M. Vago (Eds.), *First language attrition* (pp.87-98). Cambridge: Cambridge University Press.

De Bot, K., & Clyne, M. (1994). A 16-year longitudinal study of language attrition in Dutch immigrants in Australia. *Journal of Multilingual & Multicultural Development*, *15*, 17-28.

De Leeuw, E., Schmid, M. S., & Mennen, I. (2010). Perception of foreign accent in native speech. *Bilingualism: Language and Cognition, 13*(1), 33-40.

Dell G. S. (1986). A spreading activation theory of retrieval and sentence production. *Psychological Review*, 93, 283-321.

Dijkstra, T., & Van Heuven, W. J. B. (2002). The architecture of the bilingual word recognition: from identification to decision. *Bilingualism: Language and Cognition 5*(3), 175-197.

Dijkstra, T. (2005). Bilingual visual word recognition and lexical access. In J. F. Kroll & A. M. B. De Groot (Eds.), *Handbook of bilingualism: Psycholinguistic approaches* (pp. 179–201). New York: Oxford University Press.

Doğruöz, A. S., & Backus, A. (2007). Postverbal elements in immigrant Turkish: evidence of change? *International Journal of Bilingualism, 11*(2), 185- 220.

Doğruöz, A. S., & Backus, A. (2009). Innovative constructions in Dutch Turkish: an assessment of ongoing contact-induced change. *Bilingualism: Language and Cognition, 12*(1), 41-63.

Dostert, S. (2009). *Multilingualism, L1 attrition and the concept of 'native speaker'*. Doctoral dissertation, Heinrich-Heine Universität Düsseldorf.

Ecke, P. 2004. Language attrition and theories of forgetting: A cross-disciplinary review. *International Journal of Bilingualism, 8(3)*, 321-352.

Extra, G., & Vallen, T. (1988). Language and ethnic minorities in the Netherlands. *International Journal of the Sociology of Language, 73*, 85-110.

Franceschini, R., Zappatore, D., & Nitsch, C. (2003). Lexicon in the brain: What neurobiology has to say about languages? In J. Cenoz, U. Jessner & B. Hufeisen (Eds.), *The multilingual lexicon* (pp. 153-166). Dordrecht: Kluwer.

Francis, N. (2005). Research findings on early first language attrition: Implications for the discussion on critical periods in language acquisition. *Language Learning, 55*(3), 491–53.

Glaser, W. R. (1992). Picture naming. *Cognition, 42*, 61-105.

Kroll J. F., & De Groot, A. (Eds.) (2005). *Handbook of Bilingualism: Psycholinguistic Approaches*. New York: Oxford University Press.

Gollan, T. H., Montoya, R. I. Fennema-Notestine, C., & Morris, S. K. (2005). Bilingualism affects picture naming but not picture classification. *Memory & Cognition*, *33*(7), 1220-1234.

Goral, M. (2004). First-language decline in healthy aging: Implications for attrition in bilingualism. *Journal of Neurolinguistics*, *17*(1), 31-52.

Green, D. (1986). Control, activation and resources: A framework and a model for the control of speech in bilinguals. *Brain & Language*, *27*, 210-223.

Green, D. (1998). Mental control of the bilingual lexico-semantic system. *Bilingualism: Language and Cognition, 1*, 67-81.

Grosjean, F. (1997). Processing mixed language: Issues, findings, and models. In A. M. B. De Groot & J. F. Kroll (Eds.), *Tutorials in bilingualism. Psycholinguistic perspectives* (pp. 225-254). Mahwah (NJ): Lawrence Erlbaum Associates.

Grosjean, F. (2001). The bilingual's language modes. In J. Nicol (Ed.), *One mind, two languages: Bilingual language processing* (pp. 1-22). Oxford: Blackwell.

Guiraud, P. (1960). *Problèmes et méthodes de la statistique linguistique.* Dordrecht: D. Reidel.

Gürel, A. (2002). *Linguistic characteristics of second language acquisition and first language attrition: Overt versus null pronouns.* Doctoral dissertation, McGill University.

Gürel, A., & Yılmaz, G. (2011). Restructuring in the L1 Turkish grammar. Effects of L2 English and L2 Dutch. *Language, Interaction and Acquisition, 2*(2), 221–250.

Herdina, P., & Jessner, U. (2002). *A dynamic model of multilingualism: Perspectives of change in psycholinguistics*. Clevedon: Multilingual Matters.

Hopp, H., & Schmid, M. (forthc.). Perceived foreign accent in first language attrition and second language acquisition: The impact of age of acquisition and bilingualism. *Applied Psycholinguistics*.

