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French Loans in Tunisian Arabic from Phonetic and Phonological Perspective

Abstract

Tunisian Arabic, in addition to words inherited and borrowed from Arabic, has a considerable number of loanwords taken from such languages as Berber, Spanish, Italian, Turkish, French, and English. The main purpose of this paper is the inquiry into the words of French origin, since it is from French that Tunisian Arabic has borrowed a considerable amount of loanwords, a process that continues especially in the fields of technology, medicine, and internet communication.[1] Although French loanwords have already been subjected to various and even detailed investigations, it does not seem that this problem has been sufficiently elucidated, in particular from a theoretical point of view. Several proposals for different approaches to French loanwords in Tunisian are offered here for consideration.

Keywords: Arabic Tunisian, French loans, dialectology, Phonetics, Phonology

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[1] Taïeb Baccouche, *L'emprunt en arabe moderne*, Tunis 1994. Taïeb Baccouche, 'Tunisia', in: *Encyclopedia of Arabic Language and Linguistics*, 2011, Viewed 02 April 2020, <http://dx.doi.org/10.1163/1570-6699_eall_EALL_COM_0356>.

Introductory Remarks

Before continuing with the topic of this article the author would like to take the opportunity to mention a few very obvious things. One such fact is doubtless the information that the collection of loan vocabulary in a given language contains those words used in the language but which are taken from another language and which have undergone a process of adaptation. This is essentially a type of vocabulary creation which results from contacts between languages. The very term 'loanword' is then in a sense a metaphor which has become established and which will be used here as well. It is however important to remember the obvious difference between borrowing a physical object from a person and the borrowing of a word from one language to another.

Taking words from another language is then a ***process of adaptation*** through which, it should be understood that words are fitted to various systems, whether phonetic, phonological, semantic or syntactic, operating in the borrowing language. Within the process of adaptation a number of sub-processes can be distinguished, which in turn can operate gradually, which means that the attainment of the final result can pass through different stages. To put it slightly differently, the process of adaptation can be imagined as a system of sub-processes that work together operating in some phonetic dimensions re-shaping objects from the donor language into corresponding objects in the borrowing language.[2]

The main goal of these considerations is the phonetic and phonological analysis of Tunisian borrowings from French. It will be shown that certain regularities govern the process of adaptation and some of the differences in the results of adaptation will be clarified. It is important however to remember that conducting this analysis effectively requires making use of contrastive French and Tunisian research concerning phonetics and phonology as well as taking into account some essential aspect of the relationships obtaining in the Tunisian communicative community such as lectal structure. Thus, the language material which will be treated subsequently does not belong to a particular Tunisian dialect but to the supra-dialect variety. As can easily be noticed, the theory of French loans in Tunisian is doubtless a particular theory in relation to a general theory of loanwords. To put it another way, apart from general postulates it will also encompass postulates which reflect the specifics of the transmutation of the set of French language objects into corresponding Tunisian objects. Emphasized should be that the origin of some loanwords in Tunisian Arabic is not clear and the opinions of some authors differ.[3] Probably two things should be distinguished: the origin of the word and the path by

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    [2]   For further information on the subject please refer to Elżbieta Mańczak-Wohlfeld, *Tendencje rozwojowe współczesnych zapożyczeń angielskich w języku polskim*, Kraków 1995; Sid Ahmed Khelladi, 'Processus d'intégration de l'emprunt lexical dans la presse algérienne d'expression française', *Synergies Chili* 8 (2012) pp. 71–81; Souad Bouhadjar, 'Procedés d'integration et d'adaptation de l'emprunt linguistique français dans le milieu ouvrier de la wilaya de Saida', *Maǧallat Maqālīd* 8 (2015), pp. 11–17; Inès Mzoughi, 'Intégration des emprunts lexicaux au français en arabe dialectal tunisien' (PhD diss., Université de Cergy-Pontoise, 2015).

    [3]   Baccouche, *L'emprunt en arabe moderne*. Mzoughi 'Intégration des emprunts lexicaux au français en arabe'.

which language they came to Tunisian Arabic. The author is aware of the multi-aspectual nature of the adaptation process. During its clarification, not only linguistic but also sociolinguistic aspects should be taken in consideration. Unfortunately, this problem will be not dealt with here.

1. Communicative and Language Communities in Tunisia

For the goals of this article it seems to be unusually useful to use the terms 'communicative community' and 'language community' in the sense that Ludwik Zabrocki gave to them. He defined the ***communicative community*** as a group of people in which objective conditions exist for the transfer of information without regard for the means of communication used. A ***language community*** is used by him for a group of people in which objective conditions exist for the transfer of information through a relatively uniform language. Each language community then is a communicative community though the inverse is not true. There will be a short description of the Tunisian Communicative Community (**TCC**) in which it is possible to distinguish different sub-communities which make use of their respective language. Of course, not all of these sub-communities are subject of equal interest for the needs of this article.

