Language Mixing: A Distributed Morphology approach[*]

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1.   Introduction

This paper will be concerned with providing a formal analysis of data from speakers who mix two languages. We understand mixing to involve lexical items and grammatical features from two (or more) languages that appear in one sentence (cf. Muysken 2000). This is also called code switching (see Poplack 2004 for an overview) or code mixing (Muysken 2000) in the literature and it occurs in bilingual speakers, creole communities, and immigrant communities. We will use *language mixing* as our descriptive term in this paper.

Our empirical focus will be restricted to mixing within the nominal phrase. Three examples are provided in (1)-(2).

(1)   a. den **track**-en
           that track-DEF
           'that track'

       b. **the** eneste ung-en
           the only child-DEF
           'the only child'

(2)   to **matrátz**-i
       the mattress-N
       'the mattress'

The examples in (1) are from the heritage language American Norwegian and are taken from the Corpus of American Norwegian Speech (CANS). The example in (2) is from a

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speaker whose main language is Greek but the speaker is mixing a German root into the Greek noun phrase. In this paper, we argue that language mixing of the kind seen in (1)-(2) supports a Distributed Morphology model of the grammar, whereby morphophonological exponents are inserted after the core syntactic derivation (cf. Harley & Noyer 1999, Alexiadou 2001, Embick & Noyer 2007).

The paper is organized as follows. In section 2 we outline some relevant background for why language mixing is important from a theoretical point of view. Section 3 introduces the general theoretical model for the paper. Section 4 introduces a case-study of the heritage language American Norwegian. In section 5, we focus on German-Greek and Greek-English. Section 6 summarizes and concludes the paper.

2.   Why language mixing?

Chomsky (1986) famously introduced the distinction between E-language and I-language. I-language is the internal, individual and intensional property of language; language viewed as a mental and computational system. E-language is, simply put, language use. A central goal for generative grammar is to identify what a possible human I-language is. That is, what are the components that a human being can make use of that will provide him or her with a natural language? Traditionally, this question has been approached based on a careful study of data from monolingual and "idealized" speakers (Chomsky 1965), which has been an eminent simplification for purposes of uncovering substantial generalizations and results (Lohndal 2013). However, given that humans ubiquitously mix elements from one language to another, a possible I-language is also one in which certain instances of language mixing are allowed. Thus, the study of language mixing is important in order for us to provide a more comprehensive understanding of I-language.

An important premise in most theoretical work on language mixing is that the theory of language mixing should not be unique to mixing. Muysken (2000: 3) puts this aptly: "The challenge is to account for the patterns found in terms of general properties of grammar. Notice that only in this way can the phenomena of code-mixing help refine our perspective on general grammatical theory. If there were a special and separate theory of code-mixing, it might well be less relevant to general theoretical concerns". In the literature, this is known as the Null Theory (Woolford 1983, Mahootian 1993, Belazi, Rubin & Toribio 1994, MacSwan 1999, 2000, 2005, Chan 2003, 2008, González-Vilbazo 2005, and González-Vilbazo & López 2011, 2012). From this point of view, the same principles govern both monolingual production and language mixing. No constraints as such are unique to language mixing (pace Myers-Scotton 1993, 2002). A consequence of this perspective is that language mixing is not something peripheral to the study of I-language; rather, cases of mixing are crucially important to better understand the nature of the faculty of language (cf. Chan 2008). Of course, this does not "necessarily entail that the I-language of code-switchers will be identical to the union of the two grammatical systems: code-switchers may include features drawn directly from Universal Grammar which are absent in the component grammars" (González-Vilbazo & López 2011: 833).

In this paper, we will focus on language mixing within the nominal phrase, including bound morphemes. Unlike some of the literature (e.g., Sankoff & Poplack 1981, Poplack

2004, MacSwan 1999, 2009, 2013), we will include mixing within "words" within the domain of language mixing. For reasons of space, we cannot discuss this issue here (see Grimstad, Lohndal & Åfarli 2014), but we believe that mixing within the word can be better analyzed within a model that actually decomposes words into smaller units, viz. Distributed Morphology. It is also worth noting that the most frequent type of language mixing is precisely mixing within "words" (Poplack 2004). In the next section, we will outline the general model that we will apply to language mixing in sections 4 and 5.