Huls, E., & Van de Mond, A. (1992). Some aspects of language attrition in Turkish families in the Netherlands. In W. Fase, K. Jaspaert & S. Kroon (Eds.), *Maintenance and loss of minority languages* (pp. 99-115). Amsterdam: Benjamins.

Hulsen, M. (2000). *Language loss and language processing: Three generations of Dutch migrants in New Zealand*. Doctoral dissertation, University of Nijmegen.

Hutz, M. (2004). Is there a natural process of decay? A longitudinal study of language attrition. In M. S. Schmid, B. Köpke, M. Keijzer & L. Weilemar (Eds.), *First language attrition: Interdisciplinary perspectives on methodological issues* (pp. 189-206). Amsterdam: John Benjamins.

Ivanova, I., & Costa, A. (2008). Does bilingualism hamper lexical access in speech production? *Acta Psychologica, 127*(2), 277-288.

Jarvis, S. (2003). Probing the limits of L2 effects in the L1: A case study. In V. Cook (Ed.), *Effects of the second language on the first* (pp. 81-102). Clevedon: Multilingual Matters.

Keijzer, M. (2007). *Last in first out? An investigation of the regression hypothesis in Dutch emigrants in anglophone Canada*. Doctoral Dissertation, Vrije Universiteit Amsterdam.

Köpke, B. (1999). *L'attrition de la première langue chez le bilingue tardif: Implications pour l'etude pscholinguistique du bilinguisme*. Doctoral dissertation, Université de Toulouse-Le Mirail.

Köpke, B. (2002). Activation thresholds and non-pathological first language attrition. In F. Fabbro (Ed.), *Advances in the neurolinguistics of bilingualism* (pp. 119-142). Udine: Forum.

Köpke, B. (2004). Neurolinguistic aspects of attrition. *Journal of Neurolinguistics, 17*(1), 3–30.

Köpke, B., & Schmid, M. S. (2004). Language attrition: the next phase. In M. S. Schmid, B. Köpke, M. Keijzer & L. Weilemar (Eds.), *First language attrition: The next phase. Proceedings of the international conference on first language attrition: interdisciplinary perspectives on methodological issues* (pp. 1-45). Amsterdam: John Benjamins.

Kroll, J. F., & De Groot, A. M. B. (Eds.) (2005). *Handbook of bilingualism: Psycholinguistic approaches.* New York: Oxford University Press.

Kroll, J., & Sunderman, G. (2003). Cognitive processes in second language learners and bilinguals: The development of lexical and conceptual representations. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 104-129). Oxford: Blackwell.

Laufer, B. (2003). The influence of L2 on L1 collocational knowledge and on L1 lexical diversity in free written expression. In V. Cook (Ed.), *Effects of the second language on the first* (pp. 19-31). Clevedon: Multilingual Matters.

Laufer, B., & Nation, P. (1995). Vocabulary size and use: Lexical richness in L2 written production. *Applied Linguistics*, 16, 307-322.

Levelt, W. (1983). Monitoring and self-repair in speech. *Cognition, 14*, 41-104.

Levelt, W. (1989). *Speaking: From intention to articulation*. Cambridge, MA: MIT Press.

Levelt, W. (2001). Spoken word production: A theory of lexical access. *Proceedings of the National Academy of Sciences, 98*, 13464-13471.

Levelt, W., Praamstra, P., Meyer, A. S., Helenius, P., & Salmelin, R. (1998). An MEG study of picture naming. *Journal of Cognitive Neuroscience*, *10*, 553-567.

Levelt, W., Roelofs, A., & Meyer, A. S. (1999). A theory of lexical access in speech production. *Behavioral and Brain Sciences, 22*, 1-75.

MacWhinney, B. (2000). *The CHILDES Project: Tools for analyzing talk. Third edition*. Mahwah, NJ: Lawrence Erlbaum Associates. .

Nation, P. (1990). *Teaching and learning vocabulary*. New York: Newbury House.

Paradis, M. (1993). Linguistic, psycholinguistic, and neurolinguistic aspects of 'interference' in bilingual speakers: The activation threshold hypothesis. *International Journal of Psycholinguistics, 9*(2), 133-145.

Paradis, M. (1997). The cognitive neuropsychology of bilingualism. In A. M. B. De Groot & J. F. Kroll (Eds.), *Tutorials in bilingualism: Psycholinguistic perspectives* (pp. 331-354). New Jersey: Lawrence Erlbaum Associates.

Paradis, M. (2004). *A neurolinguistic theory of bilingualism*. Amsterdam: John Benjamins.

Paradis, M. (2007). L1 attrition features predicted by a neurolinguistic theory of bilingualism. In B. Köpke, M. S. Schmid, M. Keijzer & S. Dostert (Eds.),

Language attrition: Theoretical perspectives (pp. 121-134). Amsterdam: John Benjamins.

