

Creoles as interlanguages: Phonology

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1 Introduction

The idea that processes of second language acquisition (SLA) are highly relevant for an account of creole genesis is far from new or original (see Plag (2008a) for some discussion and further references). However, it is still controversial which kinds of interlanguage processes are relevant, and how much of a given creole's structures can be attributed to such processes. In my previous two Columns (Plag 2008a,b) I discussed a specific hypothesis about the relation of creolization and SLA that I labeled 'interlanguage hypothesis'.

According to this hypothesis, creoles originate as conventionalized interlanguages of an early developmental stage. The interlanguage hypothesis is highly compatible with scenarios that claim that creolization is at least a two-generation process, which involves at least two successive stages of development. For example, Veenstra (2003) argues that during the first stage, adults acquire the superstrate language to variable degrees, with interlanguages of the Basic Variety type (Perdue 1993) chiefly among them. Traditionally, this stage has also been called the pidginization stage, characterized by rudimentary acquisition of the dominant language. This stage is followed by a second stage, following the so-called target-shift, in which the next generation of speakers acquires the new medium of interethnic communication (cf., e.g., Baker 1994), and no longer the superstrate language. At this stage, processes of SLA, first language acquisition and dialect levelling may all be going on at the same time.

In my previous column, I took a closer look at inflectional morphology and a number of syntactic constructions to investigate whether the linguistic phenomena encountered in these areas lend themselves to an explanation in terms of SLA processes. Starting out with the assumptions of a psycholinguistic theory of morphosyntactic development in SLA (Processability Theory, e.g. Pienemann 1998, 2005) I argued that both the loss of inflectional morphology and the preservation (if any) of primarily inherent inflection can be

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explained under the interlanguage hypothesis. In the process of acquiring a second language, inflectional morphology, and so-called contextual inflection in particular, develops rather late as the predictable consequence of the limited L2 processing capacities that are characteristic of the early stages of SLA. Under the interlanguage hypothesis, the striking parallelisms between the nature of inflectional morphology as observable in early interlanguages and in creoles are thus convincingly accounted for. Similar arguments hold for syntax. An analysis of clausal negation, basic word order, and question formation showed that the interlanguage hypothesis can account for the allegedly unmarked nature of many syntactic structures across creoles. I demonstrated that the oft-cited 'universal tendencies' in creoles can be accounted for as results of limited processing capacities in second language acquisition, and that limited processability crucially also constrains transfer in interesting ways.

As already discussed in my first Column, my reason for further investigating the interlanguage hypothesis is not that I think that interlanguage processes can account for all structures emerging in creole languages. Rather, I believe that creoles emerge under very complex circumstances where many different mechanisms may play a role, for example, dialect leveling, substrate leveling, transfer as it occurs in SLA, transfer as a contact phenomenon in a multilingual environment, and regular language transmission effects, as they also occur in speech communities with predominant first language acquisition. But I also believe that many properties of creole languages can indeed be explained and much better understood if we push the interlanguage hypothesis as far as possible in order to see how much it leaves unaccounted for. This research strategy is very fruitful in discerning those areas that are then amenable to other explanations.

In this column, I extend my line of inquiry to phonology, an area for which in their 1995 Column in this journal Singh and Muysken proclaimed the need of a debate among creolists ('Wanted: A debate in pidgin/creole phonology', Singh & Muysken 1995). This debate has finally come, as evidenced by recent volumes focusing on this topic, for example, Plag (2003), Bhatt & Plag (2006a,b) and many individual publications elsewhere. In the following I present some illustrative case studies of selected segmental and suprasegmental phenomena from different creole languages (and their lexifiers) to show that any account of the emergence of creole structure in these domains must make reference to SLA processes. Where possible, I will take a psycholinguistic perspective and show how phonological structure in creoles emerges under the native language constraints on perception and production in SLA.

Before starting our discussion it may be helpful to clarify what I mean by 'SLA processes' (or 'interlanguage processes'), and by 'transfer'. In SLA, the nature of interlanguage is characterized by a multitude of phenomena that shape the learner's grammatical system and interlanguage production, such as simplification, overgeneralization, transfer, avoidance, conflation (i.e. neutralization) of categories, or universal developmental sequences, to name just a few that are well documented in the literature, and that hold across different linguistic systems (such as phonology, morphology, syntax, etc.). In what follows, I use the term 'SLA/interlanguage processes' as a cover term for all kinds of developmental or psycholinguistic mechanisms that are characteristic of SLA.

