

# Linguistic Approaches to Bilingualism

## The relevance of first language attrition to theories of bilingual development

--Manuscript Draft--

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<b>Abstract:</b>	<p>Research on second language acquisition and bilingual development strongly suggests that when a previously monolingual speaker becomes multilingual, the different languages do not exist in isolation: they are closely linked, dependent on each other, and there is constant interaction between these different knowledge systems. Theoretical frameworks of bilingual development acknowledge this insofar as they usually draw heavily on evidence of how the native language influences subsequent languages, and how and to what degree this influence can eventually be overcome. The fact that such crosslinguistic transfer is not a one-way street, and that the native language is similarly influenced by later learned languages, on the other hand, is often disregarded.</p> <p>We review the evidence on how later learned languages can re-shape the L1 in the immediate and the longer term and demonstrate how such phenomena may be used to inform, challenge and validate theoretical approaches of bilingual development.</p>
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37 **Abstract**  
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50 heavily on evidence of how the native language influences subsequent languages, and  
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52 how and to what degree this influence can eventually be overcome. The fact that such  
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1 crosslinguistic transfer is not a one-way street, and that the native language is similarly  
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3 influenced by later learned languages, on the other hand, is often disregarded.  
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6 We review the evidence on how later learned languages can re-shape the L1 in the  
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8 immediate and the longer term and demonstrate how such phenomena may be used to  
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10 inform, challenge and validate theoretical approaches of bilingual development.  
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## 13 14 15 **Introduction**

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18 Bilinguals differ from monolinguals in various ways, not only with respect to the  
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20 second or weaker language but also to the native or dominant one. Such differences can  
21  
22 be observed at all linguistic levels and all stages of bilingual development as a result of  
23  
24 interactions between the two linguistic systems.  
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27  
28 We refer to any of the phenomena that arise in the native language of a sequential  
29  
30 bilingual as the consequence of the co-activation of languages, crosslinguistic transfer  
31  
32 or disuse, at any stage of second language (L2) development and use, as *language*  
33  
34 *attrition*<sup>1</sup>. First language (L1) attrition is therefore considered to be the process by which  
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37 a) pre-existing linguistic knowledge becomes less accessible or is modified to some  
38  
39 extent as a result of the acquisition of a new language, and b) L1 production, processing  
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41 or comprehension are affected by the presence of this other language.  
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45 We advocate an integrated approach to bilingualism where observations on how  
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47 bilinguals differ from monolinguals with respect to the processing, use and  
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49 representation of *each* of their languages inform theories of development. We will first  
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55 <sup>1</sup> It should be noted that the term 'attrition' has often been criticized as being unfortunate for two reasons: firstly,  
56 its connotations are mainly negative and secondly, it implies some kind of permanent erosion. However, the term  
57 has been used consistently to refer to the particular and unique process of change described here for close to four  
58 decades and thus provides coherence to a field which, in comparison to L2 development is still quite recent. We  
59 thus feel that the positives of sticking with 'attrition' outweigh the – undoubted – drawbacks. Due to space  
60 constraints we limit our discussion here to the attrition of the native language.  
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1 discuss the scope of attrition effects and the terminological background. This is  
2  
3 followed by a review of some of the previous findings on how processing of the L1 may  
4  
5 change as a result of the co-activation of languages. We then turn to a consideration of  
6  
7 how different theoretical approaches (specifically, Usage-Based and generative  
8  
9 approaches) may integrate such findings into their understanding of bilingual  
10  
11 development and use them to predict and model more permanent changes to underlying  
12  
13 representations and structures of the L1. Finally, we consider the impact of three factors  
14  
15 that have often been proposed to play a role for these processes: crosslinguistic  
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17 similarity; exposure and use; and the age of onset of bilingualism.  
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## 25 **1. Background**

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27 Current approaches to bilingual development widely recognise that all languages which  
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29 co-exist in the same brain are in constant interaction (e.g., Van Hell & Dijkstra, 2002;  
30  
31 Shook & Marian, 2013) and that this interaction is at the root of many of the differences  
32  
33 which we can observe between bilingual and monolingual speakers. Language  
34  
35 processing is more cognitively demanding for bilinguals than for monolinguals since the  
36  
37 bilingual has to contend with a number of additional tasks and challenges, among them  
38  
39 resisting intrusions or automatisms from any language that has not been selected for use  
40  
41 (e.g., Green, 1986, 2011; Abutalebi, Della Rosa, Green, Hernandez, Scifo, Keim, Cappa  
42  
43 & Costa, 2011). In addition, bilinguals have to establish and maintain processing  
44  
45 routines based on less input – in either language – than monolinguals, which may lead  
46  
47 to weaker representations and lower resting activation of linguistic features (Hopp,  
48  
49 2013) and lexical items (Gollan, Montoya, Fennema-Notestine & Morris, 2005).  
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1           Crosslinguistic competition and lower levels of activation affect not only the L2 but  
2  
3 also the L1. That notwithstanding, theoretical models of bilingual representation and  
4  
5 processing rarely acknowledge this as an integral part of becoming bilingual or consider  
6  
7 what it may tell us about bilingual development. Instead, such models and theories are  
8  
9 usually based on the considerable empirical evidence relating to how learners acquire,  
10  
11 process, and use the L2, the linguistic conditions which make the L2 acquisition of  
12  
13 particular features more or less difficult, and the external factors which impact on the  
14  
15 likelihood of success. Only rarely is it investigated how these aspects of development  
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17 may impact on the maintenance (in either language) of knowledge once it has been  
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19 acquired.  
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25           As a consequence, and despite the steadily increasing number of studies focussing  
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27 on L1 attrition (see Schmid, 2016 for a recent bibliography), few theoretical approaches  
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29 consider whether the process of adapting L1-based structures or processing routines on  
30  
31 the basis of evidence in the L2 input may not only feed into L2 grammar-building but  
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33 also have consequences for those structures and routines in the L1. Many models across  
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35 the theoretical spectrum are thus built on the tacit assumption that two extremely similar  
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37 subsystems of information (the L1 and the L2) exist in a state of co-activation in the  
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39 mind of the bilingual, but that one of them is stable while the other is developing: the  
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41 L2 grows and changes according to specific mechanisms of human cognition and  
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43 learning which govern the interaction of different types of knowledge and input, while  
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45 the L1 remains unaffected.  
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52           The fact that control groups in investigations of L2 development are usually  
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54 (functionally) monolingual compounds this problem: at least some of the observed  
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56 differences between experimental and control populations which are typically  
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1 interpreted as differences between L1 and L2 speakers and interpreted in the context of  
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3 limitations to L2 development, may, in fact, be differences between bilinguals and  
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5 monolinguals and thus affect the L1 in equal measure (Hopp & Schmid, 2013). This  
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7 would indicate that what constrains ultimate success for such phenomena is not so much  
8  
9 related to the order of acquisition but to the added cognitive pressure of being bilingual.  
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13 We argue that in order to fully understand the nature of bilingual development and  
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15 to resolve important and fundamental questions about the human capacity for language  
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17 learning, processing and use, we need to arrive at a better understanding of how the  
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19 mechanisms that drive and constrain L2 acquisition may also affect already established  
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21 linguistic knowledge, both in the immediate and in the longer term. Development is not  
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23 a unidirectional process: what has been learned can also be forgotten, and the principles  
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25 that govern the process of dismantling and change can tell us as much about the nature  
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27 of a knowledge system as the ones that govern its acquisition. Comparing the outcome  
28  
29 of bilingual development in both learner and attriter systems can thus shed more light  
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31 on the question of how underlying representations and online crosslinguistic transfer  
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33 interact, and how language acquisition may be different the second time around  
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40 (Schmid, 2009, 2014).  
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## 45 **2. The scope of attrition effects**

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47 L2-to-L1 transfer effects have recently been hailed as one of the main discoveries in  
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49 bilingualism research (Kroll, Dussias, Bice & Perroti, 2015: 378). Despite such  
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51 acknowledgements that they form an important and integral part of bilingual  
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53 development, the view seems to persist that actual language attrition is a rare  
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55 phenomenon which must somehow go beyond online transfer effects. Attrition has  
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1 variously been described as a “special case of variation in the acquisition and use of a  
2 language” (Andersen, 1982: 86), occurring in “extreme situations” (Costa & Sebastián-  
3 Gallés, 2014: 399) which minimally involve a period of several decades of very limited  
4 L1 exposure (e.g., Dussias & Sagarra, 2007) as well as a high level of L2 proficiency  
5 (e.g., Kroll & Bialystok, 2013; Tsimpli, Sorace, Heycock & Filiaci, 2005). The fact that  
6 many authors (and even more reviewers) raise the question of how to separate the  
7 “normal influence between languages in a bilingual or polyglot” from the process  
8 referred to as attrition (e.g., Ahlsén, 2013: 1) further suggests the view that there is  
9 something unusual about attrition. Attriters are thus often considered to form a limited  
10 subset of bilinguals (see Köpke & Schmid, 2004 for an overview).

11 The underlying perception thus appears to be that ‘true’ attrition effects should go  
12 beyond the online manifestations of crosslinguistic transfer which all bilinguals  
13 experience, that they should be permanent, irreversible and affect underlying structure:  
14 “it is erosion that reaches the level of competence that allows for interesting claims  
15 about and meaningful insight into the attrition process” (Seliger & Vago 1991: 7).

16 This view is based on a fundamental misperception, namely that, in the first  
17 instance, all bilinguals follow a process of acquisition which starts out with massive, but  
18 entirely one-way, L1-to L2 transfer. As proficiency increases, this transfer is gradually  
19 reduced until some kind of stable endstate is reached at which the L2 either fossilizes or  
20 converges towards a native-like level and becomes dominant. On this view if, and only  
21 if, the latter is the case, language dominance reversal takes place and L1 attrition sets in.