Paradis, M. (2008). *Declarative and procedural determinants of second languages*. Amsterdam: John Benjamins.

Pavlenko, A. (2003). I feel clumsy speaking Russian: L2 influence on L1 narratives of Russian L2 users of English. In V. Cook (Ed.), *Effects of the second language on the first* (pp.32-61). Clevedon: Multilingual Matters.

Pavlenko, A. (2004). Second language influence and first language attrition in adult bilingualism. In M. S. Schmid, B. Köpke, M. Keijzer & L. Weilemar (Eds.), *First language attrition: Interdisciplinary perspectives on methodological issues* (pp. 47-59). Amsterdam: John Benjamins.

Pavlenko, A. (Ed.) (2009). *The bilingual mental lexicon: Interdisciplinary approaches*. Clevedon: Multilingual Matters.

Poulisse, N., & Bongaerts, T. (1994). First language use in second language production. *Applied linguistics*, *15*, 36-57.

Read, J. (2000). *Assessing vocabulary*. Oxford: Oxford University Press.

Schmid, M. S. (2002). *First language attrition, use and maintenance: The case of German Jews in Anglophone countries*. Amsterdam: John Benjamins.

Schmid, M. S. (2007). The role of L1 use for L1 attrition. In B. Köpke, M. S. Schmid, M. Keijzer & S. Dostert (Eds.), *Language attrition: theoretical perspectives* (pp. 135-153). Amsterdam: John Benjamins.

Schmid, M. S. (2009). On L1 attrition and the linguistic system. In L. Roberts, D. Véronique, A. Nilsson & M. Tellier (Eds.), *Eurosla Yearbook Vol. 9* (pp.212-244). Amsterdam: John Benjamins.

Schmid, M. S. (2010). Languages at play. *Bilingualism: Language and Cognition*, *13* (1), 1-7.

Schmid, M. S. (2011). *Language attrition.* Cambridge: CUP.

Schmid, M. S., & Beers Fägersten, K. (2010). Disfluency markers in language attrition. *Language Learning*, *60*(4), 753-791.

Schmid, M. S., & Dusseldorp, E. (2010). Quantitative analyses in a multivariate study of language attrition: The impact of extralinguistic factors. *Second Language Research*, *26*(1), 125-160.

Schmid, M. S., & Köpke, B. (2009). L1 attrition and the mental lexicon. In A. Pavlenko (Ed.), *The bilingual mental lexicon* (pp. 209 – 238). Clevedon: Multilingual Matters.

Schnadt, M. J., & Corley, M. (2006). The influence of lexical, conceptual and planning based factors on disfluency production. *Proceedings of the twenty-eighth meeting of the Cognitive Science Society*, 8-13.

Seliger, H. W., & Vago, R. M. (1991). *First language attrition*. New York: CUP.

Sharwood Smith, M. A. (1983). On explaining language loss. In R. Felix & H. Wode (Eds.), *Language development at the crossroads* (pp. 49-59). Tübingen: Gunter Narr Verlag.

Shriberg, E. (2001). To 'errr' is human: Ecology and acoustics of speech disfluencies. *Journal of the International Phonetic Association, 31*, 153–169.

Snodgrass, J. G., & Vanderwart, M. A. (1980). A standardised set of 260 pictures: Norms for name-agreement, image agreement, familiarity, and visual complexity. *Journal of Experimental Psychology: Human learning and memory, 6*(2), 174-215.

Soesman, A. (1997). An experimental study on native language attrition in Dutch adult immigrants in Israel. In J. Klatter-Folmer & S. Kroon (Eds.), *Dutch overseas: Studies in maintenance and loss of Dutch as an immigrant language* (pp. 181-194). Tilburg: Tilburg University Press.

Varga, Z. (2012). *First language attrition and maintenance among Hungarian speakers in Denmark*. Doctoral dissertation, Aarhus Universitet.

Van Hell, J. G., & Dijkstra, T. (2002). Foreign language knowledge can influence native language performance in exclusively native contexts. *Psychonomic Bulletin & Review, 9*(4), 780-789.

Waas, M. (1996). *Language Attrition Downunder*. Frankfurt: Peter Lang.

Yağmur, K. (1997). *First language attrition among Turkish speakers in Sydney*. Studies in Multilingualism 7. Tilburg: Tilburg University Press.

Yağmur, K., & Akıncı, M. A. (2003). Language attrition, language shift and ethnolinguistic vitality of Turkish in Australia. *Journal of Multilingual & Multicultural Development, 20*(1), 51-69.

