The role of L1 use for L1 attrition

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Introduction

One of the basic predictions of psycholinguistic research with respect to L1 attrition is that language loss can be attributed to language disuse (e.g. Paradis, this volume; Köpke, this volume). According to this prediction, attrition will be most radical among those individuals who rarely or never speak their L1 in daily life, while those speakers who use the L1 regularly, for example within their family or with friends, will to some degree be protected against its deterioration. This assumption is based on the simple fact that rehearsal of information can maintain accessibility.

There is ample evidence to demonstrate that in bilinguals, the accessibility of items in either language system depends on what has been called the *Activation Threshold* of the item, and that this threshold is a function of frequency (how often has the item been called upon?) and time (how long ago was it last activated?) (e.g. Paradis 1993, 2004). Disuse of a language system affects accessibility of lexical items most immediately, but will eventually also impact on grammatical knowledge (Paradis 2004, this volume; Köpke, this volume). In other words, the less often a bilingual uses one of her languages, the more difficult she will find it to retrieve the correct lexical and grammatical information from memory under the time pressure of normal discourse.

With respect to L1 attrition, Paradis (this volume) makes a number of predictions from the point of view of the Activation Threshold Hypothesis (ATH, see Paradis 2004), among which the following:

    (a) language disuse will lead to gradual language loss;

    (b) the most frequently used elements of L2 will replace their (less used) L1 counterparts.

Prediction a) refers to the behaviour of individual speakers, while prediction b) hinges on the characteristics of the linguistic systems which interact in the contact situation. Interestingly,

most specific applications of the ATH have investigated hypothesis b) (Gürel 2004; Köpke 2002; Schmitt forthc.). The overall degree to which a speaker goes on using her L1, on the other hand, has largely gone uninvestigated.

This article will present some findings which indicate that the relationship L1 use/L1 attrition is not a straightforward one, and that not all situations of L1 use impact on attrition in the same way. A classification of different types of L1 use, based on Grosjean's model of language modes (Grosjean 2001), is proposed, and it is hypothesized that frequent L1 use in the different modes may impact differently on the attrition of an L1.

1. The role of L1 contact for attrition

The amount of use which a potential attriter makes of her L1 strikes most researchers intuitively as one of the most important factors in determining the attritional process (e.g. Cook 2005; Paradis, this volume). There is, however, little direct evidence that the degree to which a language system will attrite is dependent on the amount to which the language is being used in everyday life. Only two studies report that those subjects who used their L1 on an extremely infrequent basis showed more attrition over time (de Bot, Gommans & Rossing 1991 and Köpke 1999). On the other hand, there is also some evidence for a *negative* correlation, suggesting that the attriters who used their L1 on a daily basis actually performed worse on some tasks (Jaspaert & Kroon 1989).

When findings are contradictory, more often than not it is the methodology which is at fault. In the case at hand the discrepancy might be due to an unwarranted simplification of a set of relationships and speech situations. "Language use" refers to a complex pattern of behaviour in everyday interaction, and can therefore probably not easily be reduced to one dichotomous factor, which is what all of the studies cited above attempt to do. De Bot et al. (1991) and Köpke (1999) make a distinction between "more" and "less" use of the L1, while Jaspaert & Kroon (1989) use the L1 of the subject's partner as a measuring stick. This latter factor also played an important role for Schmid (2002a) and proved significant for a number of linguistic variables – in this case, however, the correlation was positive, suggesting that speakers whose partner had a different L1 from themselves made more rather than fewer errors. A further distinction of L1 use in a number of contexts (with parents, partner, siblings, and children) could not account for the variance among the attrition data found in that study either (Schmid 2002a).

The only study to date which attempts to assess the impact of L1 use in a more detailed framework is Hulsen's work on three generations of Dutch speakers in New Zealand (2000). Hulsen investigated L1 attrition within a Social Networks framework, and found that the amount of L1 contacts speakers had, particularly in their primary network, correlated strongly with speed and accuracy on a naming task. While this is an important study and an interesting finding, Hulsen does not distinguish first, second and third generation speakers in her analysis. It would therefore be premature to generalise her findings to the one group of speakers which we might call 'true' L1 attriters — speakers who completed their L1 acquisition in a monolingual setting before emigration — as opposed to heritage speakers who grew up bilingually and whose acquisition of Dutch will probably have been incomplete to some degree.

2. Language modes

The inconsistencies reported above suggest that there are important methodological issues to be addressed where the role of L1 use for L1 attrition is concerned. At the root of the problem may be the simple fact that, among bilinguals, L1 use does not necessarily equal L1 use. As Grosjean (2001) points out, it is crucial for investigations of bilingualism to distinguish between language use in the monolingual and bilingual mode (see Fig. 1).

