Chapter 13   First language attrition and bilingualism

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Abstract

A considerable amount of research has been devoted to exploring how bilinguals accommodate their languages. Since it has long been assumed that the native language, once completely acquired, would be immune to change, this research has mainly been focused on L2 development and L1 interference in the process of L2 learning. However, psycholinguistic and neurolinguistic investigations into the bilingual mind have consistently demonstrated that interaction between languages is two-way and that bilinguals use and process their native language differently than monolinguals. While the precise nature of this phenomenon and the linguistic and psycholinguistic determinants involved have not been completely explored, the symptoms ascribed to first language attrition are unanimously characterized as a natural part of the developmental process in bilingualism. As attrition research has considerably advanced our knowledge on the impact of later-learned languages and bilingualism on the L1 and the loss of L1 skills, this has led to the realization that L1 attrition forms a vital component of research into bilingualism. This chapter will present a synthesis derived from the findings of previous studies on first language attrition in adult speakers in an attempt to explain the extent to which native language knowledge can become compromised, and how. It will also demonstrate how including these speakers in bilingualism investigations may help us explore the limits and possibilities of our language capacity and provide additional insight into controversial issues in second language acquisition research such as maturational constraints and the nature of L2 knowledge in late learners.

1. Introduction

Forgetting a later-learned language, such as a foreign language studied at school, is something that most L2 learners would agree is common, but forgetting one's native language (a process referred to as first language attrition, henceforth simply attrition) is often assumed to be close to impossible. If a speaker does experience attrition, the immediate assumption is that she must have high command of another language and have lived in another language environmnet for a long time. In fact, attrition is not an extreme phenomenon but common to almost all people who routinely use more than one language (Cook 2003). All speakers living in bilingual contexts experience a certain amount of change to their L1, partly through non-use (loss of accessibility) and partly through interference from the dominant contact

language (competition). They may lose some of their productivity and creativity in their native language, make occasional grammar errors and speak with a foreign accent. Yet, they are astonishingly proficient and can still outperform all but the most advanced L2 speakers, often even after having lived abroad for decades.

Such observed changes in the native language, comparatively minor though they may be, have left researchers intrigued by the question of whether a language (or parts of it) acquired completely during childhood and reinforced/stabilized over a number of years can ever be lost or forgotten. Psycholinguistic investigations have contributed to our understanding of how languages are managed in the bilingual mind and how the native language is affected by the dynamics of bilingualism. These approaches have provided evidence for a two way interaction between the languages, which begins at the initial stages of learning (van Hell and Dijkstra 2002, see Coderre 2015 for review). For example, in word production, cross language cognates are usually named faster compared to non-cognate items (for reviews see Friesen, Jared & Haigh, 2014; Hameau & Köpke, 2015) whereas auditory distractors that are phonologically related to the L1 translation of an item can delay the response in the L2, indicating that the L1 translation is active at the same time (Hermans et al. 1998). These findings have been attributed to the fact that speakers can never switch off either language entirely; that is, both languages are simultaneously activated regardless of the language which has been selected for production (Spivey and Marian 2003, Wu and Thierry 2010, see Kroll and Sunderman 2003 for review). This makes the management of the bilingual language system cognitively more demanding and bilinguals may take extra time and effort to resolve cross-linguistic influences (Green 1986, Levelt et al. 1991, Kroll et al. 2008).

Co-activation is not limited to the lexical domain but can also affect syntactic processing and phonology. It has, for example, been argued that structures which share the same word order are shared across languages (Bernolet, Hartsuiker & Pickering, 2007, for a review of non-selective syntactic activation see Sanoudaki & Thierry, 2015). Dussias and Sagarra (2007) found that native Spanish speakers who had extensive immersion experience in their L2 English environment parsed Spanish sentences in the way native English speakers would. Similarly, the way in which bilinguals carve up the phonetic space appears to differ from that of monolinguals, affecting both perception and production in either language. In his classical study on phones, Flege (1987) demonstrated that the French-English bilingual speakers merged L1 and L2 categories as evidenced by their intermediate pronunciation of some phones in both languages, and similar findings have often been reported since (for a recent overview see Bergmann, Nota, Sprenger & Schmid, 2016).