Yılmaz, G. (2011). Complex embeddings in free speech production among late Turkish-Dutch bilinguals. *Language, Interaction and Acquisition, 2*(2), 251–275.

Notes

Table 1

Participant Characteristics

		Age	Age at Emigration	Length of Residence
Bilinguals	Mean	43.94	21.59	22.57
(n=52)	Stdev	10.16	3.88	10.35
	Range	30-62	15-42	10-41
Monolinguals	Mean	42.35		
(n=52)	Stdev	9.43		
	Range	29-61		

Table 2

Predictor Variables

	Mean	Stdev	Min	Max
Interactive L1 use	0.79	0.14	0.37	0.99
Cultural affiliation	0.70	0.14	0.31	0.88
L1 use for Professional Purposes	0.20	0.27	0.00	1.00

Table 3

Lexical Diversity, Frequency and Unique Items

	Bilinguals		Monolinguals		t-test	
	Mean	Stdev	Mean	Stdev	t(102)	p
Guiraud	9.37	1.10	10.82	1.12	-6.67	< .001
AvFreq	725.43	88.91	661.51	82.95	3.79	< .001
Unique Item	1.25	0.79	2.47	1.10	-6.51	< .001

Table 4

Categories of Hesitation

	Bilinguals		Monolinguals		t-test		
	Mean	Stdev	Mean	Stdev	df	t	p
FPrel	34.87	29.13	20.18	17.15	82.57	3.13	0.002
FSrel	15.05	7.13	10.24	5.33	94.48	3.89	<.001
Retrrel	7.38	3.51	5.85	3.12	100.61	2.36	0.020
Reprel	3.30	2.75	1.63	1.54	80.04	3.81	<.001

Table 5

Percentages of Individual Categories of Hesitation Phenomena per 1,000 Words

	Bilinguals		Monolinguals	
	Abs.no.	%	Abs.no.	%
False Start	15.05	24.84	10.24	27.01
Retraction	7.38	12.18	5.85	15.43
Repetition	3.30	9.46	1.64	4.33
Filled Pause	34.87	57.54	20.18	53.23
Total	60.60	100	37.91	100

Table 6

Picture Naming Tasks Results: Response Times (in ms) and Percentage Invalid Responses

	Bilinguals		Monolinguals		t-test	
	Mean	Stdev	Mean	Stdev	t(102)	p
RT HF	1006.87	151.59	1002.51	129.07	0.16	0.88
RT MF	1089.49	169.64	1082.23	158.84	0.23	0.82
RT LF	1327.56	194.91	1289.31	164.55	1.08	0.28
Total RT	1123.03	153.81	1110.05	135.93	0.46	0.65
Invalid Responses (%)	16.60	4.58	18.73	8.92	-1.21	0.23

Table 7

Pearson Correlations Between Extra-linguistic Factors and Spoken Language Performance

		InteractiveL1Use	WorkL1	PrefCul
Guiraud	Pearson Correlation	-0.19	0.00	-0.15
	Sig. (2-tailed)	0.18	0.99	0.29
	N	52	44	52
FSrel	Pearson Correlation	-0.09	-0.18	0.04
	Sig. (2-tailed)	0.55	0.24	0.76
	N	52	44	52
Retrrel	Pearson Correlation	0.00	0.24	0.07
	Sig. (2-tailed)	0.99	0.11	0.62
	N	52	44	52
Reprel	Pearson Correlation	-0.81	-0.18	-0.01
	Sig. (2-tailed)	0.57	0.25	0.92
	N	52	44	52
FPrel	Pearson Correlation	-0.19	-0.10	-0.06
	Sig. (2-tailed)	0.17	0.51	0.70
	N	52	44	52

Table 8

Correlations Between Extra-linguistic Factors and Naming Task

		InteractiveL1Use	WorkL1	PrefCul
RT	Pearson Correlation	-0.07	-0.24	0.08
	Sig. (2-tailed)	0.63	0.12	0.58
	N	52	44	52
HFAv	Pearson Correlation	-0.36	-0.16	0.07
	Sig. (2-tailed)	0.80	0.31	0.63
	N	52	44	52
MFAv	Pearson Correlation	0.00	-0.21	0.18
	Sig. (2-tailed)	1.00	0.18	0.19
	N	52	44	52
LFAv	Pearson Correlation	-0.17	-0.30*	-0.02
	Sig. (2-tailed)	0.24	0.05	0.88
	N	52	44	52
PNTacc	Pearson Correlation	-0.07	-0.30*	0.11
	Sig. (2-tailed)	0.64	0.05	0.43
	N	52	44	52

* Correlation is significant at the 0.05 level (2-tailed).

Figure 1. Individual Categories of Hesitation Phenomena