As can easily be noticed, the language varieties used within the Tunisian Communicative Community (**TCC**) will specify the corresponding language (dialectal) communities. These language varieties include the following:
(i)   Tunisian Arabic (**TA**),
(ii) General Arabic (**GA**),
(iii) Francophone (**FP**) and
(iv) Tunisian Berber (**TB**).

It should however be remembered that the communities indicated by these language varieties overlap. Before examining the Francophone community (**FC**) some attention will be devoted to the other communities listed above.

Within the **TA** community it is possible to distinguish two sub-communities, making respective use of:
(i)   Particular Tunisian dialects, and
(ii) Pan-Tunisian Arabic as a supra-dialectal variety

In turn, within the General Arabic category it is possible to distinguish the following two varieties:
(i)   Pan-Arabic, and
(ii) Tunisian Pan-Arabic, that is the Tunisian variety of General Arabic.

The Berber community is also dialectically diversified.

Because this article is devoted to loanwords from French, a few words on the Francophone language community in Tunisia are called for. The French language is used in Tunisian in both bilingual and diglossic ways. To put it another way, it specifies two types of community:

(i)   Arabic-French bilingual, and
(ii) Arabic-French diglossic.

Those individuals who can use both languages in all situations belong to the first community. Members of the second, however, use the two languages in complementary contexts. Both communities are rather large since during the French colonial period French was the official language used, among other contexts, in administration and media communication. After gaining independence in 1956, Tunisia retained French while at the same time promoting Arabization, especially in education, administration and the media, which in consequence somewhat weakened the position of French. In some areas, however, such as technology, economics and medicine French still dominates. In recent years, knowledge of English has spread which might also weaken the position of French among the younger generation which does not know the language as well as the older generation does.[4]

2. The History of Research on French Loanwords in Tunisian Arabic

Research concerning the situation of the Francophone language community within the Tunisian communicative community have been and still are broad in scope. The majority of such research has been of a sociolinguistic nature. The status of French in the Tunisian educational system enjoyed special interest. Somewhat less attention, however, was paid to loans from French, although rather important work was carried out in this field, above all in the areas of vocabulary and morphology. Nonetheless, the phonetics of loanwords were only rarely addressed.

One of the first works concerning French loanwords was an article by S. Garmadi.[5] In the initial section of this article the author examines the problem of the Arabization of road signs and in the second he takes up phonetic problems within the contexts of bilingualism and diglossia. Garmadi also published an article in 1966 in which he analyzes contacts between Literary Arabic and French in Tunisia on the basis of phonetic, morphological, lexical and syntactic loans making use of the language of the press, radio, posters and signs.[6]

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[4]   For more detail please refer to Karim Aissa Baccouche,'L'alternance codique arabe-français dans les forums virtuels tunisiens' (BA diss., Université de Jyväskylä, 2011); Salah Mejri, 'Pluringuisme et diglossie en Tunisie', *Synergies Tunisie* 1 (2009), pp. 53–74; Jamila Oueslati, 'The phonetic and phonological systems of the Dzira dialect of Tunisian Arabic', Poznań 2015.

[5]   'La langue des enseignes de quelque rues importantes de Tunis' (I), *Revue Tunisienne des Sciences Sociales* 3 (1965), pp. 133–146. 'La langue des enseignes de quelque rues importantes de Tunis (II), *Revue Tunisienne des Sciences Sociales* 8 (1966), pp. 59–82.

[6]   'Quelques faits de contact franco-arabe en Tunisie', *Revue Tunisienne des Sciences Sociales* 3 (1966), pp. 23–43.

The greatest contribution to research on French loanwords in Tunisian Arabic, however, was made by T. Baccouche which bibliography of this research also confirms. He examined loanwords in a comprehensive manner, taking into account both theoretical and practical aspects. His publications concern phonetic, phonological, morphological, lexical, syntactic, sociolinguistic and other aspects of loanwords. In his first article in this field which appeared in 1966 he analyzed 150 recorded automotive terms from phonological and morphological points of view.[7] His works motivated a number of people to research Tunisian dialects. He also led group projects which resulted in, among other publications *L'atlas linguistique de Tunisie* (2000), co-authored with S. Mejri which also considered French loanwords.

It should be added that Mejri has worked several years since on the problems of bilingualism and diglossia in Tunisian Arabic and he has published a numerous works concerning the French language and its impact on Tunisian Arabic.

Mentioned should be also the great work of the linguist and lexicograph I. Ben Mourād *Al-Kalimu al-aʿǧamiyyatu fī ʿarabiyyati Nifzāwa bi-al-ǧanūbi al-ḡarbī at-tūnisī* published in 1999. In this work he treated hundreds of words in the Nifzāwa dialect in the South of Tunisia. The author determined precisely the origin of the loanwords used in this dialect. These loanwords are of various origins, including Berber, Greek, Turkish, Spanish, Italian and French. Before he proceeded to the analysis of particular words he devoted an introductory to the description to the area of Nifzāwa from a geographical and social point of view.