The cognitive impact of speaking two languages has been shown to extend beyond crosslinguistic interaction at these linguistic levels. It has been proposed that bilingual experience can transform the way people think as a result of restructuring at the conceptual level in some of the classical Whorfian

dimensions of categorization of colours, objects and events (Jarvis and Pavlenko 2008, see Bassetti and Cook 2011 for review). For example, Jameson and Alvarado (2003) reported an enlargement in the blue/green category of Vietnamese-Russian bilinguals compared to Vietnamese controls. They attributed this shift to the influence of Russian which has a finer distinction in this category (separate words for green, light blue and dark blue) on Vietnamese which has a single word to express this category. Bilinguals were also found to consistently differ from monolinguals in object categorization (Athanasopoulos and Kasai 2008, Cook et al. 2006) and gesturing about events and motion (Brown and Gullberg 2008, Cadierno and Ruiz 2006) whenever these properties are encoded differently in the L2 (see Athanasopoulos 2011 for review).

In the process of negotiating two languages, bilinguals also need to manage two cultural systems which can become as interrelated as the languages they speak. The impact language can exert on cultural values has been demonstrated in cultural priming experiments where an individualistic or collectivistic mindset is triggered by certain cues. For example, priming could be done by circling singular or plural pronouns or changing the language of the instrument (e.g., Chinese versus English) (Lee et al. 2010, see Oyserman and Lee 2008 for a review). When the cultural mindset cue and the task were congruent, the tasks in general were accomplished more quickly and accurately. While evidence for such conceptual restructuring has been mainly documented in L2 speakers with high levels of proficiency or long periods of exposure, this is still remarkable as it demonstrates that L2 perspectives can be internalized to the extent that the speakers come to prefer the L2 categories over those that were previously favored.

It thus seems evident that the difference between the bilingual and the monolingual mind encompasses all levels of linguistic representation, production and cognition. The findings from the above studies strongly suggest the presence of an integrated bi- or multilingual supersystem in which both languages are affected by the other one at all levels (Cook 2003, Grosjean 1989). While many of the effects that have been observed in the L1 are typically subsumed under the label of 'attrition', it should be emphasized that such interaction phenomena do not necessarily constitute (structural) loss or deterioration. For example, bilinguals might borrow elements from the L2 and integrate them phonologically and/or morphologically; extend the meaning of an L1 word to capture the meaning of its L2 translation equivalent or converge the L1 term with its L2 meaning. They may also experience shift away from L1 structures to approximate those of the L2 (Pavlenko 2011). All these occurences arise as a natural outcome of becoming bilingual and do not indicate that corresponding L1 features are lost (Schmid 2013). The term 'attrition', as we use it here, encompasses such changes.

Language attrition as a research topic has been on the rise since the early 1980s, with many studies focusing on in identifying its indicators and determining those linguistic areas vulnerable to attrition. A large number of investigations of particular lexical and grammatical features have been

conducted in a variety of attrition settings within various frameworks (e.g., the Principles and Parameters approach, Gürel 2002, McCormack 2001, the Minimalist program, Montrul 2008, Tsimpli, Sorace et al. 2004; and the 4-M Model, Gross 2004, Schmitt 2004; for overviews see Köpke & Schmid 2004, Schmid 2016). An important question in this respect is what the extent of these attrition effects is, and if the attrited system can come to resemble that of an advanced L2 speaker to a greater degree than that of a native speaker. Resolving this issue would have important implications regarding the privileged nature of the first language and constraints to ultimate attainment in L2 learning: if an attriter can come to structurally resemble an L2 speaker, this would be strong evidence against maturational constraints and suggest that the limitations of bilingual development are the outcome of competition between the linguistic systems, not to some form of privilege of a language learned in childhood over other languages learned later on.