3. A late-insertion exoskeletal model of language mixing

In this paper, we will combine a late-insertion approach to grammar, viz. Distributed Morphology, with an exoskeletal model. We will say something about each of these, starting with the exoskeletal model.

Borer (2005, 2013) argues that syntactic structure is not generated based on features on specific lexical items. Rather, items are inserted into abstract syntactic templates (or frames, as in Åfarli 2007) which are generated on the basis of features. But these features are not features of lexical items; they are just abstract units that contribute to generating a syntactic structure which will be interpreted in a specific way. Several scholars have developed this view further, arguing that in general, syntactic structure determines aspects of meaning (see, among others, Åfarli 2007, Ramchand 2008, Lohndal 2014, Alexiadou, Anagnostopoulou & Schäfer 2015). That is, a syntactic structure provides a skeleton (template/frame) in which material can be inserted, both in head positions and in specifier positions.

We assume that the abstract skeletons are generated based on syntactic features which are subject to late insertion by exponents as in Distributed Morphology. The syntactic derivation delivers a representation to Spell-Out, which is then sent to both PF and LF. On the way to PF, morphological operations will take place and the syntactic structures will receive a morphophonologial representation. Put differently, morphosyntactic exponents are inserted late through the operation Vocabulary Insertion. There are constraints on insertion, which largely follow from language-specific restrictions on Vocabulary Insertion. Note that this entails the following: "According to this hypothesis, the components of the traditional morpheme are separated from one another; that is, morphemes do not contain syntax, semantics, and phonology. Rather, the morphophonological component of the morpheme is underspecified with respect to the syntactico-semantic environments in which it appears" (Embick & Noyer 2007: 297; see also Beard 1966, 1995).

Traditionally, most formal work on language mixing has been based on various versions of a lexicalist approach (MacSwan 2009): "Whether a sufficiently rich non-lexicalist theory involving late insertion, such as distributed morphology […], could achieve similar results has not been investigated" (MacSwan 2013: 347). In the present paper, we will argue that a late-insertion theory succeeds in doing that for two case-studies. Because the Distributed Morphology perspective makes it impossible to avoid language mixing within words, and given the prevalence of word-internal mixing, the present perspective will also be empirically advantageous in that it does not set word-internal mixing aside from word-external mixing.

4. Language mixing in American Norwegian

This section will provide an analysis of language mixing within the nominal phrase in the heritage language American Norwegian. The latter is the variety spoken by Norwegian immigrants who settled in the United States from the 1850s and onwards. In his seminal work, Haugen (1953) documented the variety based on extensive fieldwork in the 1930's. In the 1980's, more data were gathered by Hjelde (1992), and currently, an electronic database is being created at the University of Oslo. The Corpus of American Norwegian Speech (CANS) is a corpus of spoken American Norwegian based on interviews and conversations between informants who speak American Norwegian. These speakers have sometimes never been to Norway, many of them do not keep in touch with Norwegian relatives or read Norwegian, but they are still able to speak the variety they acquired in their childhood. CANS has the added value of containing sound and video files together with transcriptions. These enable us to listen to the actual pronunciation of the mixed items, specifically to determine whether or not it has a full-fledged American accent. So far data from 36 informants have been included in the corpus, and it is the data from these 36 speakers that our case-study is based on.

In the corpus, we find the following occurrences of language mixing between Norwegian and English (3). The English items are boldfaced, and these are all pronounced with a clear American accent. The code at the right is the identification code for the informant in the corpus.

(3)   a.   den **field**-a   (coon_valley_WI_02gm)
           that field-DEF.F
           'that field'

        b.   den **track**-en   (westby_WI_02gm)
           that track-DEF.M
           'that track'

        c.   denne **cheese**   (blair_WI_04gk)
           this cheese
           'this cheese'

        d.   **the** by   (chicago_IL_01gk)
           the city
            'the city'

        e.   **the** eneste ung-en   (blair_WI_01gm)
           the only child-DEF.M
           'the only child'

        f.   **the road**-en   (rushford_MN_01gm)
           the road-DEF.M
           'the road'

        g.   **the** gamle kirke   (chicago_IL_01gk)
           the old church
           'the old church'

In what follows, we will provide an analysis of these data.[1]

The examples in (3a) and (3b) demonstrate that English words can be inserted in an otherwise Norwegian nominal phrase (DP). Both phrases exhibit double definiteness, a characteristic trait of European Norwegian. The different post-nominal suffixes also demonstrate that the nouns have been assigned gender, since (3a) is feminine and (3b) is masculine. The gender can be identified based on European Norwegian, where the definite endings typically are *–en* for masculine nouns, *-a* for feminine nouns, and *–et* for neuter nouns. These endings are typically considered inflection classes (Enger 2004), but in nearly all cases, they also mark gender. Note that in many cases, the gender assigned to the English word is not identical to the comparable European Norwegian word (see also Hjelde 1996 on this issue).