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The difference between the monolingual and bilingual modes hinges on the relative degrees of activation of a bilingual's linguistic systems, symbolically represented in this diagram by the colour of the squares: the darker the colour, the more highly activated the corresponding linguistic system. In the monolingual mode (1), one of the bilingual's languages is largely deactivated or inhibited (Green 1998; Paradis 1993), while the other is highly activated.[1] In the bilingual mode (3), both languages are highly active, and in this type of situation, language mixing, codeswitching and interferences are very frequent. (2) represents the intermediate mode, where Language B is not completely switched off, but still far less active than Language A.

The language mode is dependent on a number of factors in any communicative setting, such as participants, situation, form and content of the message and function of the language act (Grosjean 2001: 5). Interactions with monolingual speakers of either of a bilingual's languages will typically be in the monolingual mode (unless control of language mode has been impaired, for example due to a pathological condition) and there will be little codeswitching and interference from Language B. Informal interactions with other bilinguals, on the other hand, will often take place in the bilingual mode. If, however, two bilinguals interact in a more formal context, or if the speaker knows that her interlocutor does not like to mix languages, codeswitching and interferences will be reduced, although Language B will still remain active. Such situations, then, will usually take place in the intermediate mode.

The language mode continuum has, so far, been most often applied to experimental settings, where bilinguals typically perform differently depending on the language mode within which they complete a given exercise. However, language modes also obtain outside the experimental context, in daily life. Every instance of language use by a bilingual is situated somewhere along the language mode continuum. For potential language attriters, this implies a variety of language mode settings: a German-speaking couple, for instance, who emigrated together and still use German frequently among themselves will probably do so in the bilingual mode, codeswitching frequently. They will also often use the L2 with each other, for example when non-German speaking friends are present. On the other hand, when one of them speaks to a friend or relative back in Germany, particularly someone who is unfamiliar with the L2, the conversation will be largely in the monolingual mode.

On the basis of the language mode continuum, we can therefore distinguish five types of everyday language use among potential attriters (Fig. 2).

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At the extreme ends of this continuum, largely monolingual use of L1 (Type I) and L2 (Type V) are situated. Type V, the use of the L2 with native speakers of that language who are unfamiliar with the attriter's L1, is probably the most common language use situation in daily life for the average subject of attrition studies — well-integrated immigrants with a relatively high proficiency in L2. Type I situations, on the other hand, usually play a quantitatively relatively insignificant role for most of these speakers, as there will be few monolingual speakers of that language with whom they have daily contact. This type of language use only

applies to contacts with and in the country of origin — either in distance communication via telephone, letters and/or email or during visits (both from and to that country).

The midrange of the continuum contains two situations of bilingual language use, one where L1 is the base language and one where L2 takes on that role. Informal language use among bilinguals, such as language use within the family and among friends, fall into this category. It is not possible to make a classificatory distinction between the two situational types included here, since the base language may change from exchange to exchange and therefore can only be determined if the actual speech situation has been documented. Both are therefore included under Type III.

Type II and Type IV are then the intermediate situations, where both languages are active to some degree, but one of them is used predominantly, and switches and mixing are avoided. Emigrants often report Type IV use — predominant use of the L2 with other bilinguals — when someone is present who is trying to learn the L2 (e.g. other, more recent, emigrants; visitors or Au Pairs), or when both monolinguals and bilinguals participate in the conversation. Type II situations typically include L1 use for professional purposes, for example by language teachers (who try to stick to the L1 as far as possible, but sometimes have to take recourse to the L2 for more complicated explanations), translators (who receive L2 in the input but have to produce target-like, unmixed L1 in the output) or foreign language correspondents.[2] This type of L1 use may also include interactions in heritage language clubs, societies or churches. These exchanges are usually constrained by social pressures to keep the L1 'unmixed', since the L1 and the desire to maintain it is the common denominator shared by the members of the club or church (this function will be even stronger if the L1 has a particular role for the religion). As there may be great ideological variance with respect to code-mixing between individual societies (the reports I had from the members of the German and Austrian Vancouver 'Alpenclub', for example, point towards a rather strict policy of non-mixing among its members, while Barbara Köpke (p.c.) reports a great deal of codeswitching among the members of a Montreal German language society), it will have to be established on a case-by-case basis whether such instances of L1 use are to be classified as Type II or Type III.