In recent years publications within the areas of phonetics and phonology have appeared in reference to French loanwords in Tunisian Arabic. The most important of these is undoubtedly the doctoral dissertation *Intégration des emprunts lexicaux au français en arabe dialectal tunisien* written by I. Mzoughi (2015). She collected a significant amount of research material making use of written and recorded sources. She then subjected loans from French to a detailed phonological and morphosyntactic analysis, considering sociolinguistic factors as well.

This analysis was preceded by a presentation and comparison of the phonological systems of Tunisian Arabic, Modern Standard Arabic and French. She also attempted to determine the degree of integration of loanwords into the Arabic and Tunisian systems.

Another article that should be mentioned is *La terminologie dans le discours oral informel: Le cas de la mécanique auto* by Th. Ben Omor Ben Hamida who in 2004 analyzed French loans in the field of automobile mechanics from phonological and morphosyntactic viewpoints.

Information regarding the phonology of French loanwords can also be found in works primarily devoted to other topics.

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[7] Taïeb Baccouche, 'Un spécimen de contact linguistique: La langue des mécaniciens', *Revue Tunisienne des Sciences Sociales* III/8 (1988), pp. 151–164.

3. Some Comparative Information

The process of phonetic and phonological adaptation of foreign vocabulary is not chaotic, but rather displays certain regularities. Some of these regularities can be predicted after a direct comparison of the sound system of the donor and borrowing languages. In this case this refers to Tunisian Arabic and French.

The vowel system of French is relatively rich and includes 15 phones, not counting the reduced vowel [ə] whose status is unclear.[8] Among the French vowels are some with no analogues in the Tunisian system. This especially refers to:

(i)   front rounded vowels: [y, ï, œ];
(ii) nasalized vowels [ɛ̃, œ̃, ɔ̃, ɑ̃] as well as;
(iii) the lack of a phonological opposition between phonetically short vowels and long equivalents. Vowel length is distributionally conditioned.[9]

For French consonants, it is important to underline that:

(i)   the consonants [v], [p], [ɥ] and [R], do not occur in Tunisian Arabic;
(ii) long consonants (geminates) occur sporadically as an archaic feature or as a result of sandhi between words. In Tunisian Arabic, however, long and short consonants are bound by a phonological opposition.

In Tunisian Arabic, a phonological opposition operates between emphatic and non-emphatic consonants. This opposition does not occur in French. It can be then predicted that some French consonants may be interpreted as emphatic in borrowings into Tunisian which, in turn, will have an influence on vowel selection.

4. Overview of the Processes of Adapting French Loanwords

In this section, a number of processes which are activated during the process of adapting French loanwords into Tunisian are presented. Some of these processes can be predicted on the basis of contrastive deliberations. Among the processes in operation, the following can be distinguished:

(i)   delabialization;
(ii)   denasalization;
(iii) decomposition of a nasal vowel into an oral vowel plus nasal consonant;
(iv)   emphaticization of consonants;
(v)   voicing of the phone [p];
(vi)   devoicing of the phone [v];
(vii) vowel lengthening;
(viii) vowel raising;
(ix)   vowel fronting;

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8   Alicja Kacprzak and Józef Sypnicki, *Éléments de grammaire française*. Poznań 2002, p. 21.
9   Ibidem, p. 26.

(x) vowel backing;
(xi) lowering;
(xii) widening;
(xiii) narrowing;
(xiv) centralization;
(xv) syllabic restructuring;
(xvi) reschematization, reanalysis.

During adaptation, French phones may simultaneously undergo more than one process. Examples of particular processes are as follows:

(4.1) **vowel delabialization**
[y] → [i]
circulation [siʀkylasjɔ̃] → [sirkilasjɔ̃]
judo [ʒydo] → [ʒido]
lunette [lynɛt] → [linɛ:t]

(4.2) **vowel delabialization and lengthening**
[y] → [i:]
bureau [byʀo] → [bi:ru]
ceinture [sɛ̃tyr] → [sɛnti:r]
jupe [ʒyb] → [ʒi:b]

(4.3) **vowel backing**
[y] → [u]
musique [myzik] → [muzi:k]
numéro [nymeʀo] → [numru]

(4.4) **backing and lengthening of vowels**
[y] → [u:]
baskule [baskyl] → [bɛsku:lɛ]
musique [myzik] → [mu:zi:kɛ]
numéro [nymeʀo] → [nu:mru]

(4.5) **raising, backing and lengthening of vowels**
[œ] → [u:]
chaufeur [ʃofœʀ] → [ʃifu:r]
meuble [mœbl] → [mu:bi:ljɛ]
moteur [mɔtœr] → [mutu:r]
[ø] → [u:]
Europe [øʀɔp] → [u:robba:]/[u:ru:bba:]
européen [øʀɔpeɛ̃] → [u:rubbi:]/[u:ru:bbi:]

(4.6) **denasalization, raising and backing**
[ɔ̃] → [u]
biberon [bibʀɔ̃] → [bibru]