Our analysis of the DP builds on Julien (2005) and work cited there, but develops her model further. An abstract skeleton for the American Norwegian DP is provided in (4), where '…' means that there may be additional structure and 'u' denotes an unvalued feature.

(4)   [$_{DP}$ D$_{[DEF: U, NUM: U, GEN: U]}$ … [$_{DefP}$ Def$_{[DEF: X]}$ [$_{NumP}$ Num$_{[NUM: Y]}$ [$_{nP}$ n$_{[GEN: Z]}$ √ROOT]]]]
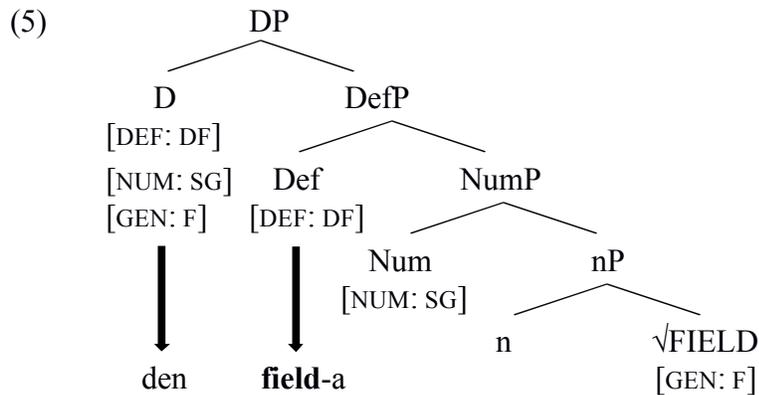
The D head has unvalued features whose values are provided from the functional heads via Agree (Chomsky 2001). The root itself has no syntactic features; rather, the gender feature is located on n (Alexiadou 2004, Kramer 2014) or some other functional head (Picallo 1991, Ritter 1993). In this paper, we will adopt the former analysis.

Importantly, below we will informally talk of "English" features and "Norwegian" features. This is merely for ease of exposition (unlike approaches such as Belazi, Rubin & Toribio 1994 which make use of a formal "language feature" in their analyses). We assume that the derivation can make use of any features from any variety that the learner has acquired. As long as there is a Vocabulary Item that can lexicalize the feature(s) in question, the derivation will converge (unless other principles are violated, of course). We make no claims as to whether or not these features are stored in different lists based on the languages from which they were acquired, or what the relationship between these lists and the encyclopedia is. These are important questions that go beyond the scope of the present paper.

Returning to (3a) and (3b), in this case, the structure is Norwegian and the root is taken from English. We analyze (3a) as in (5); (3b) will have an identical structure except that the gender feature will be different. The Vocabulary Items are provided at the bottom of the structure, below the arrows.
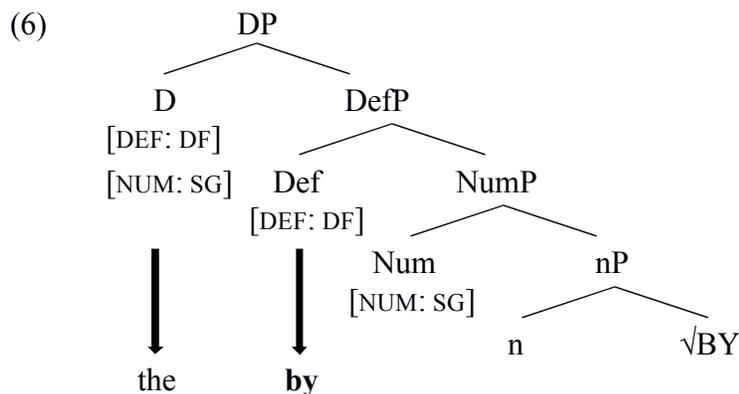
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[1]This analysis draws on work in Riksem (2015), but differs in a number of substantial ways.