22 This view was prevalent in early research on language attrition, as for example  
23 illustrated by Seliger & Vago’s (1991) model which makes reference to two types of  
24 language learner systems first proposed by Ervin & Osgood (1954): Compound

1 Bilingualism (labelled Compound I Bilingualism by Seliger & Vago), in which the L1  
2  
3 is the source for hypotheses about the target language and both grammars are subserved  
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5 by a common knowledge base from the L1 (if the learner fails to progress beyond this  
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7 stage, fossilization will occur). In Coordinate Bilingualism, on the other hand, both  
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9 languages exist largely independently of each other and traffic in either direction is  
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11 minimal. Seliger & Vago's model then adds a third stage of development, namely  
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13 Compound II Bilingualism. This stage resembles the first one in that the two grammars  
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15 become dependent again, but now it is the more fluent L2 which encroaches on the L1  
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17 in a reversal of the direction of transfer (Seliger & Vago 1991:5f.).  
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23 We propose that to make such a distinction between online/transient and  
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25 representational/permanent effects of the L2 on the L1, with only the latter being  
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27 considered instances of attrition, is both artificial and unhelpful, as they merely  
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29 represent developmental stages on the same continuum. Attrition effects begin as soon  
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31 as L2 development sets in, in the first instance as online phenomena of co-activation  
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33 where production or processing is to some extent affected and subserved by both  
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35 languages (e.g., difficulties of accessibility, phonetic or grammatical mergers). They  
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37 may or may not eventually lead to apparent changes to or restructuring of knowledge,  
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39 processing or production as a result of long-term crosslinguistic interference. There is  
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41 no meaningful way of establishing two discrete and distinct stages of this continuum, so  
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43 every bilingual is an L1 attriter.  
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### 52 **3. Online effects of linguistic co-activation in the L1**

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54 The competition incurred by the co-existence of two languages in the same mind results  
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56 in a 'bilingual disadvantage' on certain linguistic tasks (e.g., Bialystok, 2009). Such  
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1 effects have been studied most frequently in the area of the lexicon, where lexical  
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3 access or retrieval tasks reveal a robust difference between monolinguals and bilinguals  
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5 (e.g., Gollan et al., 2005; Sandoval, Gollan, Ferreira & Salmon, 2010). By contrast, top-  
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7 down tasks such as classification appear to be unaffected, suggesting that the  
8  
9 competition effect constraining bilinguals' performance is specific to accessing lexical  
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11 representations as opposed to meaning (Gollan et al., 2005). A bilingual disadvantage  
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13 can also be observed in free speech, where both L1-dominant and L2-dominant  
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15 bilinguals have an increase in disfluencies and decrease in lexical richness as compared  
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17 to monolinguals (see Bergmann, Sprenger & Schmid, 2015 for an overview).  
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23 Bilingual disadvantage effects in lexical access can be observed after rather short  
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25 periods of immersion: Baus, Costa and Carreiras (2013) found that a cohort of  
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27 participants engaged in a one semester study-abroad program had slower naming  
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29 latencies and lower production rates for non-cognates in their L1 at the end of the  
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31 immersion period than at the beginning. After as little as three years, even unbalanced  
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33 bilinguals can become faster in recognizing items in the L2 than in the L1 (Frenck-  
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35 Mestre, 1993).  
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40 The effect underlying the bilingual disadvantage in lexical processing and lexical  
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42 access has been linked to two main factors. The first relates to lower frequency of  
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44 activation: Gollan et al. (2005) compare the bilingual lexicon to a monolingual one  
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46 which is composed entirely of low-frequency items. The second factor is cross-  
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48 linguistic competition and the spread of lexical activation across languages (Marian &  
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50 Spivey, 2003; Blumenfeld & Marian, 2007). This effect is most pronounced for words  
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52 which share phonological, orthographical or semantic features (Friesen, Jared & Haigh,  
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54 2014). Such similarities may not only influence online bilingual processing and  
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1 production in both languages through facilitation or inhibition, they also allow items to  
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3 map onto each other and thus cause subtle changes in meaning. Effects of transfer and  
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5 convergence have been described for example in the area of motion events (Bylund,  
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7 2009; Hohenstein, Eisenberg & Naigles, 2006; Pavlenko, 2010), specific semantic  
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9 fields, for example that relating to emotions (Pavlenko, 2003), metaphors, idioms,  
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11 figurative and non-literal language (e.g., the papers in Heredia & Cieslicks, 2015;  
12  
13 Sprenger, Bergmann & Schmid, submitted), or the encoding of manner in speech and  
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15 gesture (Brown & Gullberg, 2008).  
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20         Similar processes of transfer have often been described for the phonetic level: a  
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22 range of investigations of late bilinguals have found adaptation of phonetic settings in  
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24 both languages towards those of the other one. This has most frequently been  
25  
26 demonstrated with respect to the lag between the release of a voiced or voiceless stop  
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28 and the onset of the vibration of the vocal fold (voice onset time, henceforth VOT)  
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30 which characteristically differs between languages (for a recent overview of  
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32 investigations of VOT in attrition see Chang, 2012). The adaptation of VOT values  
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34 towards the L2 setting increases with length of L2 experience and proficiency levels  
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36 (Flege, 1987), is more pronounced in casual than in formal speaking styles (Major,  
37  
38 1992) and is reduced after periods of re-immersion in the L1 (Sancier & Fowler, 1997),  
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40 suggesting a fluctuating and dynamic interaction of factors such as proficiency, context,  
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42 and (recent) exposure. Bidirectional crosslinguistic adaptation has also been found with  
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44 respect to the distribution of the vowel space (Bergmann, Nota, Sprenger & Schmid,  
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46 2016; Mayr, Price & Mennen, 2012), the realization of liquids (de Leeuw, Mennen &  
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48 Scobbie, 2012), rhoticity (Himmel & Kabak, 2016; Ulbrich & Ordin, 2014) and  
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50 suprasegmentals (Mennen, 2004). This suggests that L1 and L2 sounds are linked at the  
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1 system-wide level (Chang, 2012; Mayr, Price & Mennen, 2012), a notion further  
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3 supported by the fact that the perception of phonological categories in the L1 may  
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5 become weakened by competing, non-overlapping L2 categories (Tamminen, Peltola,  
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7 Toivonen, Kujala & Näätänen, 2013).  
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10 Bi-directional convergence is most likely to constrain language processing and  
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12 production in those cases where sufficiently similar features are shared which may then  
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14 provide a compatible ‘launch pad’ and ‘landing site’ for transfer effects (Schmid, 2011).  
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16 Such similarities are rarer at the morphosyntactic level than in the lexicon and in  
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18 phonetics/phonology, unless the languages which are studied are closely related. There  
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20 is, however, evidence that non-selective activation of languages in bilingual processing  
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22 does occur at the morphosyntactic level: Firstly, it has been shown that the lexicon is  
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24 influenced by bi-directional CLI not only in single-word processing (as, for example, in  
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26 naming and in fluency tasks) but also when words are processed in context, even where  
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28 the sentence provides strong cues as to the language being used (for review, see Kroll &  
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30 Bialystok, 2013). More importantly, non-selective syntactic activation in bilinguals has  
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32 also been found, for example in the context of syntactic cross-linguistic priming,  
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34 leading some researchers to argue for shared syntactic representations of similar  
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36 structures – that is, structures that share the same word order – in bilingual processing  
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38 (Bernolet, Hartsuiker & Pickering, 2007; Sanoudaki & Thierry, 2015). In such cases,  
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40 optionality in interpretation can be affected, as Dussias’ studies of relative-clause  
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42 attachment in Spanish-English bilinguals have shown (Dussias, 2004; Dussias &  
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44 Sagarra, 2007). Cross-linguistic syntactic activation appears to be modulated by  
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46 dominance effects (Sanoudaki & Thierry, 2015) and by frequency effects: preferential  
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48 strategies, such as high vs. low attachment in relative clauses have been shown to be  
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1 amenable to input in an intervention study by Dussias et al. (2014, reported in Kroll et  
2 al., 2015).  
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6 Taken together, the findings reviewed above suggest multiple links and  
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8 connections between all of a bilingual's languages, which make bilingual language  
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10 processing less efficient (slower and less accurate) as a result of the added task demand  
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12 of suppressing and inhibiting the unwanted language. Due to an overall limitation of  
13  
14 cognitive resources this increased demand prevents the bilingual to attend to all aspects  
15  
16 of language processing with the same depth as monolinguals. This assumption receives  
17  
18 further support by studies on L1 reading in bilinguals, which is not only influenced by a  
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20 cognate facilitation effect (van Assche, Duyck, Hartsuiker & Diependaele, 2009) but  
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22 also becomes overall less efficient at the paragraph-level, as has been shown in a series  
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24 of gaze-contingent moving-window paradigm studies (Whitford & Titone, 2015). To  
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26 compensate, bilinguals may develop more efficient strategies of attention control in  
27  
28 both L2 and L1 (Duncan, Segalowitz & Phillips, 2016) as well as potentially better  
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30 domain-general executive control skills (a matter which is currently the topic of much  
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32 debate but beyond the scope of the present contribution).  
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40 In summary, all linguistic systems co-existing in the same mind are in constant  
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42 interaction with each other, and this interaction constrains performance, can lead to  
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44 delayed responses, less efficient processing and the production of intermediate forms.  
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46 These effects are most pronounced in those instances where similar items or structures  
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48 exist in both languages, facilitating transfer effects in both directions.  
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52 This leads us to the question of the mechanisms underlying such processes of L2-  
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54 to-L1 transfer, and how they can be captured by current theoretical approaches to  
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56 bilingual development: how are such attrition effects brought about by the interaction of  
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1 the two linguistic systems represented in the mind, can they eventually lead to contact-  
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3 induced long-term restructuring – and, if so, how?  
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#### 8 **4. The mechanisms underlying language attrition**