(4.7)   **denasalization, raising, narrowing and decomposition**

[ɔ̃] → [un]

comptable [kɔ̃tabl] → [k**un**ta:bli:]

comptoir [kɔ̃twaʀ] → [k**un**twa:r]

contrat [kɔ̃tʀa] → [k**un**tra:tu]

[ɑ̃] → [un]

central(e) [sɑ̃tʀal] → [s**un**tral]

(4.8)   **denasalization, raising, narrowing, lengthening and decomposition**

[ɔ̃] → [u:n]

balcon [balkɔ̃] → [balc**u:n**]

camion [kamjɔ̃] → [kæmj**u:n**]

savon [savɔ̃] → [ṣa:b**u:n**]/[ṣab**u:n**]

[ɔ̃] → [u:m]

bombe [bɔ̃b] → [b**u:m**ba]

[ɑ̃] → [ɛ:n]

appartement [apaʀtəmɑ̃] → [burṭmɛ**:n**]

(4.9)   **denasalization, centralization and decomposition**

[ɑ̃] → [an]

cendrier [sɑ̃dʀe] → [s**an**drijja]

français [fʀɑ̃sɛ] → [fr**an**sa:wi:]

tranquille [tʀɑ̃kil] → [tr**an**ki:lu]

(4.10)   **denasalization, centralization, lengthening and decomposition**

[ɑ̃] → [a:n]

garantie [gaʀɑ̃ti] → [gara:**n**ti:]/[gara:**n**ti]

janvier [ʒɑ̃vje]→ [ʒa:**n**vi:]/[ʒa:**n**fi:]

[ɑ̃] → [a:m]

lampe [lɑ̃p] → [la:**m**ba]

(4.11)   **denasalization, fronting, raising, lengthening and decomposition**

[ɑ̃] → [i:n]

patente [patɑ̃t] → [bati:**n**da]

(4.12)   **denasalization , raising, narrowing, fronting and decomposition**

[ɛ̃] → [im]

symbole [sɛ̃bɔl] → [s**im**bol]

sympatique [sɛ̃patik] → [s**im**pati:k]

timbre [tɛ̃bʀ] → [t**im**bri:]

[ɛ̃] → [in]

synthétique [sɛ̃tetik] → [s**in**titi:k]

(4.13)   **denasalization, narrowing, lengthening, fronting and decomposition**

[ɛ̃] → [i:n]

plinthe [plɛ̃t] → [bli:**n**tɛ]

(4.14) **denasalization, raising, narrowing, backing and decomposition**

[ɛ̃] → [u:n]

pointe [pwɛ̃t] → [b**u:n**te]

(4.15) **denasalization, broadening, lengthening, lowering and decomposition**

[ɛ̃] → [æ:n]

Italien [italjɛ̃] → [ṭalj**æ:n**]

(4.16) **raising, backing and narrowing**

[o] → [u]

bateau [bat**o**] → [baṭṭ**u**]

chauffage [ʃ**o**faʒ] → [ʃ**u**faʒ]/[ʃ**u**fa:ʒ]

fauteuil [f**o**tœj] → [f**u**tɛ:j]

[ɔ] → [u]

chocolat [ʃ**ɔ**kɔla] → [ʃ**u**kla:ṭa]

dortoir [d**ɔ**ʀtwa:r] → [d**u**rtwa:r]

(4.17) **raising, narrowing and fronting**

[e] → [i]

général [ʒ**e**neʀal] → [ʒ**i**nira:l]

métro [m**e**tʀo] → [m**i**tru:]

téléphone [tel**e**fon] → [tɛl**i**fu:n]

[a] → [ɛ]

javel [ʒ**a**vɛl] → [ʒ**ɛ**vvɛ:l]/[ʒ**ɛ**ffɛ:l]

sida [sid**a**] → [si:d**ɛ**]

[ɛ] → [i]

réféctoire [ref**ɛ**ktwar] → [rif**i**ktwa:r]

(4.18) **raising, narrowing, backing and lengthening**

[o] → [u:]

bureau [byʀ**o**] → [bi:r**u:**]

dossier [d**o**sje] → [d**u:**si:]

stylo [stil**o**] → [sti:l**u:**]

[ɔ] → [u:]

hotel [**ɔ**tɛl] → [**u:**ti:l]

normal [n**ɔ**ʀmal] → [n**u:**rma:l]

robe [ʀ**ɔ**b] →[r**u:**ba]

(4.19) **raising, narrowing, fronting and lengthening**

[e] → [i:]

congé [kɔ̃ʒ**e**] → [ku:nʒ**i:**]

marché [maʀʃ**e**] → [marʃ**i:**]

spécial [sp**e**sjal] → [sp**i:**sjal]

[ɛ] → [i:]

citerne [sit**ɛ**ʀn] → [s**i:**ti:rnɛ]

feraille [f**ɛ**ʀɑj] → [f**i:**ra:j]

mètre [m**ɛ**tʀ] → [m**i:**tru:]

(4.20) **lowering and widening**

[e] → [ɛ]

télégramme [teleɡʀam] → [tɛlliɡram]/[tɛlliɣram]

téléphone [telefon] → [tɛlifuːn]

télévision [televizjɔ̃] → [tɛlvzɛ]