2. Scope and limitations of attrition effects

The process of first language attrition implies a gradual weakening of language skills and habits caused by a limitation in use and input of the native language due to moving into an environment where another language is dominant. Attrition can manifest itself in a variety of phenomena in the L1, such as interferences from the L2 at all linguistic levels (lexicon: Köpke 2002, Pavlenko 2009; Schmid & Jarvis, 2014, Yılmaz & Schmid, 2012; morphosyntax: Gross 2004, Gürel 2007, Yılmaz 2011; phonetics, Bergmann, Nota, Sprenger & Schmid, 2016; de Leeuw, Mennen & Scobbie 2012, Major 1992, 1993, Mayr, Price & Mennen, 2012; pragmatics, Dewaele 2004, Pavlenko 2002), a simplification or reduction of the L1 system (Seliger and Vago 1991), or disfluent speech with a high proportion of pauses and self-repairs (Köpke 1999, Schmid and Beers Fägersten 2010; Bergmann, Sprenger & Schmid, 2015). As was pointed out above, however, these phenomena need not be evidence of structural loss or change, but may be due to the on-line competition of languages. Sharwood Smith (1989, 2007) approached this question from a psycholinguistic point of view, suggesting that attrition can affect the underlying linguistic knowledge and/or the control of this knowledge which is still present intact in the mind (e.g., qualitatively divergent knowledge and/or retrieval and processing issues). It has often been hypothesized that the properties that belong to the core grammatical system are less susceptible to change whereas peripheral grammatical domains are affected first and more easily in language contact situations (Gürel 2004, Köpke 1999, Sorace 2011). The most obvious findings related to L1 attrition in the form of structural changes or loss of certain grammatical features have primarily been reported for early bilinguals who were exposed to an L2 in childhood or before puberty while attrition effects in adult bilinguals are usually found to be minimal (Silva-Corvalán 1991, Kim et al. 2010, Schmitt 2004).

In one of the key publications on first language change in adult bilinguals, Cook (2003) put together individual investigations on verbal and case morphology, word order, prepositions and the pronominal domain, among others. He reports that changes observed in the languages investigated are generally related to reduction in morphologically marked categories and simplification of costly syntactic operations. He proposes that it is natural for L1 morphosyntax to be open to influence from L2 because languages residing within the same mind form a super-system at some level and operate together (p.1-2). Most of the initial studies of attrition have dealt with production rather than perception, which makes it hard to determine whether the speakers' deep level knowledge has diverged from the native norms or whether any differences found can simply be ascribed to difficulties in online speech due to retrieval and processing problems. Studies that did employ tasks which tap into underlying knowledge have often failed to demonstrate any dramatic signs of grammatical restructuring or loss in competence, suggesting instead tht attrition is a largely on-line phenomenon. For example, a recent investigation of German L1 speakers immersed in an English-speaking background finds phenomena such as phonetic adaption in some L1 speech sounds towards the L2 values, an increase in hesitation markers and a decrease in the use of fixed expressions, but no change in EEG responses to violations of grammatical gender concord (Bergmann, forthc.). Findings such as these indicate that the mechanisms involved in accessing, integrating and producing information in real- time has somewhat become compromised due to sharing memory and processing resources while the deep knowledge has remained intact (Green 1986, Seliger and Vago 1991).

Other findings similarly suggest that attrition is a phenomenon that is largely located at the interfaces between grammar and other linguistic modules, rather than a phenomenon that will affect core grammar. For example, Perpiñán (2011) compares the production and comprehension of Spanish subject-verb inversion in two contexts (one where inversion is obligatory and one where it is optional) among Spanish-English bilinguals. She finds that, in the production task, the optional condition is affected while the obligatory one remains native like. In the comprehension task, on the other hand, the bilinguals behave like the monolingual natives in both conditions.

Similar findings concerning the selectivity of attrition processes are presented by Gürel and Yılmaz (2011), who investigate the binding properties of Turkish pronouns in Turkish-Dutch bilinguals. The Turkish overt pronoun *o*, unlike the Dutch pronoun *hij/zij* or the English pronoun *he/she,* cannot be coreferential with the sentential subject (*Murat$_i$ onun$_{*i/j}$ sinemaya gideceğini söyledi*/ Murat$_i$ zei dat hij$_{i/j}$ naar de bioscoop zou gaan/Murat$_i$ said that he$_{i/j}$ would go to the movies), while the overt pronoun *kendisi* as well as the null pronoun allow both a bound and a disjoint reading. As was predicted, the interpretation of *o* had shifted for the bilinguals towards the L2 settings, who allowed a bound reading in sentences such as the one above at a higher percentage than the monolingual controls.