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10 Sequential bilinguals are generally assumed to initially bring two things to the process  
11 of bilingual development: a) the linguistic knowledge that they have acquired in their  
12 L1 and b) a general knowledge of how language works (depending on the theory, such  
13 knowledge may be framed in terms of linguistic universals or of domain-general  
14 principles governing cognition and interaction). The task of the language learner is to  
15 use these two resources in conjunction with L2 input in order to gradually build an L2  
16 system. A crucial part of this development consists of amending the expectations,  
17 automatism and reflexes that guide the use and processing of the L1 where they  
18 conflict with the L2.  
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32 In the course of this process of acquisition, a number of changes take place which  
33 affect the L1. Firstly and most straightforwardly, the amount of L1 use diminishes,  
34 potentially constraining the accessibility of items or rules as memory traces decay.  
35 Secondly, the L1 begins to exist in a state of co-activation with a competing language  
36 system, which may lead to some (or all) of the phenomena described in the previous  
37 section. Thirdly, contact-induced change may set in, caused by the repetition and  
38 progressive entrenchment of such online transfer phenomena (with *ad hoc* L2-to-L1  
39 mergers gradually establishing themselves as permanent features of the L1).  
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52 The interdependency of languages and the bidirectionality of transfer is widely  
53 acknowledged by largely holistic theories of L2 development and the bilingual mind,  
54 such as the Multicompetence model (e.g., Cook, 2013) or Dynamic Systems Theory  
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1 (e.g., Verspoor, de Bot & Lowie, 2011). However, most theories that focus on linguistic  
2  
3 (in particular grammatical) structure and predict particular areas of susceptibility to  
4  
5 transfer in bilingual development tend to consider the L1 as stable. We argue that an  
6  
7 extension of such theories to encompass and account for changes in the L1 as the L2 is  
8  
9 being developed and established may provide an opportunity to challenge and validate  
10  
11 these theories.  
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13

14  
15 In the following, we will exemplify the predictions that may be made for language  
16  
17 attrition on the basis of two of the predominant current models of L2 acquisition (SLA),  
18  
19 namely Usage-Based and Generative approaches. Since both of these approaches  
20  
21 encompass a wide range of different theoretical models, we more specifically exemplify  
22  
23 our argument based on one recent theoretical development within each of these  
24  
25 approaches, namely the Unified Competition Model (MacWhinney, 2012) and Feature  
26  
27 Reassembly (Lardiere, 2009). This limitation in scope should not be taken to imply that  
28  
29 other hypotheses or theories might not benefit in equal measure from an application to  
30  
31 L1 attrition.  
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#### 40 *4.1 Entrenchment and competition: the Usage-Based perspective*

41  
42 From the point of view of the theoretical perspective that falls under the umbrella of  
43  
44 Usage-Based or Emergentist accounts, language is seen as an emergent and dynamic  
45  
46 system. Development is determined by user-independent factors such as frequency,  
47  
48 saliency and markedness (Ellis, 2016) and structure is derived from properties and  
49  
50 interactions that are inherent to hierarchically organised levels of processing  
51  
52 (MacWhinney, forthc). Learning occurs as a result of the brain making connections  
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54 upon encountering an event or structure, and these connections vary in strength as a  
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1 function of frequency and entrenchment (Holme, 2013; Langacker, 1987). Events that  
2  
3 are encountered frequently will achieve ‘unit status’, which means that they can easily  
4  
5 and more or less automatically be evoked as integrated wholes (Langacker, 1987). Such  
6  
7 linguistic units are not stored *per se* but exist purely in dynamic and recurring patterns  
8  
9 of neurological activity (Langacker, 2009). If this is indeed the case, then linguistic  
10  
11 units and structures of the L1 should be amenable to modification and disentanglement  
12  
13 as a consequence of either being weakened through disuse (Langacker, 1987:59) or  
14  
15 through the activation of similar and competing patterns in an L2.  
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21 A central claim of Usage-Based approaches is that processes of language  
22  
23 development are governed by domain-general learning mechanisms (Langacker,  
24  
25 2009:628), that all such developmental processes rely on the same principles (e.g.,  
26  
27 frequency, perceptual saliency, see Holme, 2013) but are shaped and determined by the  
28  
29 contexts surrounding acquisition and previously acquired knowledge (MacWhinney,  
30  
31 2012). For instance, infants learn language while learning about the world, they receive  
32  
33 strong support from their caregivers, their brain is highly malleable, and they lack  
34  
35 linguistic representations in earlier-learned languages. Such factors render child L1  
36  
37 development distinct from later L2 acquisition (MacWhinney, 2012). As such, *any*  
38  
39 context of language processing and development – L1 and L2 acquisition, simultaneous  
40  
41 bilingualism, code-switching, aphasia – should be capable of being modelled within an  
42  
43 overarching theory, and this theory should allow identifying the contribution that other,  
44  
45 user-specific or extralinguistic, factors will make in each context (MacWhinney, 2012).  
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50 One attempt to provide such a theory is MacWhinney’s Unified Competition Model  
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52 (MacWhinney, 2012, henceforth UCM). According to this model, language  
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54 development is determined by the availability (frequency) and reliability of cues in the  
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1 input, with reliability playing an increasingly strong role in more proficient speakers to  
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3 the extent that it remains the only factor which plays a role for adult natives  
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5  
6 (MacWhinney, 2012).  
7

8 The UCM attributes (positive and negative) transfer in bilinguals to the interplay of  
9  
10 risk-generating processes and support processes. Among the support processes are  
11  
12 entrenchment, resonance and decoupling: L1 knowledge is first represented in local  
13  
14 cortical maps which become more stable, and thus more resistant to modification with  
15  
16 increasing age and decreasing plasticity of the brain (MacWhinney, 2008). This is what  
17  
18 the L2 learner has to contend with, and it explains why there is an effect of age on  
19  
20 potential ultimate success: the longer a speaker was monolingual before the onset of L2  
21  
22 acquisition, the more deeply entrenched and thus the more resistant to modification the  
23  
24 pre-existing L1 cortical maps have become. However, L2 encoding can be achieved  
25  
26 through the factor of resonance – essentially, the process of linking new information  
27  
28 with existing knowledge, for instance through translation equivalents. Inhibition of the  
29  
30 L1 in conjunction with resonant activation of the L2 then leads to decoupling, which is  
31  
32 further supported if the learner can localize the L1 to those contexts where there is  
33  
34 minimal completion (MacWhinney, *forthc.*).  
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42 The UCM has not, thus far, been experimentally extended to language attrition, but  
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44 it proposes a number of highly relevant factors for this process, among them (dis-)  
45  
46 entrenchment and negative transfer. The neural connections storing L1 knowledge and  
47  
48 the cortical maps that were drawn up in childhood can be assumed to be vulnerable to  
49  
50 disuse (disentrenchment), and a highly active L2 system may become a source of  
51  
52 negative transfer to the L1. The UCM further lists a set of social factors that can serve  
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54 as risk or support factors in L2 acquisition; here, the factor pair isolation/participation is  
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1 of particular relevance to L1 attrition, predicting that higher levels of L1 use will lead to  
2  
3 better maintenance. MacWhinney (forthc.) acknowledges that findings from L1 attrition  
4  
5 studies, such as cases of long-term language stability in mature migrants despite disuse  
6  
7 of the L1 as well as of catastrophic loss in international adoptees pose a challenge to the  
8  
9 UCM, and that studying such cases may help get a better understanding of the  
10  
11 interaction of learner-independent and learner-specific features in language  
12  
13 development.  
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17  
18 Usage-Based approaches to language development and use thus have the potential  
19  
20 to provide specific and testable predictions and hypotheses for attrition studies based on  
21  
22 factors such as the frequency and reliability of cues, the similarity between languages,  
23  
24 and the distribution of background factors. The linguistic mechanisms underlying  
25  
26 language attrition should be similar to those proposed for L2 acquisition. With respect  
27  
28 to the UCM, this suggests that structures that are identical between L1 and L2 (as far as  
29  
30 such can ever exist) should be less problematic to maintain, as should be features that  
31  
32 are unique to either language due to the absence of recurring, sufficiently similar  
33  
34 competing patterns. What should be most amenable to change would then be those  
35  
36 structures which are similar but different. Here, it should be possible for the  
37  
38 increasingly deeply entrenched and ingrained L2 constructions to spill back into the L1.  
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44  
45 Investigations of L1 attrition thus can and should be used to challenge, verify and  
46  
47 validate the hypotheses that cognitive linguistics in general makes about linguistic  
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49 knowledge and development. These hypotheses should not only hold true for contexts  
50  
51 of acquisition and use, but also of maintenance and deterioration in attrition contexts  
52  
53 defined by non-production, the absence of input in the L1, and competition from the L2.  
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57 Researchers within this approach sometimes acknowledge that while frequent exposure  
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1 to a language or structure is what drives acquisition and entrenchment, disuse should  
2  
3 lead to weakening of memory traces, attrition or forgetting (e.g., Langacker, 1987;  
4  
5 MacWhinney, 2008), but this has never been pursued experimentally: While Usage-  
6  
7 Based approaches are immensely influential in studies of both L1 and L2 acquisition,  
8  
9 they have not, so far, been applied to language attrition. Exploring their predictions in  
10  
11 an experimental setting may help validate them, resolve competing theories and  
12  
13 accounts, and gain a deeper understanding of the emergent structure of human language  
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15 (MacWhinney, *forthc.*).  
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#### 23 *4.2 Interfaces and feature-reassembly: Nativist approaches*