The term 'transfer' has also been the source of some confusion (and some debate) in both SLA and creole studies. The term is actually used in at least two senses. In the wider sense of 'cross-linguistic influence', it characterizes all instances in which one language

influences another language in any type of contact. In a more narrow sense, ‘transfer’ is used to denote the mental processes in individual speakers that occur when features of one language influence features of another language present in the speaker’s mind. For example, Kellerman & Smith (1986:1) write that

the term ‘crosslinguistic influence’ ... is theory-neutral, allowing one to subsume under one heading such phenomena as ‘transfer’, ‘interference’, ‘avoidance’, ‘borrowing’ and L2-related aspects of language loss and thus permitting discussion of the similarities and differences between these phenomena.

Given that I am interested in this Column in teasing apart contact phenomena resulting from SLA processes from those that have other sources, it is useful to start with a notion of transfer in the wider sense of ‘cross-linguistic influence’. It will, however, turn out that the cross-linguistic influence manifested in the phonology of creole languages, much more often than not, is the kind of transfer corresponding to the narrow sense of the term, and is resulting from SLA. For reasons of clarity I will use the term ‘transfer’ to refer to such cases. In all other cases, I will use ‘cross-linguistic influence’.

The paper is structured as follows. I will begin in the next section with an overview of the major findings in SLA phonology that seem relevant for our discussion. Sections 3 and 4 will then deal with aspects of segmental and suprasegmental structure in creoles, making special reference to the problem of transfer and markedness. In section 5 I will summarize the results.

2 Interlanguage phonology: a short survey

It is a common observation that second language speakers, especially those that have started learning that language in late adolescence or as adults, tend to have an accent, i.e. their language production on the phonetic/phonological level is markedly different from that of native speakers. In addition, it can be observed that non-native speakers of different mother tongues vary quite a bit in the kind of accent they have, which allows one even to guess in many cases successfully what the native language of that person may be. This can be taken as a justification for the idea that the native language system plays a very important role in the SLA of phonology, perhaps more so than in any other subsystem of language. In their overview of a recent volume on SLA phonology (Hansen Edwards & Zampini 2008:2) write that “[w]hile other domains of SLA research such as morphology, syntax, and pragmatics have also focused on transfer, it is within the domain of L2 phonology ... that transfer is most prevalent.”

It is an interesting question why it would be in phonology that transfer is most prevalent. It is commonly assumed that problems in the perception of L2 speech are largely responsible for this effect. Learning a first language basically involves the development of automatic selective perceptual processes, for example the discrimination of two categorically different sounds from a continuous speech signal. At the age of only one year the infant has already learned to attend to those acoustic patterns that are relevant in their L1, and has lost the ability to perceive certain contrasts that are irrelevant in the ambient language. In SLA, the speaker thus has to re-educate their perceptual system in order to acquire the phonological system of the L2 (see Strange & Shafer (2008) for

an overview and references). It is obvious that non-native-like phonological representations and categories lead to non-native-like production, with the additional complication that new programs for phonetic encoding and articulation need to be developed under the influence of already existing L1 programs (see, for example, Zampini (2008) for a survey).

While many very specific problems may still remain to be solved, it is safe to say that interlanguage phonology is to a large extent characterized by processes of transfer (see, for example, Major (2008), for an overview). The study of transfer in this domain is, however, sometimes quite difficult because transfer interacts in intricate ways with markedness, and there is a large body of literature that tries to shed light on that interaction (see Eckman (2008) for a survey). Notably, the situation in SLA research is very similar to that in pidgin and creole studies, where the analogous substrate/universals debate has dominated the discussion over decades.

One of the most prominent approaches to the problem of teasing apart these two influences can be found in Eckman (e.g. 1977, 1991). Based on a strong tradition of similar approaches, Eckman developed two explicit hypotheses that have turned out to be quite successful in accounting for pertinent interlanguage facts. The Markedness Differential Hypothesis (Eckman 1977) states that, where the two languages differ, marked structures are more difficult to acquire than corresponding unmarked structures. Since this hypothesis has the disadvantage of making predictions only for areas of difference, a second, more general hypothesis was developed, the so-called Structural Conformity Hypothesis (Eckman 1984, 1991), which states that learners will perform better on less marked structures. A very special, though compelling, type of evidence for the latter hypothesis are interlanguage structures that are neither L1-like nor L2-like, but nevertheless conform to universal markedness patterns. More recent optimality-theoretic analyses of interlanguage phenomena can be seen as highly successful formalizations of the interaction of transfer and markedness (see Hancin-Bhatt (2008) for an overview), since Optimality Theory makes explicit assumptions about the initial state of the learner (i.e. his L1 constraint ranking), about how markedness is encoded (i.e. in universal hierarchies of markedness constraints), and about how re-ranking of constraints leads to interlanguage forms that are neither L1-like nor L2-like.