(4.21) **raising and fronting**

[ə] → [i]

tournevis [tuʀnəvis] → [tuːrniviːs]/[tuːrnifiːs]

seconde [səɡɔ̃d] → [siɡuːnd]

[ɑ] → [ɛ]

tailleur [tɑjœʀ] → [tɛjœr]

(4.22) **vowel lengthening**

[a] → [aː]

stade [stad] → [staːd]

stage [staʒ] → [staːʒ]

foulard [fulaʀ] → [fuːlaːra]

[ɛ] → [ɛː]

chef [ʃɛf] → [ʃɛːf]

toilette [twalɛt] → [twalɛːt]

[i] → [iː]

technique [tɛknik] → [tikniːk]

valise [valiz] → [fɛliːʒɛ]

visa [viza] → [viːza]/[fiːzɛ]

[u] → [uː]

blousons [bluzɔ̃] → [bluːzuːnɛːt]

course [kuʀs] → [kuːrs]

rouge [ʀuʒ] → [ruːʒ]

(4.23) **voicing**

[p] → [b]

paquet [pakɛ] → [baːkuː]

pièce [pjɛs] → [bjɛːsɛ]

place [plas] → [blaːsa]

(4.24) **devoicing**

[v] → [f]

grève [ɡʀɛv] → [ɡrɛːf]

valise [valiz] → [fɛliːʒɛ]

veste [vɛst] → [fiːstɛ]

(4.25) **emphaticization**

[t] → [ṭ]

carte(s) [kaʀt] → [kaːrṭa] (sg)/[kwaːriṭ] (pl)

marmite [maʀmit] → [marmiːṭa]/[mormiːṭa]

tablier [tablije] → [ṭablijjɛ]

[s] → [ʂ]
centimètre [sɑ̃timɛtʀ] → [ʂa:nti]
salon [salɔ̃] → [ʂa:la]
savon [savɔ̃] → [ʂa:bu:n]

(4.26)   **syllabic restructuring**
lampe [lɑ̃p] → [la:mba]
pièce [pjɛs] → [bjɛ:sa]

(4.27)   **morphological restructuring**
bouché [buʃe] → [mbu:ʃi:]
carton [kaʀtɔ̃] → [kɛrdu:na]/[kɛrdu:nɛ]
refusé [ʀəfyze] → [mru:fiz]

As can be seen from the examples given above, the process of phonetic adaptation can operate:
(i)   in one phonetic dimension, or
(ii) in several such dimensions.
      Three clear tendencies of substitutions can be also observed in:
(i)   vowel lengthening;
(ii) vowel raising;
(iii) decomposition of nasal vowels.
      A vowel can only be lengthened or simultaneously undergo lengthening and other processes such as raising and narrowing. Vowel raising never occurs alone, but co-occurs with other processes. The process of decomposition concerns French nasal vowels which in Tunisian are decomposed into the corresponding oral vowel and a nasal consonant.
      While borrowing French words, no French phone is taken into the Tunisian phonetic phonological system, with the exception of a few phones in the pronunciation of not only bilingual speakers but also by some who do not know French, such as the phones [œ], [v] and [p] in such words as:

(4.28)
ascenseur [asɑ̃sœʀ] → [asɑ̃sœʀ],
congélateur [cɔ̃ʒelatœr] → [cɔ̃ʒilatœr],
joueur [ʒwœr] → [ʒuwœr],
nasal vowels in some words, such as:

(4.29)
circulation [siʀkylasjɔ̃] → [sirkilasjɔ̃]
citron [sitʀɔ̃] → [sitrɔ̃]
frein [fʀɛ̃] → [frɛ̃]
as well as the phone [v] in such words as:

(4.30)
veilleuse [vɛjøz] → [vɛjju:zɛ]
vitesse [wites] → [vi:tɛ:s]
visa [viza] → [vi:za]

That French phones are not transferred together with a large number of words into Tunisian Arabic is in accordance with the idea that it is harder to borrow language units from closed systems (such as phones or grammatical morphs) than units from open systems (such as words or syntagms).[10]

5. Variance in Some Adaptations

The process of adapting French loanwords can result in words with more than one form, with one being more common than others. It can also be seen that adaptation can affect one or more phones in a word. Further, loaned words can show a different syllable and morphological structure. These phenomena are illustrated in the following examples:

cravate [kʀavat]　→　[krava:t]
　　　　　　　　　→　[kra:fa:t]
drapeaux [dʀapo]　→　[drabbu:](sg)
　　　　　　　　　→　[dra:bbu:wwɛ:t](pl)
fourchette [fuʀʃɛt]　→　[forʃɛ:t]
　　　　　　　　　→　[fu:rʃɛ:t]
gaule [gɔl]　→　[gol]
　　　　　　→　[gu:l]
gravier [gʀavje]　→　[grivɛ:j]
　　　　　　　　　→　[grifɛ:j]
grève [gʀɛ:v]　→　[grɛ:v](sg)
　　　　　　　→　[grɛ:f](sg)
　　　　　　　→　[grɛ:fɛ:t](pl)
hotel [ɔtɛl]　→　[u:ti:l]
　　　　　　→　[wti:l]
janvier [ʒɑ̃vje]　→　[ʒa:nvi:]
　　　　　　　　→　[ʒa:nfi:]
javel [ʒavɛl]　→　[ʒa:vɛ:l]
　　　　　　　→　[ʒɛvvɛ:l]
　　　　　　　→　[ʒɛffɛ:l]
machine [maʃin]　→　[mɛ:ʃi:nɛ]
　　　　　　　　→　[mɛ:ki:nɛ]