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25 The theoretical approach to language development and language knowledge discussed  
26  
27 in the preceding section is based on the assumption that language learning is a domain-  
28  
29 general skill. By contrast, generative or nativist approaches to SLA assume that some  
30  
31 form of domain-specific, innate learning ability also plays a role.<sup>2</sup> The question to what  
32  
33 extent this ability can similarly facilitate L2 learning later in life has been extremely  
34  
35 controversially discussed (for a recent overview see Schwartz & Sprouse, 2013). Views  
36  
37 have ranged across the entire spectrum from full availability of UG to L2 learners in  
38  
39 exactly the same way as in native language acquisition (e.g., White, 2003) to its  
40  
41 complete inaccessibility after a certain maturational stage (e.g., Clahsen & Muysken,  
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47 1986).  
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54 <sup>2</sup> It is beyond the scope of the present paper to argue for or against one of these paradigms. We do feel, however,  
55 that language attrition studies have the potential to feed into this larger discourse in a similar way to the  
56 contribution they can make to the theoretical debates within each paradigm, as discussed here: The assumption of  
57 an innate learning mechanism inherently predicts a more stable ‘endstate’ for language development, but in  
58 particular for L1 acquisition, than do dynamic, Usage-Based models. Appropriately designed investigations of L1  
59 attrition may therefore be able to contribute to the debate on the existence of an innate Language Acquisition  
60 Device, over and above what investigations of L2 acquisition are able to achieve.  
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1           The focus of many of the investigations arguing for a particular perspective within  
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3 this continuum is the *non-convergence* of SLA – the fact that the performance of L2  
4  
5 learners at a stable endstate is less consistent than that of mature, monolingual speakers.  
6  
7 However, bilinguals also become non-convergent in the process of L1 attrition, and the  
8  
9 question is whether these two types of non-convergent systems are constrained by the  
10  
11 same properties and systematicities (e.g., Sorace, 2005).  
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16           The challenge for generative approaches to bilingual development in the context of  
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18 L1 attrition is thus essentially the same as the one outlined for cognitivist/emergentist  
19  
20 approaches above: to explain the increased variability and optionality that can be  
21  
22 observed in language attrition data, based on the underlying theory of bilingual  
23  
24 development. This has, so far, been attempted mainly within the framework of the  
25  
26 Interface Hypothesis (e.g., Sorace, 2005; 2011; henceforth IH). This hypothesis assumes  
27  
28 that core syntactic features are unproblematic for both L2 learners and attriters. Both  
29  
30 near-native L2 speakers and advanced L1 attriters, however, have higher levels of  
31  
32 optionality in comparison with monolinguals where phenomena situated at interfaces  
33  
34 are concerned. This variability is ascribed to factors such as limitations in working  
35  
36 memory, processing capacity or efficiency, and resource allocation (Rothman &  
37  
38 Slabakova, 2011). In particular, the model makes a distinction between internal (syntax-  
39  
40 semantics) and external (syntax-discourse) interfaces, predicting external interfaces as  
41  
42 the locus of emerging optionality in attrition (and residual optionality in SLA). This is  
43  
44 the result of the increased task demands of integrating information across a linguistic  
45  
46 module (e.g., syntax or semantics) and a non-linguistic one (e.g., discourse) (as opposed  
47  
48 to the integration across two linguistic modules, e.g., between the core module and the  
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50 syntax-semantics interface).  
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1           The IH thus makes important testable and falsifiable predictions for the attritional  
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3 process, in particular that core syntactic features should not be vulnerable to attrition  
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5 processes. While this is indeed what a number of studies have found (e.g., Perpiñán,  
6  
7 2011; Tsimpli et al.), others do report changes that suggest syntactic representations  
8  
9 may become affected (for a recent overview see Domínguez, 2013: ch. 5). Of particular  
10  
11 interest here is Iverson's (2012) case study of Pablo, a Chilean Spanish-Brazilian  
12  
13 Portuguese speaker who represents an extreme case of L1 shift. Iverson tests a range of  
14  
15 phenomena situated at external interfaces (e.g., contexts licensing overt vs. null subject  
16  
17 pronouns), internal interfaces (e.g., definite vs. indefinite non-overt subjects) and  
18  
19 belonging to narrow syntax (e.g., specific cases of subject-verb inversion). These  
20  
21 phenomena are further classified into cases where properties are shared across the two  
22  
23 languages and those where they diverge (Iverson 2012: 49-51). A series of timed and  
24  
25 untimed grammaticality, acceptability and interpretation judgments shows that, for all  
26  
27 linguistic features where there is a divergence between languages, Pablo consistently  
28  
29 patterns with a Brazilian Portuguese monolingual control group in both his languages.  
30  
31 In other words, for this speaker L1 attrition appears to have effected a restructuring of  
32  
33 the underlying grammar to reflect properties of the L2, and this restructuring has  
34  
35 affected all three types of phenomena to a similar extent. The fact that the speaker's  
36  
37 performance was the same under timing constraints and in situations where this pressure  
38  
39 was absent leads Iverson to argue that the divergences from the native norm truly  
40  
41 represent a qualitatively different grammar, as opposed to a mere processing issue, a  
42  
43 finding not predicted by the IH.  
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54           To some extent, it may be possible to explain such findings by interaction effects  
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56 between the syntactic module and the interfaces (Domínguez, 2013) and to limitations  
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1 to computational efficiency, causing integration problems at one interface which may  
2  
3 constrain processing on others (Hopp, 2010). However, both Iverson and Domínguez  
4  
5 stress that their findings suggest that the interface-based model should be modified to  
6  
7 accommodate the possibility that syntactic representations may themselves become  
8  
9 impaired.  
10

11  
12  
13 It is important to note here that many of the studies which seem to suggest  
14  
15 restructuring deal with speakers who are exposed to structurally very similar languages  
16  
17 or varieties (see also section 5.1 below). In particular, one of the studies reported by  
18  
19 Domínguez (2013) illustrates that changes to the distribution of grammatical features of  
20  
21 Cuban Spanish (null subjects and postverbal subjects) among speakers immersed in  
22  
23 Miami adapt towards the properties of a different variety of the L1 (Peninsular Spanish)  
24  
25 also spoken in that environment, not towards the L2, English. By contrast, the  
26  
27 distributional properties of L1 Spanish among otherwise similar speakers living in a  
28  
29 largely monolingual English-speaking environment in the UK remain much more stable.  
30  
31 These findings suggest that L1 attrition may be less a matter of lack of evidence in the  
32  
33 input (as originally suggested by Sharwood Smith & van Buren, 1991) and more a case  
34  
35 of rapid, contact-induced change or dialectal levelling (Domínguez, 2013).  
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42  
43 The assumption that syntactic restructuring can take place as a result of the long-  
44  
45 term co-activation of a similar language system does seem more likely than one where  
46  
47 changes are caused merely by the absence of confirming evidence in the input (or  
48  
49 output). However, it still leaves us with the explanatory challenge of what exactly the  
50  
51 mechanisms underlying this process of modification are. As Domínguez (2013) points  
52  
53 out, the standard model of language acquisition adopted in generative approaches – a  
54  
55 scenario which assumes a stable linguistic environment once an ‘endstate’ has been  
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1 reached – is not very well suited to making predictions of what happens if this stability  
2  
3 is disrupted. This is particularly true models such as parameter-setting – Domínguez  
4  
5 (2013) observes that under such a model, changes should have dramatic, cascading  
6  
7 consequences, and such wide-ranging changes are typically not been observed in L1  
8  
9 attrition.  
10

11  
12 A promising recent alternative approach within generative approaches to L2  
13  
14 acquisition which allows modeling more localised and subtle changes to the L1 is  
15  
16 Feature Reassembly (Lardiere, 2005, 2009). Couched within a minimalist framework of  
17  
18 grammatical representation (e.g., Chomsky, 1995), this approach rejects earlier theories  
19  
20 on variability in L2 acquisition based largely on on-off-switch-like notions of  
21  
22 parameter-setting as too simplistic (Lardiere, 2009). It proceeds from the observation  
23  
24 that morphological forms across languages can encode multiple grammatical features  
25  
26 simultaneously on what seems to be one morpheme, but in fact is often a bundle of  
27  
28 multiple features. As defined here, features refer to specific, abstract grammatical  
29  
30 functions – such as Case, Definiteness, Logophoricity, Durativity, Evidentiality –  
31  
32 encoded on lexical items (Adger & Svenonius, 2011).  
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40 For example, the English plural suffix *-s* and the Chinese *-men* both encode  
41  
42 plurality. However, the latter is additionally specified for the features [+human] and  
43  
44 [+definite] (Ionin, 2013), so that the two plural morphemes cannot be considered fully  
45  
46 equivalent: At the featural level, they are distinct, in that only *-men* encodes multiple  
47  
48 features that must be satisfied for grammatical use (the noun must be plural as well as  
49  
50 human and definite). Similarly, the English past tense *-ed* not only marks tense [+past],  
51  
52 but also grammatical aspect [+ perfective] (or [-perfective]) in conjunction with the  
53  
54 context, while the past tense suffix in other languages may encode other features, for  
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1 example evidentiality in Turkish (Karayayla, *forthc.*) or Quechua (Putnam & Sánchez,  
2  
3 2013).  
4