These findings support Sorace's (2005, 2011) argument that attrition affects the ability to process structures that involve interfaces between syntax and other modules, not the syntactic knowledge itself (i.e., pure syntactic options). As a consequence of extensive exposure to L2, together with decreased input in the L1, interface structures become vulnerable to attrition leading to emerging optionality in the attrited speakers rather than permanent change/deficit (Tsimpli 2007). Whenever bilinguals go for the less preferred option in their L1 (as a result of converging L1 and L2 categories), it indicates flexibility of the system rather than the deterioration of this category in the L1 knowledge. Sorace and her colleagues' contention is that this is an expected outcome of the reorganization of the language system as a result of integrating the new learned L2 structures in to the language system and it allows bilinguals to efficiently cope with cross-language competition (Chamorro et al. 2015). This account also explains why the signs of language attrition among late bilinguals are usually comparatively subtle and often not consistent, leading to relatively minor differences between attriters and controls at the group level (Backus 2004; Jaspaert and Kroon 1989, Gürel 2002; Gürel and Yılmaz 2011; Tsimpli 2007 among others).

Grammatical categories are not the only linguistic features that may shift towards the values of the L2 in the process of L1 attrition. A similar process of the adaptation of some of the settings of the linguistic system of one language towards those of the other can be witnessed in the phonetic domain. One of the most influential theoretical approaches to L2 phonology, Flege's Speech Learning Model (SLM, e.g. Flege, Schirru & MacKay 2003; Flege 1995, 2002) assumes that similar phones in a bilingual's two languages exist in a shared phonetic space (similar to Cook's (2003) notion of a linguistic supersystem described above), and that within this space, they will mutually influence each other. A number of investigations on bidirectional crosslinguistic influence in speech production, beginning with Flege's investigation of late French-English and English-French bilinguals (1987), have shown that this is indeed the case and that the process of adaptation can be witnessed in both of a speaker's languages. His original findings on shifts in Voice Onset Time (VOT) have since been replicated in studies of Brazilian Portuguese and English (Major, 1992); English and Dutch (Mayr, Price & Mennen, 2012; Schmid, Gilbers & Nota, 2014) and English and Korean (Chang, 2012); and it has also been shown that these effects are not confined to late L2 learners: Fowler, Sramko, Ostry, Rowland, and Hallé (2008) find the same pattern in simultaneous French-English bilinguals. Bidirectional changes have also been found for the production of some vowels (Bergmann et al. 2016), the production of lateral /l/ in German-English bilinguals (de Leeuw, Mennen & Scobbie, 2012) rhoticity (de Leeuw, Scobbie & Mennen, 2012; Ulbrich & Ordin, 2014; Himmel & Kabak, 2016) and suprasegmentals (Mennen, 2004). At the same time, a range of studies on perceived global foreign accent finds that attriters are not reliably identified as native speakers by native raters (Bergmann et al., 2016; de Leeuw, Schmid & Mennen, 2010; Hopp & Schmid, 2013; among others). Attrition at this level is possibly more prevalent than other types of attrition, as

attriters themselves often report that they are recognized by the way they speak/stand out when they return to their country of origin (Boeschoten 2010, Yılmaz and Schmid 2012).

A pioneering investigation into foreign accent provides interesting insight into the distinction between attrition at perception level (in the deep knowledge) and the performance/surface level. While the studies investigating the pronunciation skills of attriters listed above had their speech rated for perceived accentedness by native controls, Major (2010) investigated to what extent attriters' ability to perceive a foreign accent in their own native language might also be subject to changes In order to tap into underlying phonetic abilities, Major asked Brazilian immigrants to the US to rate speech samples from a corpus of native and nonnative recordings of Brazilian Portuguese for the degree of foreign accent they perceived to be present. The participants were long term residents in the US and used English and Portuguese daily. They were surprisingly accurate in their judgments of the native speakers, implying that their ability to distinguish between native and nonnative speech properties was still intact. However, they were not as successful in ratings of nonnative samples and accepted more variants as native. This does not indicate a wholesale restructuring but suggests that the native speech spectrum has been widened, due to their being exposed on a daily basis to a larger range of different variants of their L1 in an L2 environment (e.g., other attriters, heritage speakers, speakers of other dialects of their L1 and L2 speakers).