Much of the work on transfer in SLA, including that of Eckman, rests on the notion of similarity and difference between L1 and L2. In his so-called Speech Learning Model of L2 speech perception, Flege (1995) posits an explicit mechanism for the mapping of phonetic categories from L1 and L2 by the learner. His model, which is based on a wide range of perception and production studies, involves an equivalence classification procedure that maps L2 segments that are similar to the L1 phonetic category onto that existing category. If they are sufficiently similar, no new category is set up. If the segments are sufficiently different, however, this results in the creation of a new phonetic category. The problem with this approach is that it is not immediately obvious from the segmental inventories of the languages involved when an L2 sound will be classified as different, and when as similar by the learner.

The models and hypotheses discussed so far involve, on the one hand, structural factors relating, to differences in the sound systems between to languages, and, on the other hand, processing factors relating to the question of how learners perceive categories and build up a new system of representations and procedures. In addition to these structural

and processing constraints on interlanguage phonology just discussed, two other factors play a very important role. First, the age factor has been shown to be influential, with later beginners being generally less successful (see Ioup (2008) for an overview). In a pidgin/creole context with a preponderance of adolescent or adult speakers involved, we would therefore not expect very advanced stages of acquisition. In more tangible terms, we would expect the emergence of a - in SLA terms - very strong accent, or - in pidgin/creole terms - the emergence of a variety that is at least phonetically, if not phonologically, clearly distinct from the superstrate varieties involved in the contact. Second, social factors are known to have considerable impact on acquisition. In her state-of-the-art article on this issue, Hansen Edwards (2008:272) summarizes existing research by stating that L2 speakers are “active agents in what elements of the L2 they target for acquisition and/or use in different contexts.” That means that the L2 speakers “may actively use (or avoid using) some variants or linguistic features over others based on gender, ethnic, national identities ... and peer group identifications.” In a plantation environment, one can imagine that the social factors involved were rather detrimental to more advanced stages of acquisition.

From these considerations, and under the assumption of the interlanguage hypothesis, the following predictions emerge.

- The creole and its lexifier should clearly differ in their phonetic/phonological system.
- The creole should show clear manifestations of substrate transfer.
- The creole should show clear manifestations of substrate influence in the way interlanguages show influence of the speakers’ L1.

The first prediction is extremely general, and seems uncontroversially valid. However, in spite of its seemingly uncontroversial nature, there is a methodological problem involved with this prediction. The prediction could only be tested thoroughly if it is more clearly defined what constitutes a ‘clear difference’. Obviously, there are different degrees of difference observable, and one could think about where to draw the line in each particular case.² It seems therefore more promising to concentrate on the more tangible second and third predictions to see whether they are borne out by the facts.

3 Segmental inventories

In a recent typological survey of the consonant and vowel inventories of 23 creole languages, Klein (2006) showed that creole phoneme inventories are not generally simpler, i.e. have fewer elements or encode fewer contrasts, than other languages. His comparison with the large number of non-creole languages as documented in Maddieson’s (1984) database provides evidence that creole inventories are of rather average size. Would this be evidence for an SLA account? Not really, since such an account would necessitate an across-the-board comparison of the creoles’ inventories with that of their respective substrate and superstrate languages to see if any of the potential differences can be attributed

²For example, the French-based Caribbean creoles seem generally less prone to syllable restructuring than the corresponding English-based varieties.

to SLA processes, such as sound substitutions, the underdifferentiation or overdifferentiation of categories (e.g. Weinreich 1953, 1957). Since there is very little cross-creole work of this type available, I will carry out some illustrative case studies of individual creoles and their substrates and lexifiers to see whether we can find evidence for SLA mechanisms.

3.1 Consonant inventories

A notable exception to the general scarcity of cross-creole phonological studies from an SLA perspective is Uffmann (2006). He compares 10 Caribbean creole languages (with three lexifiers) to their 14 substrate languages and comes to the conclusion that the consonant phoneme inventories of creoles are roughly equal in size to those of their lexifiers. Superstrate features that are generally present in the creole in spite of their lack in the substrates include the presence of both /l/ and /r/. The phonetic symbol /r/ here represents a rhotic sound, not necessarily a coronal rhotic., and of the palato-alveolar fricative /ʃ/. However, cases of actual retention of superstratal segments, or, in SLA terms, successful acquisition of these segments may be of less significance than cases of segment substitutions, i.e. cases where a given target/superstrate segment corresponds systematically to a different sound in the interlanguage/creole. If the superstrate has dental fricatives, for example, these are generally substituted in the creole. In order to explain which sounds survive in the creoles and which ones do not, Uffmann sets up the following hypothesis: the more marked a substrate segment is, the less likely will it occur in the creole. This is analogous to Eckman's hypotheses described above, and can nicely account for the neutralization of many superstrate contrasts in creole languages, including that of /d/ and /ð/ into /d/, and of /t/ and /θ/ into /t/, respectively.