[10] For further information on the subject please refer to Ludwik Zabrocki, 'Związki językowe niemiecko-pomorskie' 1980 (1954), pp. 370f. in: Zabrocki, *U podstaw struktury i rozwoju języka. At the foundation of language structure and development*, Warszawa-Poznań 1980, pp. 351–374; Ludwik Zabrocki, 'Language systems (Sprachsysteme)' in: Zabrocki, *U podstaw struktury*, pp. 35–39.

musique [myzik]   →   [mu:zi:kɛ]
                            →   [mu:si:qa:]
nerveux [nɛʀvø]   →   [nɛrvu:zi]
                            →   [nɛrfu:zi]
passeport [pɑspɔʀ]   →   [pɑspɔʀ]
                            →   [paspu:r]
                            →   [bazbu:r]
pile [pil]   →   [pi:lɛ](sg)
                            →   [pi:lɛ:t](pl)
piscine [pisin]   →   [pisi:n]
plaque [plak]   →   [bla:ka]
poteau [pɔto]   →   [butu:]
                            →   [bu:ṭu:]
prestige [pʀɛstiʒ]   →   [pristi:ʒ]
                            →   [bristi:ʒ]
shampoing [ʃɑ̃pwɛ̃]   →   [ʃambwa:]
taxi [taksi]   →   [taksi]
                            →   [tɛ:ksi:]
                            →   [ta:ksi:]
télégramme [telegʀam]   →   [tɛlligram]/[tɛlliɣram]
                            →   [tilligram]/[tilliɣram]
tournevis [tuʀnəvis]   →   [tu:rnivi:s]
                            →   [tu:rnifi:s]
veilleuse [vɛjøz]   →   [vɛjju:zɛ]
                            →   [fɛjju:zɛ]
véranda [veʀanda]   →   [vira:nda]/[vi:ra:da]
                            →   [fira:nda]/[fi:ra:nda]
vestiaire [vɛstjɛʀ]   →   [vi:stjɛ:r]
                            →   [fi:stjɛ:r]
villa [villa]   →   [vi:lla]
                            →   [fi:lla]
vitamine [vitamin]   →   [vi:ta:mi:n]
                            →   [fi:tɛ:mi:n]
                            →   [fi:ta:mi:n]
vitrine [vitʀin]   →   [vi:tri:nɛ]/[vitri:nɛ]
                            →   [fi:tri:nɛ]/[fitri:nɛ]
visa [viza]   →   [vi:za]
                            →   [fi:zɛ]
wagons [vagɔ̃]   →   [vɛgu:nɛ]
                            →   [fɛgu:nɛ]

6. The Relation of Substitution

The adaptation processes given above, with the exception of syllable restructuring and reschematization, are processes of substituting phones. ***Phone substitution***, from a formal point of view may be understood as a binary relation and indicated by the symbol ***Ssph***. The formula *X **Ssph** Y* will be read as follows: phone *X* is replaced with phone *Y*, or phone *Y* replaces phone *X*. This relation expresses thus the connection between two phones: its predecessor will always be French and the successor will be the equivalent Tunisian phone or connected phones. Thus then, the phone that appears before ***Ssph*** comes from the donor language and the phone that follows it from the borrowing language.

In interpreting the relation ***Ssph*** for the purposes of this article the formula [y] ***Ssph*** [i] will be read: the French phone [y] is replaced with the Tunisian phone [i] or the Tunisian phone [i] replaces the French phone [y].

The relation of substitution should be thus understood as a set of phone pairs, whence it can be said that the pair ([y], [i]) belongs to the relation ***Ssph***. The number of all such pairs can be referred to as the ***power*** of the set ***Ssph***, limited to French and Tunisian.

The set of all successors ***Ssph*** for the predecessor *X* can be called the ***substitutional dispersion*** of phone *X*. So then the substitutional dispersion of the French phone [y] is the following set of Tunisian phones {[i], [iː], [u], [uː]}, because the following substitution pairs occur ([y], [i]), ([y], [iː]), ([y], [u]), ([y], [uː]).

The set of all predecessors of the relation ***Ssph*** for the successor *Y* will be called the ***substitutional coincidence*** of phone *Y*. So then on the basis of the substitutional pairs ([y], [uː]), ([œ], [uː]), ([ø], [uː]), ([u], [uː] it can be stated that the French phones [y], [œ], [ø] and [u] coincide to Tunisian [uː].