(5)

```
                          DP
              ┌────────────┴────────┐
              D                    DefP
          [DEF: DF]          ┌──────┴──────┐
          [NUM: SG]         Def          NumP
          [GEN: F]        [DEF: DF]    ┌────┴─────┐
                                      Num         nP
                                   [NUM: SG]   ┌───┴────┐
                                              n      √FIELD
              │              │                       [GEN: F]
              ▼              ▼
             den          field-a
```

The gender feature is introduced on n, and the root combines with n, then Num, and then Def.[2] This feature bundle is then realized morphophonologically as *fielda*. Even though the root is English and does not have gender, the root "acquires" gender via the syntax and is inflected like any ordinary Norwegian noun. Notice that we are not making use of a language index or feature – if the root were Norwegian, the derivation would proceed as above and converge.

Turning to (3c), this is an interesting example because the noun does not carry a postnominal definiteness suffix. In the older material collected in Haugen (1953), a Norwegian postnominal suffix is virtually obligatory in such contexts, cf. Haugen (1953: 452). This shows that the speakers recorded in CANS are further attrited compared to Haugen's informants, which is to be expected given that their exposure to Norwegian has arguably been less and different from that of the older informants. We would like to analyze (3c) as a case of missing surface inflection (Lardiere 2000), which is due to attrition. The syntactic analysis is as in (5), except that the definiteness feature has not been realized overtly and that the gender feature is masculine.

(3d) is interesting because it shows that the determiner can be from one language (English) and the root from another (Norwegian). The syntactic structure is given in (6).

(6)

```
                          DP
              ┌────────────┴────────┐
              D                    DefP
          [DEF: DF]          ┌──────┴──────┐
          [NUM: SG]         Def          NumP
                          [DEF: DF]    ┌────┴─────┐
                                      Num         nP
                                   [NUM: SG]   ┌───┴────┐
              │              │                n       √BY
              ▼              ▼
             the            by
```
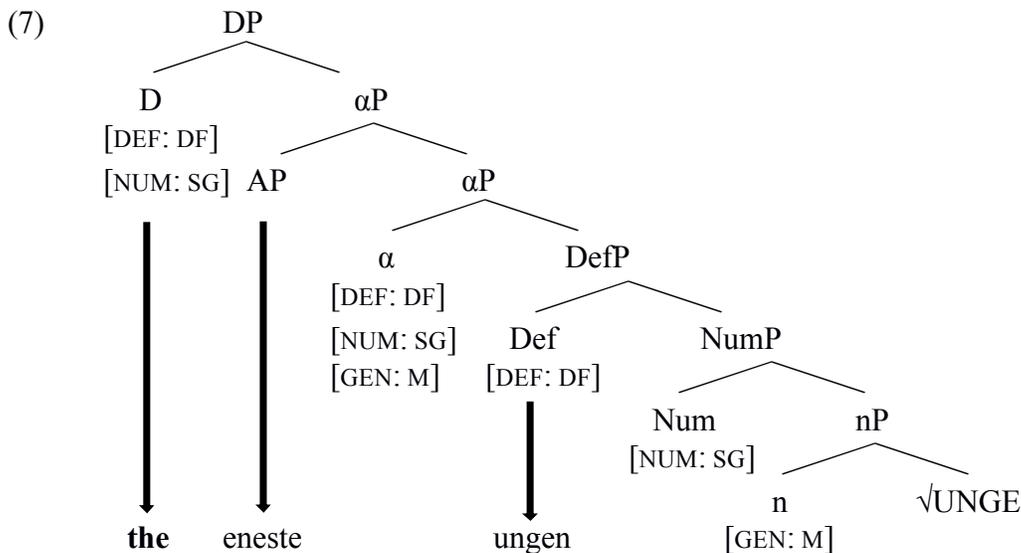
Here, the structure is presumably generated based on abstract features that are English, so we do not expect a postnominal definiteness suffix on the noun. Alternatively, if the
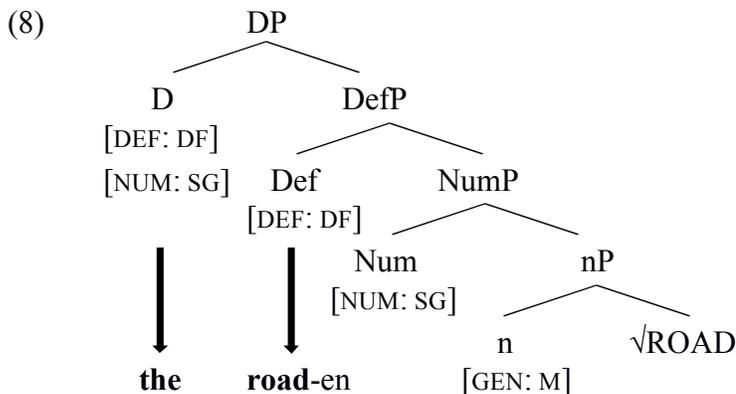
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[2]We set aside whether this happens by way of head movement (Delsing 1993) or by way of morphological merger (Embick & Noyer 2001).