With regard to the general preservation of superstratal /v/, /z/ or /ʃ/, Uffmann poses the question why these three fricatives, but not the dental ones, survived in the creoles. He argues that what is at work here is that the non-dental fricatives did not involve the introduction of a new feature, but only the application of a certain feature across the board. For example, in the levelled West African consonant system Uffmann proposes, there are already palatal stops, palatal nasals, and palatal approximants, and /ʃ/, being a palatal fricative, thus "fills a natural gap in the palatal series" (Uffmann 2006:14). The dental fricatives, in contrast, would necessitate the introduction of an entirely new feature, [+strident]³, which apparently is more difficult than extending to a gap a feature that is already there. It is unclear to me how the idea of 'filling a gap' in inventories translates into SLA theory, but it seems that reference to such a principle is not even necessary. The dental fricatives are uniformly regarded as highly marked segments, which, on account of both of Eckman's hypotheses, should be hard to acquire and hence prone to loss even in those situations in which the superstrate was available to a larger extent than in Suriname (see, for example, Lombardi (2003), for an overview of interlanguages and their substitutions of the dental fricatives).

It should also be noted that, contra to the general trend found by Uffmann for the present-day Caribbean creole varieties, in the early English-based varieties of St. Kitts, Jamaica, Barbados and Suriname one can in fact observe the (variable) substitution of /v/ by /b/ (Plag 1999). Is this substrate-induced? A look at the substrates reveals

³Note that Uffmann uses generative phonological features for formalization, but the point he wants to make does not rest on any particular formalization.

that at least some of the substrate languages involved (Akan, Gban, Kabiye, Mandinka, Wolof, Yoruba, see Uffmann 2006:Appendix) did not have /v/ in their inventory, which strongly suggests an SLA-based explanation of this substitution process, in analogy to the substitution of the dental fricatives. Due to its crucial absence in the native language, the more marked voiced fricative /v/ is replaced by the less marked voiced plosive /b/ (largely preserving the place of articulation). Again, this is a typical case of category conflation as observable in SLA.

Another interesting feature of the Surinamese Creoles is the fact that they replace the dental fricatives variably by plosives or fricatives. In onset position one finds /t/ and /d/, as in Sranan *noti, disi* < E. *nothing, this*, while (English) final position /θ/ is systematically turned into /f/, as in Sranan *tifi* < E. *teeth* (cf. e.g. Smith & Haabo 2004). While this pattern may have its origin already in 17th century Cockney, it is interesting to note that such variation in the production of the dental fricatives is also known from interlanguages (see Lombardi (2003) for discussion).

Finally, let us turn to phenomena that also often run under the label of substrate influence or transfer, but are not the result of SLA. In Saramaccan and Ndjuka, we find the highly marked co-articulated labiovelar stops /k̠p/ and /g̠b/. How can they enter the emerging creole, given their highly marked status? Certainly not from English, since these sounds do not occur in that language, and English words containing /p/ or /g/ would be learned with these segments. The labiovelar stops could, if at all, only survive in substrate-derived words (of Gbe origin), and this is exactly what we find in Saramaccan. Similarly, prenasalized stops were retained in this language with lexical items from Kikongo. Such retention (or rather faithful phonological borrowing into the new variety) of words from the L1 is, however, characteristic of situations of rather stable bilingualism, and not of SLA. This statement entails that there is cross-linguistic influence without SLA, as in diglossic situations or in bilingual first language acquisition (see also Kouwenberg 2006, Siegel 2008).

Note that, just as there is cross-linguistic influence without SLA, there is also SLA without transfer. As shown in my previous columns, there are other SLA processes at work in creolization, which result, for example, in universally unmarked structures. Returning to the survival of coarticulated stops and prenasalized stops we are faced with a clear instance of cross-linguistic influence (i.e. borrowing under preservation of phonological structure), but not with a clear case of SLA.

We now turn to two other creoles and their consonant inventories for further evidence of SLA processes. One of these, French-based Haitian Creole, also comes from the Caribbean, has roughly the same substrates but a different superstrate language. The other one, the Bislama variety of Melanesian Pidgin, has the same superstrate, i.e. English, but is located in a different area with different substrates.