To summarize, I propose a distinction of the following types of L1 use:

    Type I: monolingual mode L1 use

- distance communication with country of origin (telephone, email, letters)
- visits to and from country of origin

    Type II: intermediate mode L1 use

- professional L1 use
- L1 use in clubs and societies with an (explicit or tacit) non-mixing policy

Type III: bilingual mode L1 or L2 use

- L1 use within the family
- L1 use with friends, acquaintances, colleagues

Type IV: intermediate mode L2 use

- L2 use with recent emigrants wishing to acquire L2
- L2 use with native speakers who have a rudimentary knowledge of L1

Type V: monolingual mode L2 use

- L2 use with monolingual speakers
- L2 use with bilingual native speakers of other languages

Among the groups of bilingual speakers typically investigated in language attrition studies (immigrants from cultural background relatively similar to that of the host country, e.g. Western Europeans in North America or Australia/New Zealand), Type V is probably the most frequent speech situation by far, as most of these speakers are well-integrated into the host society and use their L2 both professionally and socially on a daily basis. Type III L1 use will also be relatively frequent for some speakers (but not for all) as will Type II. On the other hand, Type I and Type IV will probably not be used on a very frequent basis by most speakers.

How often the L1 is used in these different types of situations in daily life might impact differently upon L1 attrition, since selection of the language mode is achieved by two processes: *activation* and *inhibition*. These two processes also determine the activation threshold (AT) of any given linguistic item or language system (Paradis 2004). The level of activation corresponds to the frequency and recency with which any particular item (or the overall language system) has been called upon, so the prediction is that those speakers who make more use of their L1 (and particularly those who have done so recently) will experience less accessing difficulties and other attrition phenomena. *Inhibition*, on the other hand, in our context refers to the use of L2: in order to be able to successfully access any item of linguistic knowledge, a speaker has to inhibit all competitors. Inhibition of L1 is therefore a process that speakers operating in an L2 environment routinely have to perform, and by so doing, the activation threshold of L1 items and of the overall L1 system are raised.

Since the different types of language mode introduced above may impact on activation levels of L1 and L2 rather differently, they should not be lumped together under the common factor

'L1 contact' in attrition studies. Type I use will require the inhibition of L2 to some degree. In this type of monolingual L1 use, effort expended on inhibition will be highest at the beginning of the interaction or visit, and then decrease as the monolingual mode in L1 has been established. The same process, *mutatis mutandis*, goes for activation and inhibition of L2 and L1, respectively, in Type V situations. The intermediate types, II and IV, on the other hand, will require constant inhibition of L2 or L1, as external stimuli and the knowledge that the interlocutors are also bilingual will make it more difficult to entirely deactivate that system. Lastly, in Type III interactions, little effort will have to be expended on the inhibition of either L1 or L2, since the use, mixing and switching of both is socially acceptable and contextually appropriate here.

From the point of view of the ATH, it can be predicted that frequent use of L1 in the monolingual mode (Type I) may help prevent L1 attrition, while frequent use of monolingual mode L2 (Type V) may help accelerate it. This latter type of language use (interaction with monolingual speakers of the L2) is probably the most frequent for most attriters and used on a daily basis. On the other hand, experience shows that the quantitative differences with respect to situations where L1 is the base language are quite dramatic among potential attriters. It is therefore problematic that the distinction between the different modes of L1 use is not usually made or acknowledged in L1 attrition studies.

3. Predictions

The ATH predicts that disuse of L1 and frequent use of L2 will initially lead to a higher activation threshold, that is, reduced accessibility, of lexical knowledge (Paradis, this volume). In other words, the area that will be affected first and most severely by attrition is lexical access. This will lead to a number of well-documented attrition phenomena which will manifest themselves in the following ways:

- impaired performance on lexical naming and/or fluency tasks (slower responses, reduced accuracy, e.g. Ammerlaan 1996; Hulsen 2000)
- a decrease in lexical richness in free speech (higher type-token ratios, e.g. de Bot & Clyne 1994; Schmid 2005)
- an increase in hesitation phenomena in free speech (pauses, filled pauses, repetitions, self-repair, e.g. Nakuma 1997)

This paper will attempt to assess the impact of the mode of L1 use as predictor variables on these indicators of attrition.

4. Method

4.1 Subjects

The data for this study were collected from three groups of L1 speakers of German, one in an L2 English context (in the area of Greater Vancouver, BC, Canada; n=53) one in an L2 Dutch context (in the area commonly referred to as the "Randstad", the densely-populated area of the Netherlands between Rotterdam and Amsterdam; n=53) and a control group of speakers in Germany (in the Rhineland and the lower Rhine area) who had never lived abroad for an extended period of time (n=53).

Contact with the émigrés (henceforth: attriters) was made through advertisements in both German and English/Dutch newspapers, through German clubs, churches, libraries, schools and TV channels, and through further contacts suggested by the participants themselves. The control group subjects were approached through advertisements in newspapers, through clubs and organizations whose members were assumed to be in the target age group, and through personal contacts.

We stipulated as criteria for participation for the attriters that they should have lived in an L2 environment for at least 10 years (one exception was made for a German speaker in Canada who was very eager to participate, but whose emigration was only 9 years ago). All efforts were made to control factors such as age, age at emigration, and length of residence (LOR) across groups (see Table 1 below).