Taken together, these findings of attrition at the level of grammar and phonetics suggest that attrition is primarily a processing- or control-related phenomenon which manifests itself in performance related problems (Sharwood Smith and van Buren 1991) and increasing flexibility in certain categories leading to the optional use of some target forms (Sorace 2005). This conclusion seems plausible because attrition has been observed to be temporary in some cases. Once they are re-immersed in an L1 environment, speakers gradually become attuned to the way monolinguals speak again (Herdina and Jessner 2002; Genevska-Hanke 2016).

3. Factors in attrition

Quantitative investigations of L1 attrition often reveal differences between attriters and nonattrited controls at the group level on measures such as grammatical complexity and accuracy, lexical diversity and sophistication, fluency and perceived native-likeness in speech as well as in their performance on experimentally controlled tasks. However, attriters' performance at the individual level is often less consistent, with some speakers performing within the native range and others failing to reach native levels. It is also often not the same speakers within any one investigation who fall outside the native range on different tasks (e.g. Bergmann, forthc.). Some appear to have maintained their knowledge across the whole range of measures while others' performance is affected variably at different linguistic levels (e.g.,

decreased lexical accessibility but intact morphosyntax). This high rate of inter- and within- individual variability has led to a search for the factors contributing to attrition. This is further complicated by the fact that attriters themselves tend to form extremely heterogeneous groups with respect to the context and frequency of use of their languages and the degree of bilingualism. Further contributing or counfounding predictors include personal background factors such as age of acquisition, education and length of residence in the L2 country; as well as social and psychological variables linked to attitude, motivation and affiliation. Given the fact that most, if not all, individual predictor factors interact with others, leading to a complex web of interrelated factors (de Bot 2007, Herdina and Jessner 2002), it has been a real challenge for the attrition research to identify the factors that determine the development of attrition or retention.

The factor that is usually assumed to be the most important by both researchers and laypeople relates to the amount of L1 use in daily life (de Bot 1998, de Bot et al. 1991, Herdina and Jessner 2002, Köpke 1999, Laufer 2003) and in particular in domains outside the home (Hulsen 2000). However, most early studies determined the amount of L1 use in a simplistic and often dichotomous way, e.g. by asking participants if they used more or less L1 or if they made frequent or infrequent use of their L1. This has led to the establishment of a more fine-grained measure of language use in the Language Attrition Test Battery developed by Schmid (2011) (available at languageattrition.org). Part of the test battery is a sociolinguistic questionnaire containing a set of items on interactive language use in different contexts. This instrument was subsequently used in a number of studies, which – rather surprisingly and somewhat counter-intuitively – revealed the impact of language use in informal settings on language maintenance to be much more smaller than previously assumed (e.g., Cherciov 2011, Dostert 2009, Opitz 2011, Varga 2012, Yılmaz 2013). It is only L1 use for professional purposes which apparently has the potential to slow down the rate of attrition (Schmid 2007, Schmid and Dusseldorp 2010).[1]

A possible explanation for these rather surprising findings is proposed by Schmid (2007), who argues that the native language of a monolingual speaker may reach a certain level of stability or 'saturation threshold' at some point in the process of language acquisition, due to its very frequent activation. Once this 'resting level' has been reached, frequency of use may become less relevant for the maintenance of the language system, and online attrition effects may be more indicative of unsuccessful inhibition of the L2 than of failure to access the L1 values or settings. Following Grosjean (2001); Schmid further suggests that variability in attrition phenomena are related to the use of language in different modes (i.e., monolingual and bilingual mode) and on how these modes impact on language

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[1] It should be noted here that a potential problem for such investigations relates to the fact that L1 use can only be assessed through self-evaluations, which may not always be accurate reflections of linguistic behaviour.

inhibition. In her investigation, frequency of use of the L1 in bilingual mode contexts played no role in protecting language against attrition, which she ascribes to the fact that code-switching is acceptable and frequent in such settings, making strong inhibition of the L2 unnecessary. However, speakers who use their L1 for professional purposes, i.e. in intermediate mode settings where code-switching is inappropriate, did score higher on lexical skills and fluency measures. Schmid ascribes this to higher levels of practice in suppressing the L2 – a account that receives support from recent psycho- and neurolinguistic investigations and theories, such as Green's behavioral ecology of bilingualism, which also links the development of inhibitory skills to the frequency of code-switching (Green 2011).