In Haitian, the consonantal inventory is very similar to that of French, with the interesting exception of French /ʁ/, which, depending on its position in the word, has different reflexes in Haitian (see, for example, Nikiema & Bhatt (2003), Steele & Brousseau (2006)). In general, these replacements are clear manifestations of transfer as typically found in interlanguages. Let us look at the details.

In coda position /ʁ/ is mostly lost (as in, e.g., [bjɛ] < F. *bière*). As argued by Steele & Brousseau (2006:343-345) the loss of /ʁ/ as against the preservation of /l/ in this position is paralleled by similar asymmetries concerning rhotic vs. liquid deletion in L2 acquisition

data, for example Mandarin-French interlanguage.

In other environments, French /ʁ/ is either substituted in Haitian by its closest substrate equivalent /ɣ/ (as in [diɣɛk] < F. *direct*), which can again be interpreted as a case of transfer, or it is realized as [w]. Replacement by [w] occurs in complex onsets, but is not categorical in this environment, cf. [fwɛ] < *frère* ‘brother’ and [pwɔp] < F. *propre* (Nikiema Bhatt 2003:44f), as against [tyete] < F. *traiter*). However, before back vowel this replacement is quite regular (as in, for example, [nimewo] < F. *numéro*). How can this distribution be accounted for? Steele & Brousseau (2006:341f) show that the realization of the rhotic in Haitian is at least partly based on transfer of an allophonic rule from Gbe, the major substrate language of Haitian. In many Gbe lects the distribution of the two allomorphs of the Gbe counterpart of French /ʁ/ is similar to that of Haitian: [w] before back vowels, [ɣ] elsewhere.

In Bislama, we find the usual loss of the dental fricatives, and, perhaps more interestingly, the neutralization of the four English phonemes /s/, /z/, /ʒ/, and /ʃ/ into /s/. A comparison with the substrate languages is difficult for two reasons. First, because there is very little information available (Crowley 2004:684), and second, the sheer number of substrate languages involved (“80 or so”, Crowley 2004:684) makes an assessment of substrate influence difficult. What we can say, however, is that we see replacements in the direction of the least marked sound of the set, which is typical of the acquisition of an L2 phonology. Similarly, we find in Bislama final obstruent devoicing, a process that is also very common in interlanguages irrespective of the L1, and a textbook example of Eckman’s Structural Conformity Hypothesis.

By way of an intermediate summary we can say that we find very good evidence for processes of SLA in the emergence of the consonantal inventories of the creoles we looked at. As we also have shown, however, not all instances of restructuring can straightforwardly be attributed to SLA.

3.2 Vowel inventories

The literature on the interlanguage behavior of vowels almost unanimously suggests that the interlanguage treatment of target vowels is – like other areas of interlanguage phonology – strongly influenced by the native language system (e.g. Flege et al. 1997, Ingram & Park 1997, Bosch et al. 2000), with L2 contrasts often facing neutralization in SLA. What about the creole vowel space?

Of the Surinamese creoles, Saramaccan has a seven-vowel system, whereas Ndjuka and Sranan have a five vowel system. In all three creoles the long/short (or tense/lax) opposition of English was lost and plays no role in the present-day systems. Note that these distinctions are also absent from two of the major substrate languages, Gbe and Kikongo, which have either a seven- or eight-vowel system (Gbe lects), or a five-vowel system (Kikongo), see Uffmann (2003:13). Overall, we find massive neutralization, as is characteristic of SLA (based on Smith & Haabo 2004:555):

- (1) Neutralization of stressed vowels in the Surinamese creoles⁴

⁴English key words are given in small capitals and represent Wells’ (1982) lexical sets. Note that in the late 17th century, some of the vowel qualities were different from those of the corresponding Present-day English vowels, see Smith (1987) for detailed discussion.

KIT = FLEECE: /i/
 DRESS = FACE = SQUARE = PRICE: /e/
 TRAP = LOT = BATH = CLOTH = THOUGHT = START = NORTH: /a/
 STRUT = NURSE = CHOICE = GOAT = FORCE: /o/
 FOOT = GOOSE = CURE: /u/

In general, large-scale neutralization in interlanguage is all the more prevalent in those cases when the native language has fewer contrasts than the target language (again a transfer effect). The inventories of the substrate languages involved in the creation of the Surinamese creoles fulfill this criterion in that none of the substrate languages has a vowel inventory as large as that of the superstrate (see Uffmann (2003) for a survey, and Table 1 below for a case in point, the inventory of Fongbe).