Table 1: Age factors across groups*

	CA (n=53)		NL (n=53)		CG (n=53)		Total (n=159)	
	mean	stdev	mean	stdev	mean	stdev	mean	stdev
Age	63.23	10.92	63.36	9.55	60.89	11.60	62.49	10.71
Age at emigration	26.13	7.07	29.08	7.46	-	-	27.60	7.42
Length of residence	37.09	12.25	34.28	11.02	-	-	35.69	11.74

* CA=German speakers in Canada, NL = German speakers in The Netherlands, CG = control group of German speakers in Germany. Group size is not always consistent, since some speakers missed some tests for various reasons.

In addition, the groups were controlled for sex (it was not possible to achieve a 50-50 distribution of men and women, the CA and CG groups contained 35 women and 18 men, the NL group contained 34 women and 19 men) and education. For education, a variable with four levels was chosen: Level 1 comprised those subjects who attended school until the end of the German *Volksschule* or *Hauptschule*, subjects in level 2 completed the German *Realschule* or *Mittlere Reife*, subjects in level 3 had obtained the *Abitur* or *Fachabitur*, and subjects in level 4 had received a university degree. The distribution of these levels across groups was as follows:

Table 2: Education (EDU) across groups

	CA (n=53)	NL (n=53)	CG (n=53)	Total (n=159)
Level 1	13	9	13	35
Level 2	22	21	23	66
Level 3	5	6	6	17
Level 4	13	17	11	41

Unfortunately, as is clear from this table, it turned out impossible for practical reasons to achieve a complete match across groups with respect to this factor.

4.2 Materials

4.2.1 Independent variables

The aim of this investigation was to assess to what degree frequency of use of the L1 in everyday life impacts on overall performance in that language, and what role the language mode in everyday L1 use plays in this respect. Information on L1 use was elicited by means of a sociolinguistic and personal background interview, based on a catalogue of 78 questions on personal background and lasting between ½ and 1½ hours. The interview was conducted in German. The question catalogue contained a number of binary or yes/no questions (such as gender), a set of ordinal variables (such as education level), a large number of 5-point Likert-scale preference or frequency indications (such as L1 use in daily life, with family and friends, cultural affiliation, language preference)[3], and some genuine interval variables such as age and length of residence in the country of emigration. This interview was recorded and later transcribed orthographically (at the time of writing, these data are in the process of being analyzed linguistically).

For the purpose of the present analysis, three independent variables pertaining to the frequency of language use were then established:

BILMOD   This variable is an average of a total of 18 Likert-scale questions on the frequency of L1 use with family[4] and friends, i.e. in typically bilingual-mode settings

INTMOD   This variable is an average of a total of 4 Likert-scale questions on the frequency of L1 use in clubs, churches and at work, i.e. in typically intermediate-mode settings

MONMOD   This variable is an average of a total of 2 Likert-scale questions on the frequency of L1 use with speakers in Germany, i.e. in typically monolingual-mode settings

The averages per group for these variables are summarized in Table 3.

Table 3: L1 contact and use per emigration group

	CA (n=53)			NL (n=53)		
	Mean	Max.	Min.	Mean	Max.	Min.
BilModTot	0.28	0.66	0.00	0.28	0.75	0.00
IntModtot	0.29	0.94	0.00	0.35	0.81	0.00
MonModTot	0.55	1.00	0.00	0.63	1.00	0.25

4.4.2 Dependent variables

The experimental design consisted of a number of tests intended to elicit an overall picture of individual L1 proficiency (for a description of the overall design see Keijzer & Schmid 2005). For the purpose of the present analysis, the results from two of these tests will be used.

a) Verbal Fluency (VF)

The first of these consisted of two verbal fluency (VF) tasks (Goodglass & Kaplan 1983). In this task, the subject is invited to produce as many items as she can that belong to a particular semantic field (e.g. animals) or fulfil a particular phonological condition (e.g. start with the letter 'p'). Following Yağmur (1997) two semantic stimuli were used: animals on the one hand, and fruit and vegetables on the other, and a 60-second production period for both. Since it was the purpose of this task to establish lexical access in the L1, all items which were correct German terms for objects in those fields were scored, while L2 items and repetitions were omitted from the count. Items which were German terms, but were used with an incorrect article or plural allomorph were included in the count.

b) Charlie Chaplin film retelling task

The second experiment was designed to elicit relatively free speech in a controlled context. This was done by the Charlie Chaplin film retelling task (Perdue 1993). In this task, the subject is asked to watch a 10-minute sequence from the silent Charlie Chaplin movie *Modern Times*[5], and retell what happens in her own words afterwards. These retellings were between 3 and 12 minutes long (max. 2296 tokens, min 176 tokens, mean 753 tokens). They were orthographically transcribed[6] and converted to CHAT-format (for a description of CHAT see http://childes.psy.cmu.edu/).