Among the other suggested predictors associated with attrition are affective factors related to cultural and language identity and motivation. In general, speakers who have a strong desire to immerse themselves in the L2 society and for whom the L1 loses its practical and symbolic significance would be expected to experience more L1 attrition because they would not be motivated to make an effort to maintain their L1 (Hammer and Dewaele 2015). However, the role of attitudes has been extremely difficult to establish in empirical studies, including the ones that considered wider community level factors such as language prestige and community support (Waas 1996, Yağmur 1997, Hulsen 2000). For example, Turkish-English bilinguals in Australia (Yağmur 1997) and Dutch-English bilinguals in New Zealand (Hulsen, 2000) were found to be significantly different from the control groups. There is a dramatic difference between these two populations and the value which they assign to their respective native language and culture: for the Turks, it was associated with a high symbolic value, while the Dutch tended to orientate themselves towards the L2 society and language, to the degree that even the second generation of immigrants are often not bilingual (i.e., the migrant parents did not teach their own native language to their children. The fact that attrition effects were evident in both these populations suggests that a high level of attachment to the L1 is not as protective as one might assume, and neither does an outlook which favours full integration necessarily lead to a deterioration of the L1. Likewise, in a number of recent studies carried out in different settings, the impact of attitudes on attrition turned out to be limited (Opitz 2011, Schmid & Dusseldorp 2010; Varga 2012, Yılmaz and Schmid 2012).

Again, one of the problems with respect to investigating the impact of attitudes on L1 attrition relates to the fact that these can be measured only by means of self-assessments, that is, through questionnaires and interviews where the participants are asked to evaluate the relative importance of the languages and cultures in their life and the attitudes they hold towards them. Arguably, such a snap-shot measurement cannot reliably determine linguistic and cultural affiliation, as individual attitudes fluctuate with time and are too dynamic to directly account for a slow process such as language attrition, which takes place slowly over decades (Cherciov 2013). The only study to date which takes a different approach to assessing attitudes is situated in a unique historical context, as it investigates language attrition and

maintenance among German-Jewish Holocaust survivors (i.e., Holocaust survivors) (Schmid 2002). The participants in this study were grouped according to the time interval (between 1933 and the outbreak of World War II) at which they left Germany and settled in Anglophone countries. Based on this classification, Schmid was able to establish a link between the severity of the persecution measures that individual speakers had experienced and the degree of L1 attrition. A later study carried out by Ben-Rafael and Schmid (2007) provides further indirect support for the role of attitudes when they can be determined reliably at the group level. Their comparison of Russian and Francophone immigrant groups in Israel revealed distinct interferences in their L1 as a function of prevailing national language policies and their orientations towards the host society. It does appear, therefore, that attitudes, motivation and attrition are closely linked, but that it may be difficult to isolate the impact of these predictors in studies which try to assess it exclusively on the individual level and through self-reports.

4. Contribution of attrition studies to bilingualism research

With the acquisition of a second language, competing entries and categories are established in the mind/brain for items, features or rules which already exist in the native language. These competitors represent the way in which the same communicative intent is realised in the L2, but in a fashion that can range from the almost identical to the completely different. The pre-existing processing strategies and representations of the L1 initially influence the way in which the new competitor is represented, processed and used; with practice and increasing proficiency, this L1-to-L2 transfer can be reduced or minimized. As was shown above, however, features or rules can similarly and increasingly come to be affected by crosslinguistic interference in L1 attrition.

That notwithstanding, the majority of research focuses on the acquisition of L2 knowledge with the (often implicit) underlying assumption that the L1 is a mature, stable and invariate baseline. 'Development', in any language, is thus conceived of as a unidirectional process, where proficiency continues to increase until a plateau is reached at which the language user then remains indefinitely. All theoretical approaches to bilingualism to date are focused on providing an explanation for the phenomena which can be witnessed in the language which is being acquired and which becomes increasingly more target-like. This view of the developmental process is based on the underlying, implicit and unquestioned assumption that crosslinguistic interaction and transfer is a one-way street and that, while the L2 is linked to and influenced by the L1, the reverse is not true or not important.