In Haitian we again find a seven-vowel system, while in 17th-century French there is a vowel system with eleven vowels. A comparison of the two systems shows that the main difference between the two is that the front rounded vowels of French are missing in Haitian. Crucially this series is also missing in Fongbe, the major substrate language of Haitian. This is illustrated in Table 1.

Table 1: The vowel systems of Haitian, Fongbe and 17th century French
(cf. Lefebvre 1998, Tinelli 1981)

French			Haitian		Fongbe	
i	y	u	i	u	i	u
e	ø	o	e	o	e	o
ɛ	œ/ə	ɔ	ɛ	ɔ	ɛ	ɔ
a		ɑ	a		a	

The lack of the rounded front vowels in the creole is in complete accordance with the Markedness Differential Hypothesis. The more marked segments are not acquired, and a reduced system emerges. Readers interested in a formal implementation of this process in an optimality theoretical framework are referred to Uffmann (2003). In that paper, Uffmann also presents a short survey of the vowel inventories of Caribbean creoles and comes to the conclusion that none of their basilectal varieties has an inventory that is as large as that of the superstrate, which is expected under an SLA approach.

Turning to Bislama, we find a five-vowel system, with the tense/lax distinction of English disappearing. In etyma from French⁵ the front rounded series is neutralized with

⁵Although primarily English-based, a substantial amount of words in Bislama are of other origins. According to Crowley (2004:674) between 6 and 12 percent of the vocabulary are French-derived

the front unrounded series (as in Haitian), and French nasal vowels are incorporated into Bislama as vowel-engma series (Crowley 2004:678f). The latter is an interesting finding since this kind of replacement is very wide-spread also in loanword adaptation (Paradis & Prunet 2000), a process in which very similar mechanisms seem to hold as in SLA (see more on this point in section 4, and Winford (2005) for general discussion).

Again, a comparison with the substrate languages is not really possible for lack of available data, but it can be noted that the developments observable for the Bislama vowel space are in complete accordance with the Markedness Differential Hypothesis: The more marked sounds of the inventory tend to be not acquired.

To summarize the discussion of segmental inventories, we can say that we find substantial evidence for the work of SLA processes. Returning to our predictions presented in section 2, we do find clear differences between lexifier and creole inventories, we do find clear manifestations of transfer, and we do find transfer and markedness effects that are closely parallel to what we find in interlanguages. Marked sounds have a tendency to get lost, especially, but not exclusively, when they are not part of the native language inventory. Overall this may result in smaller inventories of the creole languages vis-à-vis the superstrate language. In the next section, we will see whether the same tendencies can be observed with syllable structure.

4 Syllable structure

In the literature on SLA and loanword adaptation, processes of syllable restructuring feature prominently. For example, Ross (1994:2) states that “[o]ne of the most fundamental processes in loan word phonology and interlanguage phonology is the insertion of an epenthetic vowel.” The phenomena observed in SLA exactly parallel those attested in creoles. Vowel epenthesis, for example, can be found word-initially before /sC/ onsets, word-internally between consonants, and in word-final position to avoid final nonsonorant consonants or consonant clusters. Some illustrative data are given in examples (2), (3), and (4):

- (2) Epenthesis in initial position before /sC/ onsets in creole and interlanguage
 - a. Haitian Creole (e.g. Nikiema 2000)
 - eskout < F. scout
 - espò < F. sport
 - estasyon < F. station
 - b. Interlanguage
 - [ɛspik] < E. speak (Spanish-English IL, Carlisle 1991:84)
 - [istadi] < E. study (Arabic-English IL, Broselow 1983:271)
 - [isnoo] < E. snow (Arabic-English IL, Broselow 1983:271)

- (3) Epenthesis into consonant clusters in creole and interlanguage
 - a. Portuguese-based creoles (e.g. Holm 1988:108-113)
 - álima < Pt. alma (Príncipe CP)
 - galufu < Pt. garfo (São Tomé CP)
 - lávulu < Pt. libro (Annobón CP)

- b. Interlanguage
 - [størit] < E. street (Japanese-English IL, Eckman 1984:91)
 - [kəlas] < E. class (Japanese-English IL, Eckman 1984:91)
 - [tɪransɪlet] < E. translate (Arabic-English IL, Broselow 1983:271)
- (4) Epenthesis in final position in creole and interlanguage
- a. Sranan (e.g. Plag & Uffmann 2000)
 - noso < E. nose
 - tapu < E. top
 - wanti < E. want
 - b. Interlanguage
 - [bit^hi] < E. beat (Korean-English IL, Broselow & Park 1995)
 - [rɛdə] < E. red (Mandarin-English IL, Eckman 1984:91)
 - [doɟi] < E. dog (Brazilian Portuguese-English IL, Major 1987)