5  
6 The level of granularity that features provide has been shown to be very useful in  
7  
8 explaining developmental paths and outcomes in different contexts (Lardiere, 2009).  
9  
10 The task of all learners is thus to acquire the entirety of the bundle of grammatical  
11  
12 features associated with any particular lexical head of the target grammar and assemble  
13  
14 them onto the lexical form. For young children, this process is relatively straightforward  
15  
16 since they have no previous linguistic knowledge which might get in the way. For  
17  
18 sequential bilinguals, on the other hand, cross-linguistic differences between the  
19  
20 compositionality of feature bundles on lexical items that ostensibly have similar  
21  
22 functions could be the root of differences from monolinguals (Ionin, 2013). Lardiere's  
23  
24 Feature Reassembly Hypothesis (FRH) claims just that: L2 acquisition is complicated  
25  
26 by the influence L1 feature configurations have on how – and even if – target feature  
27  
28 bundles will be acquired in the L2. If the L1 and L2 have the exact same feature  
29  
30 configurations for a given property, the FRH does not predict any difficulty in L2  
31  
32 acquisition. However, whenever the assemblies of features are distinct, the task of  
33  
34 acquiring the target is potentially problematic and subject to variability due to cross-  
35  
36 linguistic influence.  
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44 L2 acquisition is thus seen as an incremental process. The learner starts with the  
45  
46 feature configurations from her L1 (Full Transfer), and some features may be adjusted  
47  
48 to the L2 settings earlier than others (Lardiere, 2009). In other approaches it is  
49  
50 furthermore assumed that L2 features may fluctuate between settings, both among  
51  
52 populations and within individuals (e.g., Ionin, Zubizarreta & Maldonado, 2008).  
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1 Taken together these approaches make it possible to account for input- and  
2  
3 activation-based fluctuations to (some) settings in the L1. Feature Reassembly has, so  
4  
5 far, been applied to changes in an L1 in two contexts, neither of which are ‘classic’  
6  
7 attrition settings, namely heritage languages and dialect levelling. Both are contexts  
8  
9 which can be assumed to facilitate grammatical mergers more than immersed adult  
10  
11 bilingualism, in the former due to the fact that the L1 grammatical settings are  
12  
13 presumably still developing and hence more malleable, and in the latter because the two  
14  
15 varieties in contact are minimally different and thus encourage co-activation and  
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17 transfer.  
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22  
23 Putnam and Sánchez (2013, henceforth P&S) study children who are exposed to  
24  
25 Quechua in the home and to Spanish in the environment. They argue that one of the  
26  
27 crucial factors for contact-induced change to the L1 is processing for comprehension  
28  
29 and for production – that is, processing where input is converted to intake: Largely  
30  
31 irrespective of how much input a heritage speaker receives in her L1, the level of  
32  
33 activation of individual features or constraints depends on the depth of processing  
34  
35 (intake), and if activation of particular (morpho)syntactic expressions is low, this can  
36  
37 lead to a decline in the availability of functional features (FFs). Less salient or less  
38  
39 frequent elements of the heritage language, as well as ‘fringe’ elements whose change  
40  
41 has little impact on other areas of grammar, can become recessive and eventually be  
42  
43 dissociated and reassigned to L2 features due to the continued activation of the L2 (see  
44  
45 also Cuza & Pérez-Tattam’s 2016 discussion of [+/- strong] features in HL  
46  
47 development). In other words, progressive re-assembly may occur from the dominant  
48  
49 L2, in effect leading to a grammar that is complete but different from the monolingual  
50  
51 target of both L1 and L2, that is, a rule-governed and logical system whose feature  
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1 bundles end up being distinct. This implies that the continued activation of the L2 over  
2  
3 the L1 not only impacts on parsing strategies but can eventually permanently influence  
4  
5 the configurational of formal feature bundles – that is, the amalgamated grammar exists  
6  
7 at the level of competence.  
8  
9

10 P&S propose a four-stage model, where stage 1 corresponds to mainly online re-  
11  
12 assembly effects due to high co-activation levels, while at stage 4 the learner struggles  
13  
14 to activate L1 features of all types (phonological, semantic and functional) for both  
15  
16 production and comprehension.  
17  
18

19 In the context of L1 attrition, the question then is whether there are mechanisms  
20  
21 under which the activation of feature bundles of specific lexical heads (e.g., functional  
22  
23 morphology) in the L1 of sequential bilinguals can similarly become weakened, leading  
24  
25 to an eventual dissociation and re-assembly towards the L2 settings. If so, it should be  
26  
27 determined whether and to what degree these mechanisms may affect both early and  
28  
29 late bilinguals – and if not, it should be determined why not. P&S assume that heritage  
30  
31 speakers may have only weakly activated some (particularly late acquired or infrequent)  
32  
33 L1 features, making them susceptible to competition and replacement by similar FFs  
34  
35 from the L2, particularly if a morpheme encoding a similar FF exists in both languages.  
36  
37 They explicitly acknowledge that one of the problems in their model is the impossibility  
38  
39 at establishing a point within development when acquisition is ‘complete’ – a  
40  
41 mechanism that would, presumably, have to be couched in terms of some kind of  
42  
43 assumption along the lines of a Critical Period. Is there a stage in L1 development at  
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45 which L1 features become fully resistant to being weakened by non-activation and  
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47 competition, and if there is, what does it tell us about maturational constraints?  
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1 P&S do not extend their discussion to attrition among mature speakers. The only  
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3 investigation to date, to the best of our knowledge, which applies the FRH to the adult  
4  
5 context is provided by Domínguez & Hicks (2016) in a reassessment of Domínguez'  
6  
7 study of null and postverbal subjects in L1 Spanish mentioned above. What is identified  
8  
9 here as the main factor driving language change is not so much the influence of L2  
10  
11 English but prolonged and intensive contact with speakers of varieties of Spanish in  
12  
13 which null and postverbal subjects are used with different frequencies than in the native  
14  
15 variety of the participants. In other words, Domínguez & Hicks ascribe the reason for  
16  
17 the change in feature specification not to loss of contact with the L1 or pressure from  
18  
19 English, but “to exposure to L1 input with different grammatical properties”  
20  
21 (Domínguez & Hicks, 2016: 68). But can we really consider exposure to two different  
22  
23 dialects of the same language as something that is qualitatively distinct from exposure  
24  
25 to two different languages (and where do two varieties cease to be dialects of each other  
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27 and begin to be different languages)? How much similarity is necessary for transfer to  
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29 occur?  
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37 To summarize, the two studies just discussed do allow for the possibility of an L1  
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39 grammar to be modified through a process that is similar to the one described in L2  
40  
41 acquisition by the Feature Reassembly approach. However, they suggest that such a  
42  
43 modification will occur only if a) the exposure to a different linguistic system takes  
44  
45 place at a relatively early age or b) the speaker is exposed to a variety of the L1 in  
46  
47 which the feature under observation is differently distributed or realized than in the  
48  
49 native variety. The question which remains open is if, and under what conditions,  
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51 similar processes of change and restructuring are also possible among mature native  
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1 speakers through exposure to a different L2. An answer to this question would  
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3 significantly benefit our understanding of developmental processes and constraints.  
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#### 8 *4.3. Summary*

9

10 The two approaches to bilingual development discussed above proceed from different  
11 assumptions about the architecture of the human language faculty. Both, however, are  
12 compatible with the view that the knowledge of a native language, once acquired, does  
13 not have to be stable but is susceptible to processes of change and adaptation in the  
14 bilingual mind. What these processes will look like and how the two languages will  
15 interact with each other depends on a number of key factors. Interestingly, the factors  
16 assumed to play a role appear to be the same for both frameworks: First, similarity  
17 between the two linguistic systems facilitates interaction; second, frequency of exposure  
18 and co-activation is predicted to play a role; and, third, the age at which the speaker  
19 becomes bilingual appears to be an important factor.  
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35 In the following, we will address these three factors and illustrate, based on recent  
36 findings, what is known about how they influence the attritional process.  
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## 42 **5. Factors driving the attritional process**

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### 44 *5.1 Crosslinguistic similarity*

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47 As was pointed out above, processes of change in language attrition are the most  
48 productive in those instances where the two languages are sufficiently similar to allow  
49 some kind of spillover. Such crosslinguistic similarities are assumed to be of importance  
50 both by Usage-Based approaches – as this is where competition between two  
51 alternatives may occur – and by FR approaches, under which the activation of some  
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1 features of lexical items, which have become weakened in the L1 through co-activation  
2  
3 of the L2, might eventually lead to those features being adapted towards their L2  
4  
5 settings.  
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7  
8 Where linguistic areas other than morphosyntax are concerned the impact of  
9  
10 crosslinguistic similarity on language attrition has often been demonstrated, for example  
11  
12 in the context of cognates and lexical accessibility, or in the adaptation of similar  
13  
14 phones towards the setting of the other language (see above, section 3). The main  
15  
16 difference between these areas and morphosyntax is that the lexicon and the phonetic  
17  
18 repertoire can tolerate a certain amount of variance, while inflections or word order are  
19  
20 discrete. This may mean that a speaker becomes quite variable in the pronunciation of,  
21  
22 for example, a particular phoneme or the use of any given semantic field without this  
23  
24 consisting an outright violation of the target norm. In particular for speakers who are  
25  
26 part of an immersed L1 community, such minor changes may foster and accelerate a  
27  
28 gradual process of linguistic change and adaptation throughout the bilingual social  
29  
30 network. It is more difficult to predict how such changes may take place in  
31  
32 morphosyntax.  
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40 Two factors are probably of importance here. The first is formal (near)-equivalence  
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42 and the second is the status of the resulting construction in the attriting language – is it  
43  
44 an acceptable (although possibly dispreferred) option, or does it constitute an actual  
45  
46 violation? Consider the English and German simple and periphrastic past tense: both are  
47  
48 formed identically (through suffixation of the verb stem or *ablauting* vs.  
49  
50 auxiliary/participle constructions, respectively), but while both German tenses only  
51  
52 locate an event in the past, the English is furthermore specified for aspect. For an L1  
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54 English-L2 German learner who had successfully acquired this distinction, the aspectual  
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1 specification of the English system might become weakened due to co-activation. She  
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3 might then use some of the forms infelicitously (e.g., “I have worked in the US in the  
4  
5 1960s”). Self-reports from attriters suggest that they are, at least initially and often for a  
6  
7 long time, sensitive to such violations in their own output and that of others, which may  
8  
9 constitute a barrier towards such online fluctuations taking hold. A strong resilience of  
10  
11 grammaticality intuitions is also suggested by recent neurolinguistic investigations,  
12  
13 which find that brain responses to morphosyntactic violations are extremely stable in L1  
14  
15 attrition (e.g. Bergmann et al., 2015a; but see also Kasparian, 2015). This may be one  
16  
17 reason why error rates in attrition studies rarely exceed 5% of obligatory contexts  
18  
19 (Montrul, 2008: 265). In the reverse case, however (that is, L1 German – L2 English),  
20  
21 there is nothing to prevent the German attriter from using the periphrastic past to refer  
22  
23 to perfective states and the simple past to ongoing ones, as both are perfectly acceptable  
24  
25 (though not conventionalized) options, so the statistical distribution of the use of each  
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27 tense may change, but this will not lead to perceptible anomalies.  
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34  
35 Previous research suggests that linguistic changes that create unconventional but  
36  
37 not ungrammatical distributional patterns may indeed be more common in the course of  
38  
39 language attrition. For example, in the study by Domínguez (2013) discussed above,  
40  
41 contact between Peninsular and Cuban Spanish led to a variety in which the distribution  
42  
43 of overt and postverbal subjects shifted to resemble the environmental variety, and  
44  
45 similar findings have been reported in a number of other studies of null and overt  
46  
47 pronouns (for a recent overview see Gürel, *forthc.*). In the same vein, Jackson,  
48  
49 McDermott & Schmid (2011) conducted an analysis of word order in free speech from  
50  
51 L1 German speakers immersed in an L2 English or an L2 Dutch setting. It was  
52  
53 hypothesized that long-term immersed German-English speakers might fail to apply the  
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1 verb-second (V2) rule in main clauses consistently, due to the high number of English  
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3 XSVO constructions they were exposed to on a daily basis, but that German-Dutch  
4  
5 bilinguals would show no such change, Dutch also being a V2 language. A somewhat  
6  
7 higher proportion of inaccurate constructions (4.3%) was indeed observed in the  
8  
9 English-German population than among the Dutch-German (2.57%) and the German  
10  
11 monolingual speakers (2.67%), but as V2 was still targetlike in over 95% of all main  
12  
13 clause utterances it would be a stretch to claim that actual restructuring had taken place.  
14  
15 On the other hand, the distribution of different constituents occupying the pre-verbal  
16  
17 position in the correct sentences was exactly the same between the German-English  
18  
19 bilinguals and the controls, but had shifted towards a lower incidence of subjects and a  
20  
21 higher proportion of adverbial, temporal and prepositional phrases in the German-Dutch  
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23 speakers, approximating the distribution of these elements in monolingual Dutch.  
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30 Under certain conditions, however, it seems that constructions may take hold  
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32 although they are not licensed by the L1 grammar. A number of studies have  
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34 demonstrated how grammatical intuitions may change for speakers of closely related  
35  
36 languages. Iverson's investigation of a Chilean Spanish-Brazilian Portuguese speaker  
37  
38 (Iverson 2012) is an interesting case in point, as it shows a complete shift towards the  
39  
40 settings of the L2. For example, Pablo consistently rejects SV inversion in declarative  
41  
42 sentences wherever BP does not allow it, both in cases that are optional and those that  
43  
44 are obligatory in Spanish. A similar tendency, although somewhat less pronounced, is  
45  
46 reported by Ribbert & Kuiken (2010) with respect to the Dutch and German  
47  
48 complementizer-infinitive construction *um – zu.../om – te...*. This construction follows a  
49  
50 complex pattern with different constraints requiring and restricting its application in the  
51  
52 two languages and is often problematic for bilinguals (Brons-Albert, 1994). Ribbert and  
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1 Kuiken show that the immersed Germans' intuitions have remained largely intact, with  
2  
3 the exception of the category which is ungrammatical in German but optional in Dutch,  
4  
5 and which their L1 German-L2 Dutch participants failed to reject in a third of the cases.  
6  
7 In both of these studies, similarity between languages and constructions is likely to be a  
8  
9 main factor which facilitated a change to the attriters' sense of what is and is not  
10  
11 grammatical in their L1.  
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14  
15 These findings seem to suggest that the disentanglement or restructuring of  
16  
17 linguistic patterns in the process of L1 attrition may, for most speakers, be kept in check  
18  
19 by more or less intact grammaticality intuitions. Exceptions to this mainly appear to  
20  
21 occur in situations where there is either a very close correspondence between forms, a  
22  
23 highly productive pattern of co-activation of the languages, or both.  
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### 30 *5.2 Exposure and co-activation*