5. Analyses

5.1 Independent variables

From the raw data described above, the following measures were established per subject:

1. *VF*: Performance on the two verbal fluency tasks was averaged to one variable, VF The results are summarized in Table 4.

Table 4: Scores on the verbal fluency (VF) tasks per group*.

	VF 1 (animals)			VF 2 (Fruit & Vegetables)			VF total		
	CA	NL	CG	CA	NL	CG	CA	NL	CG
	n=51	n=50	n=53	n=53	n=53	n=51	n=53	n=53	n=53
Mean	20.98	22.84	27.34	19.72	19.06	22.59	20.44	20.88	24.92
Stdev	5.69	6.00	5.55	5.10	4.58	5.72	4.59	4.81	4.67
Max	38	36	46	29	32	38	33,5	31	37
Min	10	11	11	9	8	9	10,5	10	15,5

2. *Charlie Chaplin film retelling task*: With respect to the retellings of the Charlie Chaplin film sequence, the following measures were established with the help of the CLAN package (http://childes.psy.cmu.edu/).

   D: The lexical diversity measure D[7] was established per subject. The results per group are summarized in Table 5.

Table 5: Lexical diversity (as measured by D) per group

	D		
	CA	NL	CG
	n=52	n=49	n=53
Mean	70.45	63.93	75.35
Stdev	17.12	15.67	17.90
Max	135.23	111.15	133.03
Min	41.21	34.70	44.76

In addition, a number of fluency measures were standardized per subject and 1,000 words of spoken data. The following phenomena were counted: pauses (PAUS), filled pauses (FP), repetitions (REP) and self-corrections (RETR). The results per group are summarized in Table 6.

Table 6: Fluency phenomena per group

	PAUS/TOK			FP/TOK			REP/TOK			RETR/TOK		
	CA	NL	CG	CA	NL	CG	CA	NL	CG	CA	NL	CG
	n=52	n=49	n=53	n=52	n=49	n=53	n=52	n=49	n=53	n=52	n=49	n=53
Mean	14.79	14.82	6.30	35.01	52.75	34.44	12.65	10.04	5.48	15.80	15.54	11.20
Stdev	14.35	14.27	10.05	26.16	35.05	24.66	11.38	6.70	5.06	8.13	9.34	6.77
Max	81.84	58.17	45.89	134.54	134.70	103.13	56.15	34.07	23.43	41.70	52.11	37.67
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00

a) One-way ANOVA

To assess whether there were discernible signs of language attrition among the experimental groups, scores on the 6 dependent variables were first compared across the three groups. A one-way ANOVA established highly significant differences on all of the variables described above (see Table 7).

Table 7: Dependent variables across groups

	df[8]	F*
VF	(2, 149)	14.124***
D	(2, 152)	5.873**
PAUS/TOK	(2, 152)	7.478**
FP/TOK	(2, 152)	6.607**
REPTOK	(2, 152)	10.371***
RETRTOK	(2, 152)	5.304**

* (One-way ANOVA, ** = p<.01, *** = p<0.001)

In other words, the three groups did perform differently on all of the measures. For all variables except filled pauses, the significance was due to a difference between both attriting groups on the one hand and the control group on the other (with respect to filled pauses, the CA and CG group behaved similarly), filled pauses were therefore dropped from the subsequent analysis. The group effects were established to be stable across age and education by means of a univariate analysis of variance (ANCOVA, see Appendix, Table 2).

5.2 Predictor variables

The ANOVAs reported in the previous section established that the attriting groups did indeed perform differently on the linguistic measures than the control group: there is evidence for attrition in the sample at hand. However, there is also considerable interpersonal variability within the attriting groups: some speakers perform much better than others (see the overview above, Tables 4-6). The predictions made above was that individual performance would be considerably influenced by the amount to which the L1 is used in daily life, and that the impact of habitual L1 use in different language modes might play different roles in facilitating language maintenance.

In order to establish the impact of these predictor variables, a linear regression was carried out on the data from the two attriting groups (n=106). The predictor variables were entered in three blocks: the first block contained a single predictor variable which has the potential to influence performance in any sample and is therefore not *per se* attrition linked, namely age at the time of data collection. In the second block, two variables were entered which have previously been shown to play a role in language attrition, namely length of residence (LOR) and education (EDU). The third block contained the variables which pertain to our research question: L1 use in the bilingual mode (BILMOD), in the intermediate mode (INTMOD) and in the monolingual mode (MONMOD). The results from the linear regression are summarized in Table 8.