Apart from the concept of substitutional dispersion and substitutional coincidence, another useful concept of power will be used. The ***power of substitutional dispersion*** of phone *X* will be described as the number of phones belonging to the dispersion of this phone. In an analogous manner the ***power of substitutional coincidence*** of phone *Y* will describe the number of phones belonging the coincidence of this phone. So, for example, the power of the substitutional dispersion of the French phone [y] in loanwords into Tunisian is 4. However, the power of the substitutional coincidence of the Tunisian phone [uː] in these loans is 6. Coincidence seems to reflect the adaptational neutralization of different pairs of phones. Dispersion, on the other hand, reflects various adaptational possibilities of one and the same foreign phone.

Making use of the concepts of substitutional dispersion and substitutional coincidence it is possible to carry out an appropriate comparison of phones. To put it more precisely, this, among other factors, concerns:

(i) a comparison of French phones with each other with regard to their dispersion in Tunisian borrowings as well as the power of this dispersion;

(ii) a comparison of Tunisian phones with each other with regard to the coincidence among them of French phones in these borrowings.

The substitutional dispersion of two phones may completely overlap, that is be identical, they may partially overlap, be contained within each other or be completely exclusive of each other. When, for example, a French phone is substituted always by one and the same Tunisian phone then the power of dispersion is obviously 1. Questions then arise concerning the factors that influence the size of the dispersion or coincidence.

The relation of the discussed phonic substitutions for the purposes of a general overview may be presented with the help of the following graphs:

(6.1)

French phone		Tunisian phone
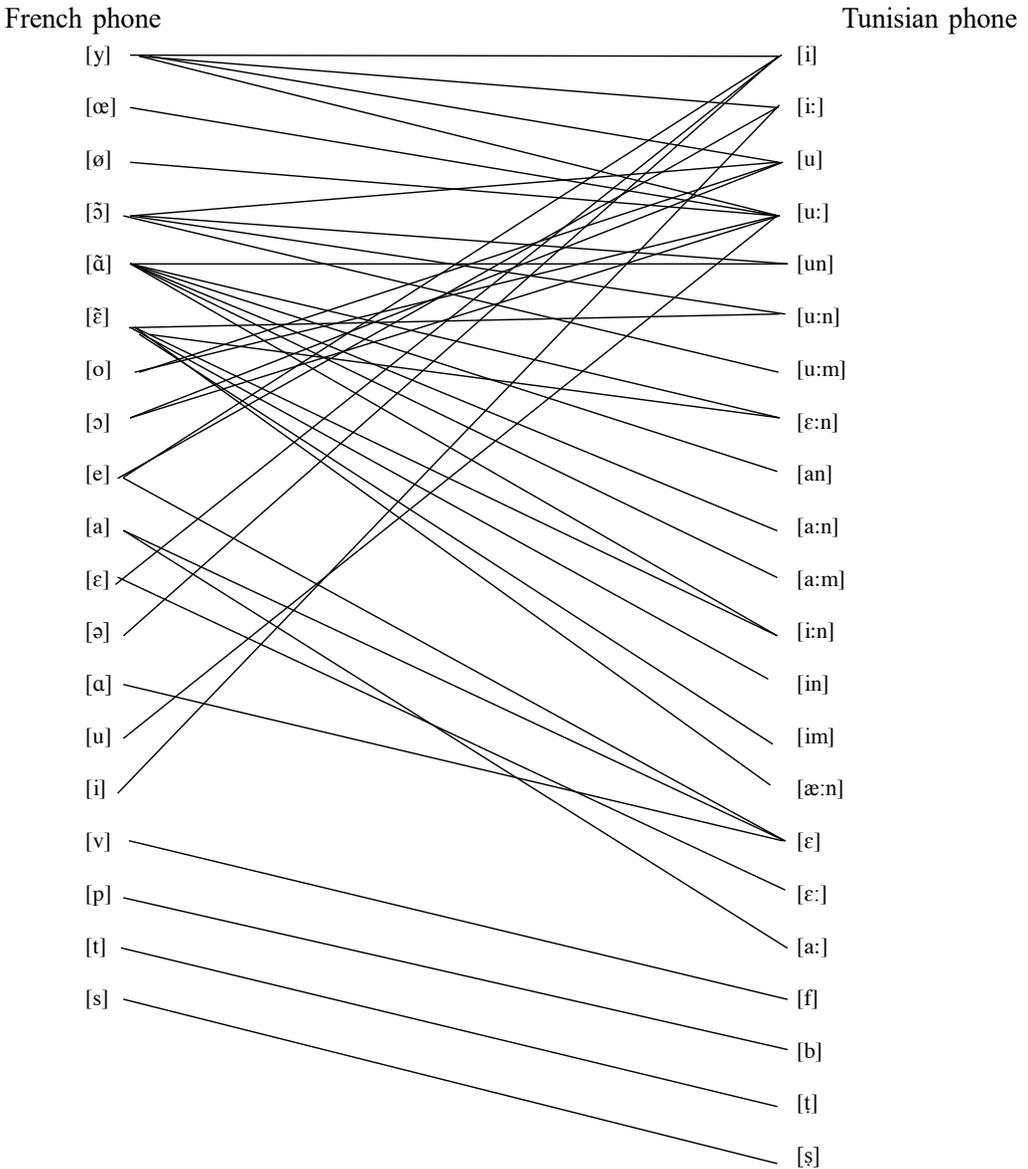
(6.2)