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32 One of the most compelling and most often invoked factors in language attrition is the  
33  
34 frequency with which a speaker uses the attriting language. This factor is assigned  
35  
36 particular importance in Usage-Based approaches (see above) as well as  
37  
38 psycholinguistic studies of linguistic accessibility and activation thresholds (e.g.,  
39  
40 Paradis, 2007), which assume that the retrieval of any linguistic item will depend on  
41  
42 frequency and recency of its prior activation.  
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47  
48 The relationship between use and attrition was taken to be axiomatic for a long  
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50 time. The only early studies which took this factor into account revealed conflicting  
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52 findings, possibly due to inconsistencies in methodology (for a discussion see Köpke &  
53  
54 Schmid, 2004). The first more in-depth investigations of a range of measures of lexical  
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56 diversity and fluency as well as overall accuracy, however, failed to find any consistent  
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1 relationship with a broad range of language exposure and use measures (Schmid, 2007;  
2 Schmid & Dusseldorp, 2010). The absence of an effect of exposure, and in particular of  
3 the frequency of use in informal contexts, has since been replicated across a host of  
4 investigations of attrition across a range of linguistic levels, such as perceived foreign  
5 accent (Hopp & Schmid, 2013; de Leeuw, Schmid & Mennen, 2010) or lexical diversity  
6 in free speech (Yılmaz & Schmid, 2012; Schmid & Jarvis, 2014) to syntactic  
7 complexity (Yılmaz, 2011). The only studies which do find an effect of L1 use are  
8 Opitz (2013), who found a weak negative correlation between frequency of use and  
9 scores on a C-Test, Bergmann, Nota, Sprenger and Schmid (2016), who find a higher  
10 level of use led to a more native-like perceived accent, and Köpke (1999), who reports  
11 an overall effect of L1 use on lexical errors in a picture description task and accuracy in  
12 grammaticality judgments.

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These findings suggest that what is important is not so much the frequency of use of the L1 but the mode in which it is activated and used (Grosjean, 2001). Processing-based accounts, Emergentism and Usage-Based Theory as well as the Nativist approaches represented here by the Feature Reassembly Hypothesis all rely to some extent on the notion of co-activation of linguistic systems. It is this co-activation, rather than the use of one language and disuse of the other, that leads to mergers at the online level which may or may not then spill over to the underlying representation. Frequent use of the L1 within a community where code-switching is the norm may thus trigger an accelerated process of contact-induced L1 change (Grosjean & Py, 1991).

This suggests that a much more prominent role should be given in investigations of bilingual development to the notion of code-switching: Language systems are probably never co-activated more closely than in speakers who are dense code-switchers (Green,



1 2011). On the other hand, bilingual speakers who frequently use one of their languages  
2  
3 in a setting in which it is inappropriate to code-switch, for instance at work or with  
4  
5 monolinguals, especially professionals such as (simultaneous) interpreters (Woumans,  
6  
7 Ceuleers, van der Linden, Szmalec & Duyck, 2015), have extensive practice in  
8  
9 minimizing co-activation and crosslinguistic interference, in addition to a more  
10  
11 developed monitoring system.  
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15 Several studies have found that it is mainly speakers who use the L1 regularly in  
16  
17 professional contexts who show relatively minimal attrition effects, while there is no  
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19 such benefit among speakers who use the L1 mainly within the family or with friends  
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21 (de Leeuw, Schmid & Mennen, 2010; Schmid, 2007; Schmid & Dusseldorp, 2010).  
22  
23 Speakers who use their L1 professionally perform better on a verbal fluency task and  
24  
25 have higher lexical diversity and a lower error-rate in free speech than those who do not  
26  
27 use it regularly at all as well as those who use it mainly in social settings (Schmid &  
28  
29 Dusseldorp, 2010). In addition, professional language use has been associated with a  
30  
31 more native-like perceived foreign accent (de Leeuw, Schmid & Mennen, 2013) and  
32  
33 shorter naming latencies for low-frequency lexical items (Yılmaz & Schmid, 2012). At  
34  
35 the other end of the spectrum in Iverson's (2012) highly attrited speaker, Pablo (see  
36  
37 section 4.2 above), who himself claims not to actually speak Portuguese. In all his daily  
38  
39 interactions, he speaks Spanish while his family, friends and colleagues answer in  
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41 Portuguese. It is likely that it is this unusual and productive co-activation which has  
42  
43 produced the sweeping change to his L1 grammar.  
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52 Such findings can be accounted for on the basis of Green's model of inhibitory  
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54 control (e.g., Green 1986; 2011) as well as Grosjean's language mode model (Grosjean,  
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56 2001), both of which are integrated in the recent control process model of code-  
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1 switching as proposed by Green & Li Wei (2014): in professional contexts, many  
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3 external stimuli contribute to keeping the activation level of the L2 high, so the speaker  
4  
5 has to exert effort to suppress it (for example in a language teacher, who receives  
6  
7 constant L2-influenced input from her students but has to ensure that her own use of the  
8  
9 L1 remains target-like), contributing to the development of enhanced inhibitory control.  
10  
11 All in all, the interaction between L1 use and L1 attrition is therefore a more complex  
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13 one than often assumed, and more fine-grained analyses are necessary to establish a  
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15 clearer picture.  
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### 23 *5.3 The role of AoA*