Table 8: Linear regression of linguistic and extralinguistic measures

	VF		D		PAUSE		REP		RETR	
	R^2 chg	ß	R^2 chg	ß	R^2 chg	ß	R^2 chg	ß	R^2 chg	ß
	.038		.016		.005		.000		.001	
AGE		-.194*		-.128		.073		-.002		.031
	.036		.083		.014		.037		.056	
LOR		-.168		-.316		-.192		.308		.396*

EDU	.157	.199	.014	-.023	.033
	.052	.008	.046	.034	.004
BilMod	-.010	.045	-.048	.095	.032
IntMod	.170	-.067	-.025	.171	-.005
MonMod	.127	-.061	-.194	-.082	-.069
	$R^2 = .125$	$R^2 = .108$	$R^2 = .065$	$R^2 = .071$	$R^2 = .061$
	$F_{(6, 99)} = 2.358^*$	$F_{(6, 95)} = 1.912$	$F_{(6, 94)} = 1.096$	$F_{(6, 94)} = 1.198$	$F_{(6, 94)} = 1.014$

From these results it is evident that the age of the speaker does not impact on performance in free speech. It is only where the VF is concerned that there is a slight interaction (this finding is unsurprising, since elderly speakers have often been found to perform more weakly on fluency tasks). EDU and LOR also appear not to interact with performance, the only measure where there is a significant interaction with LOR is RETR: those speakers who have a longer emigration span self-correct slightly more often than speakers at the lower end of the LOR spectrum.

Most astonishing, however, is the fact that there is absolutely no interaction between any of the lexical access, lexical diversity and fluency measures used here on the one hand and frequency of L1 use in daily life in any language mode.

In order to assess whether any one language use variable might, after all, have an effect on the performance which in the above tests was masked in the cumulative variables, several more linear regressions were performed. Blocks 1 and 2 were left unchanged (and will not be reported here). The first analysis entered two variables in block 3: L1 use within the family (i.e. with partner, children and grandchildren, BILMOD1) and with friends (BILMOD2). The second set of analyses investigated language use in the interactive mode in more detail: INTMOD1 comprises L1 use in German clubs, churches etc., while INTMOD2 represents the use of the L1 for professional purposes. Finally, the third set of analyses distinguishes L1 use in the monolingual mode in distance communication (MONMOD1) and during visits to Germany (MONMOD2). The results are summarized in Table 9:

Table 9: Linear regression of linguistic measures and language modes

	VF		D		PAUSE		REP		RETR	
	R^2 chg	ß	R^2 chg	ß	R^2 chg	ß	R^2 chg	ß	R^2 chg	ß
	.020		.040		.015		.025		.000	
BilMod1		.175		.189		-.129		-.042		.021
BilMod2		-.086		-.209		-.019		.175		-.021
	.074*		.013		.043		.035		.048	
IntMod1		.037		-.115		.049		.194		-.152*

IntMod2	.275**	.021	-.204*	.030	.161*
	.024	.032	.048	.009	.004
MoMod1	.132	.054	-.199	.063	-.029
MoMod2	.099	-.181	-.100	-.078	-.059

Again, the results are meagre. Subjects who regularly use their L1 for professional purposes achieve a slightly higher VF score and use slightly less pauses in free speech. None of the other measures has any impact.

6. Discussion

Considering how widely accepted the dictum is that L1 use prevents L1 attrition, the results presented above are quite startling. While the initial analyses clearly showed *that* the attriters differ from the control group speakers, there is little or no correlation with the self-reports on frequency of L1 use. In other words, while there clearly is an attrition effect, the amount of use of the L1 in daily life does not seem to have any predictive power for this effect.

In other areas of bilingual investigation, the impact of frequency of activation on accessibility has clearly been established. The findings from this study, however, suggest the possibility that frequency and recency of activation play a less prominent role in L1 attrition than they do in other bilingual or multilingual contexts. This suggests a rather intriguing possibility: it is probably safe to claim that there are no other areas of abstract knowledge that are rehearsed as extensively as a linguistic system that is acquired in a monolingual setting until adulthood. It may thus be possible that there is a kind of saturation point of rehearsal. Such a process of stabilization of knowledge through massive rehearsal has been suggested as one possible explanation for the so-called Critical Period, as an alternative to biologically-based brain plasticity models (Pallier, this volume). I would suggest the possibility that once this point has been reached, frequent activation is no longer necessary to maintain accessibility, and that in such a case, inhibition becomes the process which impacts upon the activation threshold. In other words, attrition among attriters might depend less on the mere frequency to which the L1 is continued to be spoken than had previously been assumed, since quantity of contact might be more important than pure quality, and more and more to the fact that monolingual mode use of the L2 demands that the L1 be inhibited (see also Köpke, this volume).

In this context it is interesting to see that, meagre though they are, those predictors that do have a significant impact on lexical access and diversity all belong to L1 use in the intermediate mode. It should therefore also be considered that virtually any experimental setting investigating L1 attrition belongs to that same type of interaction. The participants in the investigation will be aware that the investigator is proficient in their L2, and furthermore the setting is usually the subject's country of residence, so that L2 can be considered quite active and visible. On the other hand, the relative formality of the situation (a scientific experiment) and the prestige of the investigator (an academic, a scientist) will in all probability signal to the subject that codeswitching is less appropriate in this situation than it would be in an informal interaction with friends. As was pointed out above, this is probably the type of situation in which inhibition of L2 is most difficult.