However, in order to establish what characteristics of linguistic knowledge or rules contribute to their learnability and govern the acquisitional process, we also need to examine what makes it easy or difficult to maintain them in the L1 once an L2 competitor has been established. Investigating processes

of back-transfer or deterioration can help shed light on fundamental questions about the human language capacity. Factors such as salience, frequency, complexity etc. have often been invoked in trying to provide accounts of what is hard and what is easy to acquire in L2 acquisition. Extending these predictions to cover the process by which knowledge that has been acquired may deteriorate under disuse or be affected by later-learned knowledge provides an important opportunity for theory-building and validation.

There has been some development towards such a view, most notably within psycholinguistic approaches to bilingualism which have often made the point that bilingualism is not the simple addition of language but a special configuration of interacting languages within a unified super-system within which all languages potentially affect each other (Cook 1991, Grosjean 2008, Pavlenko and Jarvis 2002, see Cook 2015 for review). This view of bilingualism, dubbed 'multicompetence' by Cook (1991), since such a comparison cannot take into account the additional cognitive demand of managing more than one language system and is thus inherently flawed. It has been proposed (Hopp & Schmid 2013; Schmid 2014) that in order to establish success and potential limitations of L2 learning, data from L1 attriters may consistute a more appropriate baseline. Such investigations can compare two populations who both have to cope with the competing/interfering effects of another language which resides in the same brain, and thus have the potential of isolating those grammatical features or structures which become substantially more difficult to acquire later in life. Therefore, findings from attrition studies on the restructuring versus preservation of the L1 system can help disentangle age-at-onset effects from other factors such as cross-linguistic interference.

To date, however, very few studies exist which carry out such comparisons between late L2 learners and L1 attriters of the same language. One of the earliest studies connecting the attrition and acquisition perspective investigated binding properties of Turkish (Gürel 2002). The L2 group consisted of native English speakers of Turkish who had been living in Turkey for at least 10 years. They were all highly proficient end state speakers of Turkish. The attriter group included native speakers of Turkish who had lived in English speaking environments for an extended period of time and were all advanced speakers of English. The analyses revealed that both groups had similar difficulties with the acquisition and preservation of binding properties of the overt pronoun *o* (see above for an explanation of these grammatial phenomena), while the referential properties of the overt pronominal *kendisi* and the null pronoun were unproblematic. Further comparisons of advanced or near-native L2 learners and advanced attriters are reported by Hopp and Schmid (2013), who find a similar range of perceived foreign accent ratings in both populations, and Schmid (2014) who reports that some grammatical categories, most notably NP agreement features, appear to remain more problematic for a proficiency-matched population of L2 speakers than for L1 attriters. More such investigations are needed to help provide insight into what

is difficult and what is easy in either L2 acquisition and L1 attrition, and the results from these studies should then feed back into the theoretical frameworks.

5. Conclusion

Native languages are not stable: any speaker who becomes bilingual will experience changes in how her L1 is accessed, processed and produced, and with prolonged and intensive exposure to another language, these changes will become more pronounced. Attrition has long been a neglected area of bilingualism research, possibly because it is a less 'rewarding' area of investigation: unlike in L2 acquisition, it can take a long time for these changes to become overtly visible, necessitating more sophisticated investigation and elicitation methods. The long incubation period, alongside the fact that human lives and human contacts are often messy and circumstances change all the time, has furthermore made it difficult to relate the development of attrition to language internal and external conditions. However, this in no way makes it less worthy of investigation. Despite its relatively short history, the field of attrition studies has contributed considerably to our understanding of the complex dynamics of language development under challenging conditions and made it possible for researchers to recognize the uniqueness of the bilingual mind. In particular, it has helped challenge the notion that monolinguals are an appropriate baseline for comparison – a perspective which Cook has compared to trying to fit a quart into a pint bottle (Cook 2015: page no).

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