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25 Thus far, our discussion has focused largely on L1 attrition among mature, sequential  
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27 bilinguals. It should, however, be acknowledged that the role of AoA for L1 attrition is  
28  
29 an important consideration for any theoretical approach, since findings indicate that  
30  
31 there are massive differences between the developmental outcomes of early and late  
32  
33 bilinguals where the language they were exposed to first is concerned.  
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37 It is a well-established finding that the developmental trajectory of the home  
38  
39 language among learners exposed to more than one language in childhood is extremely  
40  
41 complex: It varies per child and per situation, is affected by a wide range of factors  
42  
43 (such as the cultural context, literacy etc.), is often characterised by non-linearities,  
44  
45 spurts and reversals in development etc., and its outcome is impossible to predict (e.g.,  
46  
47 De Houwer, 2009; Kupisch & Rothman, 2016; Montrul, 2008; Pascual y Cabo &  
48  
49 Rothman, 2012; Scontras, Fuchs & Polinsky, 2015). Of particular relevance here is the  
50  
51 observation that, despite the fact that such early bilinguals or Heritage Speakers (HSs)  
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53 are exposed to their home language from birth, as adolescents or adults many of them  
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1 share more characteristics with adult L2 learners than with monolinguals (e.g., Montrul,  
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3 2008; Montrul, Davidson, de la Fuente & Foote, 2014). They often fail to establish  
4  
5 target-like representations of grammatical categories, even if they had been exposed  
6  
7 solely or largely to the home language up to and beyond the age at which these  
8  
9 categories are typically mastered in monolingual L1 acquisition (e.g., Cuza & Perez-  
10  
11 Tattam, 2016; Karayayla, *forthc.*; Montrul et al., 2014; Polinsky, 2008), suggesting the  
12  
13 necessity for either an extended period of entrenchment or some kind of maturational  
14  
15 stabilization effect after the rule has been acquired in order to decrease vulnerability to  
16  
17 erosion (Schmid, 2012). By comparison, attrition effects observed among post-puberty  
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19 bilinguals in the L1 are typically limited, and such attriters tend to be much more  
20  
21 similar to monolinguals than to L2ers (see above, see also Schmid, 2014).  
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27 Findings such as these have important implications for our understanding of L1 and  
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29 L2 grammars, their interaction, and the development of these phenomena across the  
30  
31 lifespan. They tentatively suggest that:  
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- 34 1. for many bilinguals (some) L1 grammatical features are susceptible to  
35  
36 dissociation and re-assembly  
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- 39 2. for most individuals this susceptibility decreases with a higher age of onset of  
40  
41 bilingualism, but in some relatively rare individual cases restructuring may take  
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43 place beyond that age  
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47 Treating heritage language development and L1 attrition as different developmental  
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49 contexts carves up a continuous spectrum of L1 development into artificially distinct  
50  
51 categories. This has resulted in the emergence of two related but mainly independent  
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53 fields of research: investigations of attrition, which focus largely if not exclusively on  
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55 post-puberty bilingualism, and studies of heritage speakers, which consider populations  
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1 that became bilingual roughly between birth and school age. Extremely few studies  
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3 examine the AoA range in between these two or make comparisons across age groups.<sup>3</sup>  
4  
5 A more holistic approach which considers changes to the native language across the  
6  
7 entire AoA spectrum may allow us to gain important insights into aspects of bilingual  
8  
9 development at different ages: The many comparisons of the L2 development of  
10  
11 bilinguals of all AoAs and the extensive discussions surrounding the role of AoA for  
12  
13 ultimate success have been among the most challenging, interesting and informative  
14  
15 contributions to our understanding of L2 acquisition. A similarly integrative and  
16  
17 integrated perspective on how the age at which a speaker becomes bilingual will affect  
18  
19 L1 development is necessary in order to complement this understanding of how and  
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21 why the age of learning plays such an important role for ultimate success in L2 learning  
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23 (see Schmid, 2009, 2014).  
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## 32 **Conclusion**

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34 We have argued in the above that expanding the perspective on bilingual development  
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36 to fully acknowledge and include changes to the L1 has the potential to broaden the  
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38 scope of the discussion, refine theoretical models and gain insight into phenomena that  
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40 are as yet not fully understood. In order to achieve this, we have challenged a number of  
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42 preconceived notions:  
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54 <sup>3</sup> We fully acknowledge that the practical reasons for distinguishing L2-to-L1 effects between HSs on the one hand  
55 and late bilinguals on the other are obvious and compelling. Firstly, it can be difficult to design linguistic tasks  
56 that are not either too difficult for HSs or too easy for attriters, making it taxing to investigate both groups within  
57 the same study or with the same methodology. Secondly, unlike in investigations of L1 attrition among late  
58 bilinguals, the baseline is very hard to establish for HSs: we can assume with a reasonable amount of confidence  
59 what the L1 knowledge of a post-puberty learner would have looked like at the time of L2 onset, but if another  
60 language is thrown into the developmental mix at such an early stage, all bets are off.  
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- the notion that ‘linguistic development’ is invariably, or even typically, unidirectional, involving a series of changes in which linguistic knowledge increasingly comes to resemble that of the mature, stable native speaker
- the notion that there is such a thing as ‘complete development’ in the native language, and that after this stage has been reached, the processes and forces which drive (first or second) language acquisition will cease to operate on this language system
- the notion that there is a difference between ‘normal’ processes of crosslinguistic interference from L2 to L1 which affect all bilinguals, and some ‘abnormal’ process of language attrition which affects only a subset of long-term, immersed L2 speakers who make little use of their L1.

Counter to these notions, we propose that all of a bilingual’s languages are in a constant state of flux and adaptation, and that the same processes and principles which drive and guide the acquisition of a language will also come to bear, in similar ways, on linguistic knowledge that has already been developed. Investigations of how grammatical processes that had previously been mastered may change or deteriorate are as informative about the nature of human linguistic knowledge as those that focus on their acquisition. Both should be capable of being accounted for within the same theoretical framework – and if the framework fails to predict patterns which can be shown to occur in attrition, this should invalidate the theory in the same manner as would counterevidence from language acquisition studies.

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## When is a bilingual an attriter? – Response to the commentators

Monika S. Schmid & Barbara Köpke

We are delighted by the wide range of constructive and controversial commentaries in response to our attempt to make “effects of the second language on the first” (Cook, 2003) a more integral part of the wider field of bilingualism. For the purpose of this response, we will refer to such effects as EotSLotF.

We would like to thank all commentators for their thoughtful and careful engagement with our keynote article and look forward to the future debates and developments which we hope this epistemological issue will initiate and shape. In particular, we are excited by the theoretical advances and considerations proposed by many of the contributions (among others, by Allen, de Bot, Domínguez, Gyllstad & Suhonen, Keijzer, MacWhinney, Sanchez and Tsimpli), which will no doubt contribute to a more sophisticated and informed debate within attrition studies in future, and hopefully also influence the wider field of bilingualism research. Unfortunately, space constraints prevent us from engaging with these proposals here, and we will instead address and clarify those parts of our argument which have sparked controversy, in particular questions relating to the definition, scope and limitation of attrition effects.

There are a number of issues on which all contributors are in agreement. The first, and most important, of these relates to the bidirectionality of crosslinguistic influence (a term first proposed by Sharwood Smith, 1982): When a previously monolingual speaker –for the time being let us imagine an adolescent or adult– begins to acquire and use a second language (L2), the L1 inevitably plays an important role, shaping and constraining the developmental process. However, the acquisition and use of other languages also have immediate, tangible and measurable ramifications for the first one (L1). These ramifications, or EotSLotF, will change over time, modulated by a wide range of external factors (such as amount of use and length of exposure, but also aptitude, motivation, L2 proficiency, etc.) in ways which are, to date, poorly understood. EotSLotF will thus usually not develop in a linear fashion: In some situations, in some settings, in some life phases, these effects may be less or more pronounced both within and across bilingual individuals.

A second uncontroversial point is one which we have pointed out before (e.g., Köpke & Schmid, 2004), namely that there are two ways in which EotSLotF can manifest themselves: “a) pre-existing linguistic knowledge becomes less accessible or is modified to some extent as a result of the acquisition of a new language, and b) L1 production, processing



1 or comprehension are affected by the presence of this other language” (Schmid & Köpke, p.  
2 \$\$\$). While this observation in itself is also uncontroversial, many of the commentaries  
3 question our proposal to:  
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- 5 a) consider phenomena of both types as belonging to the same developmental spectrum;
- 6 b) subsume them both under the label of *language attrition*; and thus
- 7 c) argue that every bilingual is an attriter (recall that we are at present talking about *late*  
8 bilinguals).  
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12 With respect to the first point, many of the commentaries argue for a need to distinguish  
13 EotSLotF which reach the level of *representation* from those which are a matter of  
14 *processing* (among others Gürel, Tsimpli). In the first instance, of course, our proposal to  
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16 consider both types of phenomena as representing developmental stages on one and the same  
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18 continuum was never intended to suggest that attempts to differentiate them should be  
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20 abandoned, but that they should be brought together under one common denominator. As  
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22 Domínguez points out, there is inevitably an interplay between processing difficulties and  
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24 structural reconfigurations. What we reject is the view that only the latter should be  
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26 considered instances of attrition, and we instead argue for a broader view capable of  
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28 investigating and assessing them in relation to each other, across the full continuum of  
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30 bilingual development.  
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33 Furthermore, as we have pointed out, both in the keynote and elsewhere, the available  
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35 evidence suggests that among first-generation immigrants who are late bilinguals, structural  
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37 reconfigurations are, at the very least, extremely rare: attriters commonly show accuracy on  
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39 morphosyntactic features such as agreement above 95% of obligatory contexts (Montrul,  
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41 2008, p. 265) – well above any of the thresholds usually applied within studies of L2  
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43 acquisition as the yardstick for having attained target-like representations of a particular  
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45 structure (Schmid, 2013).<sup>1</sup> Far more common are changes to the statistical distribution of  
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47 grammatical features which monolinguals also allow to some extent but apply more  
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49 restrictively (e.g., Tsimpli et al., 2004 on null and overt syntactic subjects; Gürel & Yilmaz,  
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52 <sup>1</sup> To our knowledge, the only two individuals ever studied who became bilingual after puberty and who show  
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54 indications of consistent and apparently categorical misapplications of a particular property are the Spanish-  
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56 Portuguese bilingual studied by Iverson (2012) and discussed in more detail in our keynote paper (p. \$\$\$) and  
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58 one of the Albanian-English speakers investigated in de Leeuw, Tusha & Schmid (2017, see de Leeuw’s  
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60 commentary) who seems to have neutralized a phonemic contrast. Beyond these two cases, the evidence of  
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62 attrition found so far is limited to distributional changes, and the question of whether the more consistent  
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64 changes observed by Iverson and de Leeuw et al. would persist upon re-exposure is open.  
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2011 on Turkish anaphors, among many others). These shifts are often reflective of  
distributional properties of the variety of either the L1 or the L2 which is spoken in the new  
community, and they are influenced by patterns of code-switching and co-activation (see  
Domínguez, Perpiñán) and the speaker's sensitivity to statistical distributions of grammatical  
properties (Nagy). Distributional patterns vary over time within the same individual and may  
re-converge towards the target norms upon relatively short periods of re-exposure to the  
original L1 variety of the speaker (e.g., Genevska-Hanke, 2016) but they are not necessarily  
indications of erosion or structural loss.