It is therefore possible that the results presented above are to some degree the outcome of more or less 'practice' with L1 use and L2 inhibition in this kind of situation. Subjects who routinely use their L1 in this type of interaction may find it easier to inhibit their L2, and this might account for the better results and easier access to L1 which these subjects have shown on some of the dependent variables.

If such were to be the case, then the impact of both L1 and L2 use in the situations detailed above for other types of linguistic knowledge should have to be further looked into. The present study has confined itself to issues of lexical accessibility. Further studies should investigate to what degree grammatical knowledge (e.g. with respect to inherent and contextual inflection, such as gender and plural information across the NP, or information on tense inflection of words) is affected.

Most of all, however, the findings from this investigation suggest that it is relatively meaningless to study the attrition and use of only one of a bilingual's languages in isolation, and exclude the development and use of the other. The results above suggest a delicate balance of the two language systems and their activation, inhibition, and accessibility. To what degree actual underlying knowledge is affected by this state of balance, which is probably in continual shift across the lifespan, and almost certainly affected by far more parameters than this study has thought to include, is, and remains, a mystery.

paper. With respect to the statistical analysis, I would like to thank Elise Dusseldorp for her insights and advice. Any remaining mistakes and oversights are mine.

Notes

[1] There is strong experimental evidence (e.g. van Hell & Dijstra 2002) that none of a bilingual's languages can ever be completely switched off, so the square can never become entirely white (Grosjean 2001).

[2] Note that predominantly social or informal use of the L1 with other bilingual colleagues does not fall into this category.

[3] In line with common practice in the social sciences, these Likert-Scales were treated as interval variables.

[4] The term "family" here refers to partner, children and grandchildren in the country of emigration.

[5] The sequence commonly used in this experiment starts ca. 33 minutes into the film, at the scene where Chaplin (freshly released from prison) applies for work at a shipbuilding company. It ends ca. 10 minutes later, when Chaplin and Goddard wake up from their daydream outside a little suburban home, to find a policeman is watching them, and walk off together.

[6] I am grateful for the dedicated work of two student assistants, Anja Fislage and Linda Marie Schulhof, who were responsible for most of the transcriptions.

[7] D is a measure of lexical diversity that is based on type-token frequencies. Unlike the traditional TTR, which is highly sensitive to sample size, however, D is robust even if applied to text samples of varying length (see MacWhinney 2006: 134ff.; McKee, Malvern & Richards 2000).

[8] The degrees of freedom vary somewhat for individual measures, since not all participants were able to complete all tests.