Tunisian phone	French phone

[i]   [y]

[i:]   [œ]

[u]   [ø]

[u:]   [ɔ̃]

[un]   [ɑ̃]

[u:n]   [ɛ̃]

[u:m]   [o]

[ɛ:n]   [ɔ]

[an]   [e]

[a:n]   [a]

[a:m]   [ɛ]

[i:n]   [ə]

[in]   [ɑ]

[im]   [u]

[æ:n]   [i]

[ɛ]   [v]

[ɛ:]   [p]

[a:]   [t]

[f]   [s]

[b]

[t]

[ṣ]
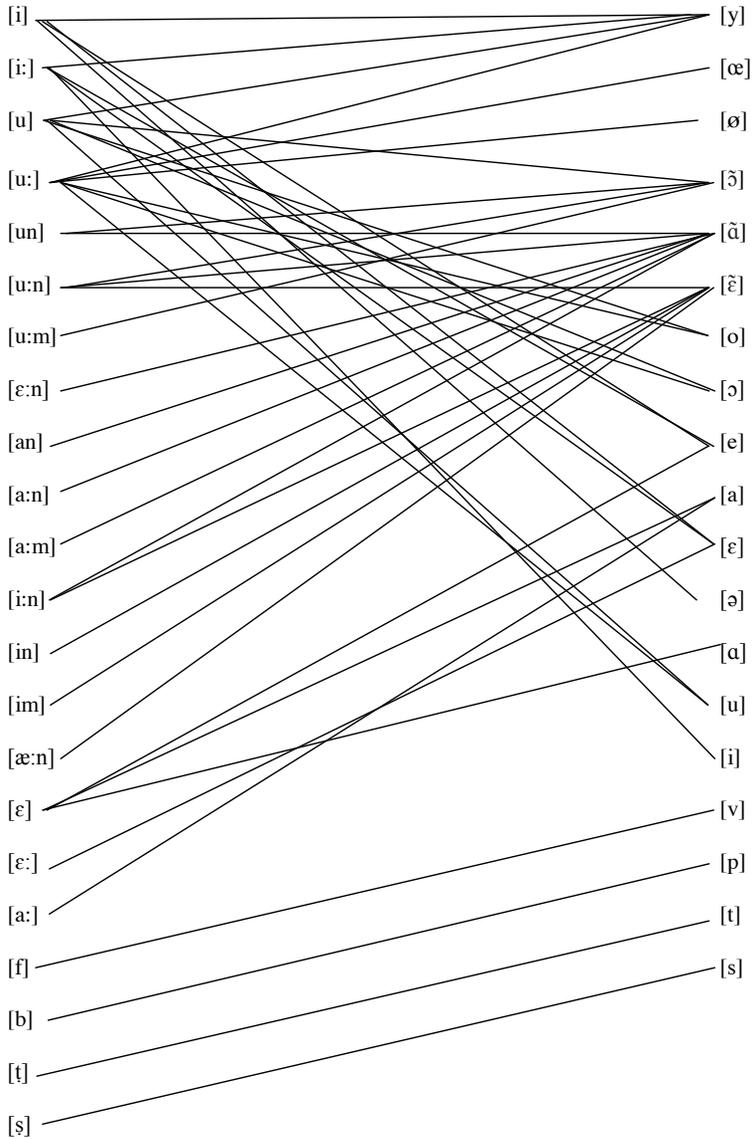
7. Some Conclusions

The present deliberations on French loanwords in Tunisian Arabic are not in any way exhaustive. In terms of theoretical problems only a few of them have been touched upon in a rather preliminary manner. Above all, the explanatory component should be

clearly developed within a framework that would make it possible to explain concrete substitutions both from the French-Tunisian and Tunisian French points of view. Thus, it should be possible to give answers to, among others, the following questions:

(i)   Why is the French phone *X* replaced by the Tunisian phone *Y*?
(ii) Why is the Tunisian phone *X* replaced by the French phone *Y*?
(iii) Why is the French phone *X* regularly replaced by the Tunisian phone *Y*?

The author would like to address these and similar problems in the future. In addition, comparative research on the phonotactic and syllabo-tactic systems of the donor and borrowing languages is important for the theory of phonic substitution.

Despite the preliminary nature of the above treatment of French-Arabic phonic substitution, an idea has crossed the mind of the author whether it would be possible to devise an algorithm for computing the relation ***Ssph*** for the two languages in question. Such an enterprise would certainly require a more advanced theoretical description. But if it turned out to be successful, it might be treated as a test of adequacy for the underlying theory.

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