abstract features are Norwegian, this would be another case of missing surface inflection comparable to (3c). The example in (6) occurs in an otherwise Norwegian sentence, which may be a reason to suspect that the latter analysis is correct, since that suggests that the abstract features underlying the sentence are mostly drawn from Norwegian.

There are cases where the determiner is English and yet there is double definiteness. (3e) is a case in point. Our analysis is given in (7), where we follow Julien (2005) in assuming that adjective phrases are merged in the specifier of an αP. Note that the determiner is taken from English whereas the rest of the structure is Norwegian.
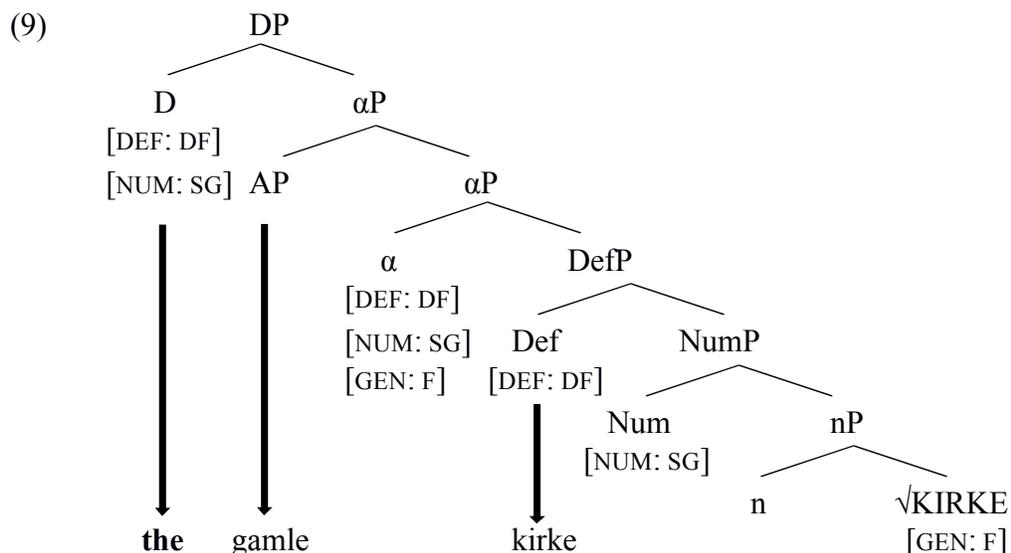
(7)

```
                    DP
            ┌────────┴────────┐
            D                 αP
        [DEF: DF]      ┌───────┴────────┐
        [NUM: SG]  AP                  αP
            │       │          ┌────────┴────────┐
            │       │          α                DefP
            │       │      [DEF: DF]      ┌───────┴───────┐
            │       │      [NUM: SG]    Def            NumP
            │       │      [GEN: M]   [DEF: DF]    ┌──────┴──────┐
            │       │          │        Num            nP
            ▼       ▼          ▼      [NUM: SG]   ┌────┴────┐
          the    eneste      ungen               n      √UNGE
                                              [GEN: M]
```

An even more striking example is (5f), where everything but the postnominal ending is English. The structure is given in (8).