Crucially, syllable restructuring via epenthesis in SLA only occurs if the L1 of the speakers has tighter syllable structure constraints than the L2. In other words, we find epenthesis exclusively in those contexts where the L2 allows more complex syllables (e.g. Eckman 1981, Hancin-Bhatt & Bhatt 1997, Broselow & Wang 1998, Young-Scholten & Archibald 2000:81). The same holds for loanword adaptation, in which epenthesis is also a highly pertinent process (e.g., Silverman 1992, Yip 1993, Itô & Mester 1995a,b, Paradis 1996, Paradis & Lacharité 1997, Uffmann 2001, 2007, Boersma & Hamann 2008, Peperkamp et al. 2008). Unsurprisingly, the same constellation with the same set of results can be found in creole languages: as witnessed by the above examples, a more complex superstrate structure is simplified via epenthesis in those cases where the substrate languages would not allow such structures. Thus, syllable restructuring via epenthesis in creoles is a clear indicator of transfer in SLA.

Why is this particular kind of asymmetry between target language/superstrate/donor language on the one hand, and mother tongue/substrate/borrowing language on the other hand, so important for epenthesis to occur? Recent research strongly suggests that perception based on L1 cues, i.e. interlanguage processing, is the key to an understanding of epenthesis in second language phonological development and loanword adaptation (Boersma & Hamann 2008, Hallé 2008, Strange & Shafer 2008). For example, Hallé (2008) shows in an experimental study that, if a given structure is not in accordance with L1 phonotactics, speakers actually hear epenthetic vowels in spite of the fact that the acoustic signal does not contain these vowels.

A similar point is made by Boersma & Hamann (2008) and Peperkamp et al. (2008). In their investigation of English loanwords in Korean, Boersma & Hamann (2008) provide a detailed optimality-theoretic account of how subtle acoustic cues are transformed into representations and productions that contain vowels that were not in the input. In Korean, the presence of a release burst always indicates to the native Korean listener that the perceived consonant forms a syllable onset. This has serious consequences for the perception of non-Korean words that contain a release burst, e.g. English [bit^h]. A perceived release burst at the end of such a plosive-final English word causes the perceptual insertion of an illusory vowel with native speakers of Korean, which in turn leads to

epenthetic vowels in production, as evidenced, for example, in (4-b) above for Korean-English interlanguage.

Peperkamp et al. (2008) investigate French and English loanwords in Japanese in an experimental setting. This is an intriguing topic due to the differential behavior of these items. While nasal-final French loanwords receive a paragogic vowel in Japanese, nasal-final English loanwords do not show paragoge, but are instead integrated with a moraic final nasal. Peperkamp et al. (2008) now show that this peculiar contrast naturally emerges from the different acoustic properties of final nasals in the two languages. In contrast to English, the French final nasals have a strong vocalic release, which is perceived by native Japanese listeners as their native vowel [u]. This is again a strong piece of evidence for the idea that epenthesis in language contact originates in perceptual assimilation of non-native structures to the closest native ones, and is thus a clear case of transfer in the narrower sense.

While accounts along these lines are in principle available for all contact situations, it is clear that for creoles the necessary direct phonetic evidence is very hard or impossible to come by. In order to make a convincing case for processes of SLA in creole formation we must therefore fall back on a methodology that involves careful comparisons of the languages involved and the strong parallelisms between the structural patterns we find in interlanguages and creole languages. Along these lines, the types of syllable restructuring attested in creole languages strongly suggest that processes of SLA are crucially responsible for the emergence of these structures.

This allows for another interesting and testable prediction. Given the right constellation of languages (i.e. the superstrate having more complex syllable structure than the substrate) we should find more epenthesis in contact situations where the social conditions for L2 acquisition are less favorable. This prediction seems to be right on target, with the Surinamese creoles and early varieties of English-based Caribbean creole languages being a case in point, as shown, for example, in Plag & Schramm (2006). In that paper we showed that the degree of restructuring correlated with the availability of the superstrate in the four early varieties of Sranan, Saramaccan, St. Kitts and Jamaican.

In contrast, we find much less epenthesis in French-based creole languages, which could be argued to be attributable to more extended availability of the superstrate. This argument is corroborated by the fact that, for example in Haitian, the extent of substrate transfer in other domains of grammar is also generally not as pronounced as in the Surinamese creoles. Nevertheless, some evidence for substrate influence on the syllable structure of Haitian is still traceable, for example with regard to initial preconsonantal epenthesis or particular phonotactic patterns (see, e.g., Brousseau & Nikiema 2006, Bhatt 2008, Nikiema 2000).