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Appendix

Table 1: ANCOVA dependent variables

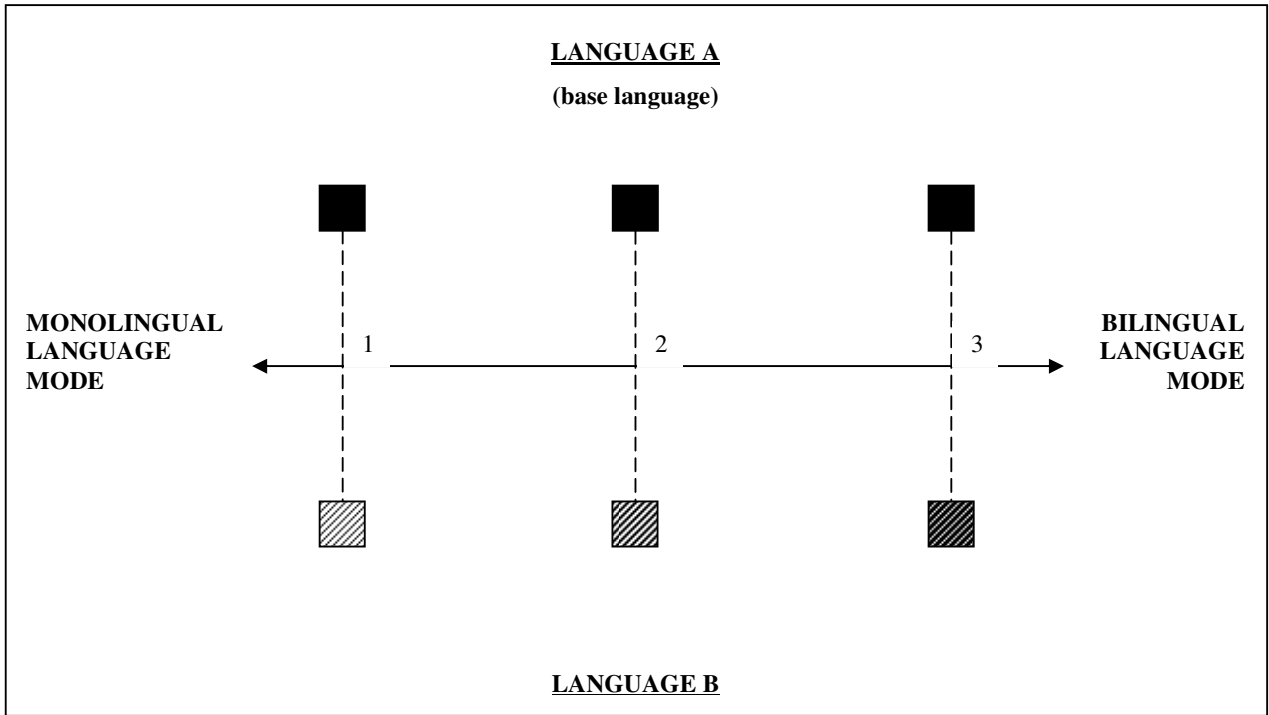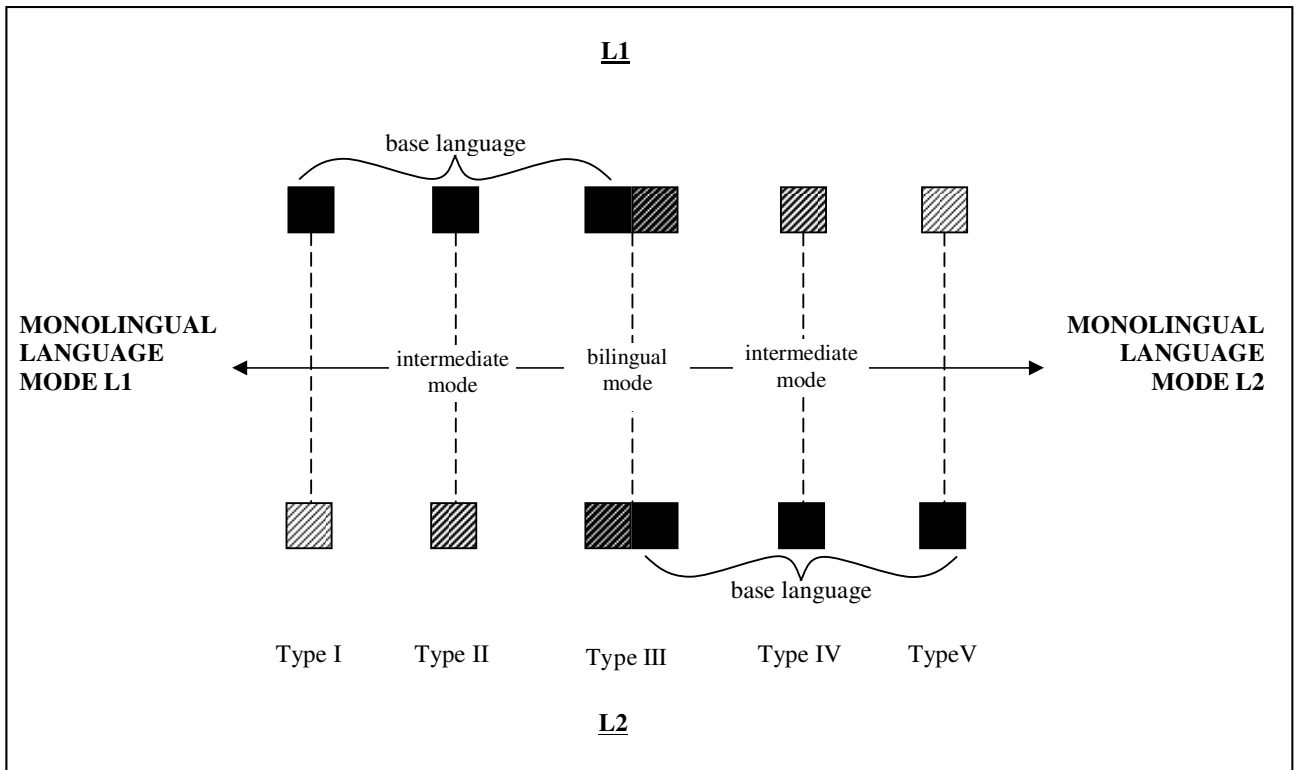| Variable	Group	Age	Education	R^2
VF1	.000	.095	.022	.244
VF2	.006	.012	.706	.121
D	.002	.178	.026	.129
PAUS/TOK	.010	.678	.511	.067
RETRTOK	.009	.297	.606	.080
REPTOK	.000	.952	.629	.103

Fig. 1: The language mode continuum (Grosjean 2001:3, his Fig. 1.1)

Fig. 2: Types of L1 use among emigrants