(8)

```
                    DP
            ┌────────┴────────┐
            D               DefP
        [DEF: DF]      ┌──────┴──────┐
        [NUM: SG]    Def           NumP
                  [DEF: DF]   ┌──────┴──────┐
            │        │      Num           nP
            │        │   [NUM: SG]   ┌─────┴─────┐
            ▼        ▼               n        √ROAD
          the     road-en        [GEN: M]
```

The postnominal ending demonstrates that the English root acquires gender in the course of the derivation. Given that the feature bundle [DEF: DF, NUM: SG; GEN: M] does not have an English realization, there is only a Norwegian exponent that can realize the bundle. In English, that feature bundle would arguably have a zero realization, yielding *the road*.

Lastly, we turn to (3g). The structure is provided in (9).

(9)

```
                          DP
                   ┌───────┴───────┐
                   D               αP
              [DEF: DF]        ┌────┴──────┐
              [NUM: SG]  AP              αP
                   │       │      ┌───────┴───────┐
                   │       │      α             DefP
                   │       │  [DEF: DF]     ┌─────┴──────┐
                   │       │  [NUM: SG]   Def         NumP
                   │       │  [GEN: F]  [DEF: DF]  ┌────┴────┐
                   │       │      │     Num        nP
                   │       │      │   [NUM: SG]  ┌──┴───┐
                   │       │      │            n    √KIRKE
                   │       │      │                 [GEN: F]
                  the    gamle  kirke
```

The weak adjective inflection provides evidence for Norwegian structure. In this case, we cannot know for sure that the gender is feminine, as the adjective has the same weak inflection for all three genders. We have assumed that it is feminine, as this is the gender in European Norwegian, but nothing hinges on this somewhat arbitrary choice.

In sum, we see that dissociating the syntactic structure from the morphophonology enables us to account for DP-internal language mixing in American Norwegian. The evidence from CANS suggests that a lot of different options are possible and our model allows for these options. However, the features together with Agree also rules out certain patterns, such as the constructed example in (10).

(10)   **the** gammel   kirke
          the old.INDEF church
          'the old church'

This is a case where the adjective does not agree in definiteness with the rest of the DP, which would not be possible on this approach. The same reasoning applies to a range of other examples, which, if they turn out to be possible, would require certain modifications of the theory.

5.   Language mixing involving Greek

In this section, we will discuss data from language mixing involving German and Greek. The data are based on Fotopoulou (2004) who collected data based on questionnaires and recordings. All speakers live in different areas of Germany (Bochum, Frankfurt, Main, and Stuttgart). There were 95 participants (11-36 years old, both male and female) in the study who all had acquired Greek and German by the time the critical period had ended. Younger participants seemed to have problems with Greek vocabulary and orthography and tended to switch more between the two languages.
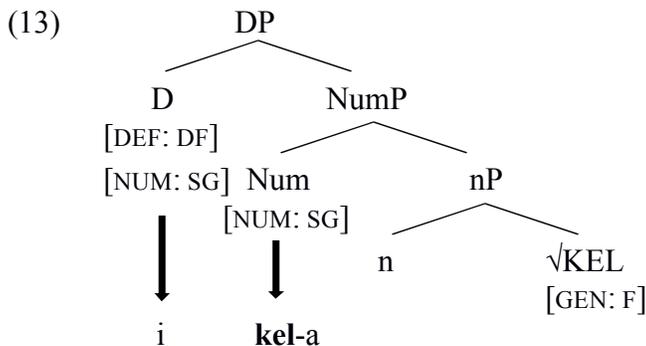
An example of switching within the DP is provided in (11).

(11)   Simera piga   stin   **Krankenkáss**-a
          Today went.1SG to.the health.insurance.office-F
          'Today I went to the health insurance office.'

This example demonstrates that the German compound is fully integrated into the Greek nominal inflection system. Further examples are provided in (12), which provide both the German and Greek versions in addition to the mixed phrases.

(12)

	Mixing	*German*	*Greek*
a.	to matrátz-i the.N mattress-N	die Matratze the.F mattress	to.N strom-a the mattress-N
b.	to regál-i the.N shelf-N	das Regal the.N shelf	to.N raf-i the shelf-N
c.	o. Vetrét-as the.M representative-M	der Vertreter the.M representative	o.M andiprosopos the representative.M
d.	i Káss-a the.F cashpoint-F	die Kasse the.F cashpoint	to.N tami-o the cashpoint-N
e.	i Kél-a the.F cellar-F	der Keller the.M cellar	to.N kelar-i the cellar-N

Greek and German are similar in that they both have three genders and a large number of declension classes. Despite this, in the mixed variety, the German roots are assigned a Greek declension class. Note the gender interference that takes place in (12). (13) illustrates a general structure for mixing based on (12e).