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These findings suggest that the phenomenon which is commonly described under the  
term *attrition* is, in the vast majority of cases, more likely to be a matter of on-line processing  
than an indication of structural erosion. It should be noted, however, that the distinction  
remains a problematic one to make: While many commentaries object to a broad definition of  
attrition, none of them proposes a workable definition by which the categorization of  
EotSLotF phenomena into processing vs. representation, and consequently loss vs. non-loss,  
could be achieved. The use of on-line vs. off-line tasks (as suggested for example by Montrul  
and Tsimpli) is certainly a step in the right direction. However, on-line and off-line tasks do  
not map neatly onto performance vs. competence, respectively. On the one hand, no single  
task is completely off-line, allowing to capture competence without interference from  
performance, and on the other, on-line experiments are often based on artificial materials and  
a high number of tokens of the same structure. They may thus not be representative of natural  
processing, and elicit higher levels of metalinguistic awareness as the task progresses and the  
target structure becomes evident (see e.g. Altenberg, 1991 and Altenberg & Vago, 2004 for a  
discussion of on-line and off-line tasks in the study of L1 attrition).

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At the level of the participant, the distinction between attrition and non-attrition is  
equally problematic: most attrition studies find that a number of bilingual participants score  
within the monolingual range on *some* of the tasks (as pointed out by de Leeuw), but the  
same participant will often score outside this range on others.<sup>2</sup> Using self-assessments (as  
suggested by Kasparian & Steinhauer) as an inclusion criterion is similarly fraught with  
difficulty, as such introspective reports are susceptible to minor variations in elicitation and,

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<sup>2</sup> For example, of the 20 speakers in de Leeuw, Schmid, & Mennen (2010) who scored within the native  
range in terms of perceived foreign accent, eight fell outside that range with respect to their performance on a C-  
Test, Verbal Fluency Task, and/or lexical sophistication, accuracy and fluency in free speech.

1  
2 more importantly, have not consistently been shown to have predictive power for actual  
3 linguistic tasks.<sup>3</sup>

4 The attempt to distinguish those EotSLotF which are a matter of representation from  
5 those which are not, and to only consider the former to actually be *attrition* has furthermore  
6 had the effect of dividing the research field into two subareas which often take little or no  
7 notice of each other. This search for a criterion capable of dividing a larger sample (e.g., all  
8 late bilinguals) into distinct subpopulations (e.g., attriters and non-attriters) – for example,  
9 immersion periods of over 10 years, self-perceived attrition, or performance outside the  
10 native range – is, in our view, a regrettable outcome of a research tradition which over-relies  
11 on categorical predictors. This tradition has been linked to the wide availability and  
12 comparative conceptual accessibility of statistical tests based on population means or  
13 medians (the “ANOVA mindset syndrome”; MacCallum, 1998), and has been criticized for  
14 the loss of informative variability inevitably entailed when dividing continuously measured  
15 predictors – such as age of acquisition (AoA), proficiency, working memory, length of  
16 residence, or self-perceived attrition – into artificial, discrete and often arbitrary categories  
17 (Plonsky & Oswald, 2016).

18 We argue that such discrete categories may not exist: All bilingual speakers –  
19 beginners and veterans, with balanced or asymmetric proficiency, and of all ages of onset and  
20 all types of acquisition (instructed or immersed) – have what Cook terms a linguistic  
21 “supersystem” (e.g., Cook, 1999, 2003) in which the way in which each language is handled  
22 is affected by the presence of the other. Everything else is a matter of degree, hence our  
23 assertion that “every bilingual is also an attriter” (\$\$\$). However, the consequence of the  
24 mindset driven by the “attrition = erosion” assumption has been that in the population where  
25 erosion was *expected*, those EotSLotF were called attrition. In other populations, for example  
26 early-stage L2 learners, different terminologies were used although similar effects were found  
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<sup>3</sup> While the feeling of being an attriter proved an interesting inclusion criterion in the studies by  
Kasparian et al. (e.g., Kasparian, Vespignani, & Steinhauer, 2016), studies using the Language Attrition Test  
Battery ([www.languageattrition.org](http://www.languageattrition.org)) show that responses to such questions are often inconsistent. The question  
of self-perceived attrition is included twice in the Sociolinguistic Questionnaire proposed as part of this battery  
(Questions 24/25 and 67). Among 106 participants (described in Schmid & Dusseldorp, 2010) only one third  
responded consistently that their L1 either had or had not deteriorated. Neither of the responses was a significant  
predictor for the performance on any of the tasks described by Schmid & Dusseldorp (2010). Similarly, Opitz  
(2011:221) found that speakers who in the first instance reported no change to their L1 then sometimes went on  
to enumerate areas which had become problematic for them (such as lexical access).

1 (e.g. slower lexical access, increased effects of frequency or non-selective syntactic  
2 activation, see section 3 of our keynote paper). This has had the regrettable effect of  
3 fracturing the field and masking very relevant findings from one cohort to researchers  
4 studying the other (Bylund). The fact that none of the twenty commentaries in this volume  
5 represent the perspective of on-line, transient EotSLotF as they occur in early stages of  
6 bilingual development may well be an indication of the blinkering effect of this division.  
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10 Many commentaries argue that our attempt to subsume different types of EotSLotF  
11 under the same heading collapses distinct phenomena and may lead to a lack of conceptual  
12 clarity (e.g., Bardovi-Harlig & Stringer, Gürel, Meisel). We would argue that a similar point  
13 can be made about the term ‘bilingualism’, which historically was taken to imply an  
14 individual who commands both languages at the monolingual level (e.g., Bloomfield 1933:  
15 56 – who, interestingly, explicitly excludes those cases where "perfect foreign-language  
16 learning" is "accompanied by loss of the native language" from this definition, see also  
17 Ortega, 2016: 66) but today is used to describe any individual able to use two or more  
18 languages productively. This conceptual broadening has not, we feel, led to vagueness and a  
19 loss of clarity for bilingualism research, nor to the impossibility of distinguishing different  
20 types of bilinguals, and we do not see why it should for language attrition. We hope instead  
21 that conceiving of developmental processes which, to date, have been assumed to be  
22 categorically distinct from each other as being situated on a larger continuum will lead to a  
23 better understanding: it will allow modeling the impact of predictors more accurately and  
24 comprehensively and comparing EotSLotF at all stages of bilingual development, and thus  
25 lead to a better understanding (as suggested by Allen).  
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40 Needless to say, our call for conceiving of all sequential bilinguals as attriters does  
41 not imply that any particular study should not pre-select its participants in a way that is  
42 consistent with the research question, for example according to their age of acquisition  
43 (AoA), proficiency, literacy, length of residence, or other criteria that may be relevant, and/or  
44 contrast different levels of these predictors (as de Leeuw seems to suggest). Any such study  
45 should, however, interpret its findings against other investigations which may have used  
46 different levels of these predictors, and it should not be conceptually limited to comparisons  
47 with results from studies investigating similar populations.  
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54 Finally, we would like to address the point which several of the commentaries (among  
55 them Bylund, Flores, Kupisch et al., Montrul) have correctly identified as the elephant in the  
56 room: the role of AoA. The first draft of our article contained an extensive section on the role  
57 of AoA which, due to length restrictions, ended up on the cutting room floor. In brief, we feel  
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1 that investigations of the development EotSLotF as a function of AoA suffer even more  
2 strongly from the tendency to focus on the extreme ends of the spectrum – in this case,  
3 bilingualism from birth vs. bilingualism after puberty – than is the case for investigations of  
4 different stages of the attritional process in late learners. The rapidly expanding field of  
5 Heritage Language Development has provided important insights into processes of  
6 bidirectional crosslinguistic influence in simultaneous and early sequential bilinguals, but is  
7 almost invariably limited to AoAs <6. Language attrition studies, on the other hand, rarely  
8 consider individuals who become bilingual below around 15. While HL studies have found a  
9 very wide range of variability in endstate proficiency in the birth language, ranging from  
10 populations with purely receptive knowledge (e.g., Montrul, 2010) to full proficiency similar  
11 to that of monolinguals (Kupisch et al.), studies of attrition in late bilinguals show far more  
12 homogenous results. Taken together, these findings suggest that there may be developmental  
13 changes in the native language in the AoA range between 6 and 15 years, i.e., in the blind  
14 spot between the two fields, which contribute to the stabilization of linguistic representations  
15 (Montrul). These developments may unfold along the lines suggested by Usage-Based  
16 models (in particular the approach proposed by MacWhinney, but see also Keijzer and  
17 others), or in accordance with the generative model underlying, for example, Meisel’s or  
18 Tsimpli’s commentaries. As Flores points out, both cross-sectional and longitudinal  
19 investigations of the entire range of AoA (as well as age at testing) are necessary in order to  
20 fully map these developments and establish their underlying causes.

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22 The last point to address is whether ‘attrition’ is a felicitous label for the processes  
23 referred to here as EotSLotF. First coined by none other than the great Einar Haugen (1938:  
24 reprinted 1972, pp. 1-2), it does carry the conventionalized implication of erosion or loss  
25 (Gyllstad & Suhonen). We find it interesting that some of the contributors to the present  
26 debate who have extensively worked on language attrition have no problem accepting this  
27 term as a general label for EotSLotF (e.g., Bylund, Keijzer, Montrul) while among those  
28 whose work is predominantly situated in other areas of bilingualism research a reluctance  
29 prevails to accept the notion of ‘attrition without loss’ (e.g., Bardovi-Harlig & Stringer,  
30 Meisel). It seems, therefore, that within the field of attrition studies, the meaning of the label  
31 has come to evolve in accordance with the actual phenomena that were being described and  
32 discovered. Our proposal to consider all types and stages of EotSLotF as part and parcel of  
33 the same developmental processes, and subsume them under the same label, did thus not arise  
34 from Humpty-Dumpty-like capriciousness (Meisel) but reflects a change in meaning that has  
35 long since taken hold. What makes us reluctant to propose a change of label is a fear for the  
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1 cohesion of the field, in a time where research that is not visible to Google Scholar is, for all  
2 intents and purposes, nonexistent – a major problem with phrases such as "effects of the  
3 second language on the first". As we pointed out above, language attrition research originally  
4 set out in search of one thing but eventually discovered quite another – but kept on referring  
5 to it under the label that was first chosen. We hope that the concept of ‘attrition without  
6 erosion’ will come to be more widely accepted as insights into the nature of attritional  
7 processes as well as their limits percolate through the community of bilingualism research.  
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