Apart from epenthesis we also find deletion processes in creoles and SLA, but these are generally also (or even more) characteristic of L1 acquisition and are therefore not so well suited to show SLA-specific mechanisms at work. Concerning the relationship of epenthesis and deletion, there is a consensus among SLA researchers that epenthesis characterizes the earliest stages of interlanguage development and that deletion characterizes later developmental processes that are less influenced by transfer (e.g. Major 1987). For example, with regard to paragoge in Japanese-English interlanguage Ross (1994:21) claims that “The apocope phenomenon appears to commence when transfer wanes.” Viewed from this angle, even deletion processes that repair syllable structure can be interpreted

as evidence of SLA, even though of a later stage.

Another problem that comes with epenthetic vowels is the question of which kind of vowel is selected. In principle, there are three options. The first is to use a default vowel, the second is to insert vowels whose quality is determined via vowel harmony with another vowel of the word, and the third is to assimilate the epenthetic vowel to a neighboring consonant. There is generally very little work on this problem, but what is available is highly suggestive of SLA processes being at work. To my knowledge the only creole language for which the quality of the epenthetic vowel has been systematically investigated is Sranan (see Smith 1977, Koefoed 1973, Plag & Uffmann 2000, Lappe & Plag 2003, Uffmann 2007). From these works it is clear that contemporary Sranan shows a complex mixture of all three strategies mentioned above. One can find back/round vowel harmony as the major strategy (as in *oso* < E. *house*), consonantal spreading after labials and coronals (as in *tapu* < E. *top*), and default vowel insertion (as in *taki* < E. *talk*). Plag & Uffmann's (2000) and Uffmann's (2007) detailed diachronic studies now show that this complex pattern emerged gradually over two centuries, starting with default vowel insertion in the very earliest sources, and adding new complexities along the way.

The Sranan situation is very interesting for two reasons. First, the diachronic development mirrors the development of interlanguage epenthetic vowels, and second, the complexities found in Sranan have strong parallels in those found in loanword adaptation. I will discuss each in turn. The literature on the quality of epenthetic vowels in SLA is extremely scarce but I came across one more detailed investigation. In his study of such vowels in Japanese-English interlanguage, Ross (1994) finds that learners start out with default vowels, and only later develop more complex patterns of assimilation. This is exactly parallel to the diachronic development of Sranan. Under the assumption that loanword adaptation processes are largely a reflection of SLA processes, the parallelism between Sranan epenthetic vowel quality and SLA epenthetic vowel quality is naturally accounted for.

Second, in his large-scale cross-linguistic investigation of epenthetic vowel quality in loanword adaptation, Uffmann (2006) finds that in each of the languages investigated (i.e. Shona, Sranan, Samoan and Kinyarwanda) there is "a complex web of different strategies" (p. 236), with each of the four languages making use of (highly restricted) default vowel insertion, vowel harmony and assimilation to a neighboring consonant. That means that there are not only developmental parallels, but also parallels in the kind of the structural processes involved and the variability of these processes.

To summarize, we have found many similarities between creole languages and interlanguages with regard to syllable structure and the processes of restructuring. This suggests that the key to an understanding of the emergence of creole structures in the realm of the syllable, perhaps even more so than in the area of segmental inventories, can be found in the processes known from SLA.

5 Conclusion

In this column I have investigated the hypothesis that processes of SLA are a crucial ingredient in the emergence of the phonology of creole languages. It turns out that both in segmental inventories and in syllable restructuring we find good evidence for the in-

terlanguage hypothesis. Using predictions from current SLA research one can show that the make-up of creole inventories bears witness of developments that are typical of L2 acquisition, most prominently the conflation of phonological categories and the emergence of unmarked structure. Both phenomena result from the interaction of a native language system (including its processing aspects) with a new language system and the processing problems this new system poses for the learner.

The discussion showed also, however, that there are phenomena that do not lend themselves easily to an SLA-based explanation, and researchers have to be careful in teasing apart different mechanisms. Furthermore, given the intricacies of second language phonological acquisition and the many open questions that still prevail in SLA research one cannot hope to always come up with satisfactory results when applying insights from SLA studies to creole languages. I hope to have shown, however, that taking the interlanguage hypothesis seriously can help us understand better a significant portion of the data that creole languages offer. Needless to say, there are many areas of phonological research that I have not touched upon, such as stress, tone and intonation. These domains are still underresearched in creole studies, but, as shown, for example, in Brousseau (2003), an SLA-based approach may also be fruitfully applied to these phenomena.

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