(13)

```
                    DP
            _____|_____
           D              NumP
       [DEF: DF]       ____|____
       [NUM: SG]  Num            nP
              [NUM: SG]      ____|____
           |        |      n        √KEL
           |        |              [GEN: F]
           ▼        ▼
           i      kel-a
```

Similar observations hold also for English–Greek language mixing by British Born Cypriots (BBC)-Greeks, as Gardner-Chloros (2009:50) reports (14).

(14)   *BBC Mixing*   *English*   *Greek*
- a. marketa (F)   market   agora (F)
- b. hoteli (N)   hotel   ksenodohio (N)
- c. kuka (F)   cooker   furnos (M)
- d. fishiatiko (N)   fish and chip shop   --
- e. kitsi (N)   kitchen   kuzina (F)
- f. ketlos (M)   kettle   --
- g. haspas (M)   husband   andras (M)

The three varieties in (14) all differ in terms of the features that are part of their noun phrases. In English, there is no grammatical gender or declension class. However, in the mixed variety, all the English words have been assigned a Greek declension class and gender.

These two examples suggest that the following principle holds for mixing involving Greek, cf. Alexiadou (2011):

(15)   *All* loanwords must be assigned to declineable noun classes, since the main language (Greek) has declension classes.

The above data clearly demonstrates that gender and declension class features cannot be a property of the root, as they get reassigned depending on the linguistic context.

In (16), we provide an overview of the Greek declension classes (Ralli 1994, Wurzel 1998, Alexiadou & Müller 2008).

(16)

		S-principle			**Neuter**			
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
NOM/SG	os	s	Ø	Ø	o	os	Ø	Ø
ACC/SG	o	Ø	Ø	Ø	o	os	Ø	Ø
GEN/SG	u	Ø	s	s	u	us	u	os
VOC/SG	e	Ø	Ø	Ø	o	os	Ø	Ø
NOM/PL	i	es	es	is	a	i	a	a
ACC/PL	us	es	es	is	a	i	a	a
GEN/PL	on	on	on	on	on	on	on	on
VOC/PL	i	es	es	is	a	i	a	a

In the data above, we can observe certain preferences. German stems are either incorporated into the VII class (*spiti* 'house') or into one of the S-classes (ending in $-as_M$ and $-a_F$), which are considered to be the unmarked ones in the language, see Anastasiadi-

Simeonidi & Chila-Markopoulou (2003). From this perspective, prototypical masculine nouns end in *–s*, prototypical feminine nouns end in *–a*, while prototypical neuter nouns end in *–o* or *–i*. We thus observe that the mixed phrases adhere to these generalizations.

Assuming that declension class and gender are assigned on n, speakers, obeying principle (15) above, pick one of the realizations of the unmarked classes to integrate German or English roots into the Greek morphosyntax. Note that when the word contains a German ending which determines class or gender such as *Begegn-ung* 'meeting-feminine', no further realization of n is provided by the grammar. In this case, it is possible for the word to appear after a Greek determiner in strings such as *i Begegnung* 'the.FEM meeting.FEM' (Fotopoulou 2004). This is straightforwardly captured by the system outlined in the previous section for American Norwegian, where the features of D agree with the features on n.

Finally, in case the noun is inserted into a "German" syntax, no adaptation takes place, as illustrated in (17).

(17)   Thelo   na   vgo   **mit meinem Freund**
           want.1SG SUBJ go.out.1SG with my.DAT boyfriend.DAT
           'I want to go out with my boyfriend.'

The local context determines the shape of the noun, which suggests that the lexicon of both languages is active, as for American Norwegian.

6.   Conclusion

In this paper, we have argued that a late-insertion Distributed Morphology model receives further support from language mixing. A central point in the discussion has been gender, as we have provided a lot of evidence for gender being assigned syntactically. A lexicalist model would have to stipulate that the speaker has e.g., an English noun stored with gender and an English noun without gender. In addition to duplicating the lexical representations for nouns, it is also problematic because the mixed patterns do not necessarily have the same gender as their non-mixed counterparts. Thus a lexicalist model of the sort developed for mixing in MacSwan (1999 inter alia) does not seem viable confronted with the present data.

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