

An analysis of adaptation of the Loanwords in Kikuyu technological Words

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Abstract

This paper examines loanwords adopted by native Gikuyu speakers to nativise English technological words using the theoretical framework of Optimality Theory as initiated by Prince and Smolensky (1993). Loanword adaptation is a linguistic phenomenon that occurs cross linguistically whenever one language interacts with another language. However, there are stipulations to borrowing because loanwords must be adapted to fit the second language's Phonology system. Drawing from a sample of 80 words collected from the domain of technology, medicine, education and agriculture, the study found that Gikuyu speakers use processes such as insertion, deletion, vowel substitution and preservation to nativist borrowed word from English. The study also found out that this process occurs because of the tolerance threshold to segment preservation within a given constraint domain and due to distinctive features in English language and Gikuyu language.

Key words: Kikuyu language, English language, Loanword, borrowing, loan adaptation

1. Introduction

One of the effects of language contact and communication is the set of loanwords that is imported into the vocabulary of the languages involved. Loanwords are lexical items borrowed from a foreign language into a recipient language. Borrowing is a natural process of language change whereby one language adds new

words to its own lexicon by copying those words from another language. The words which are borrowed are more like of stealing according to Haugen (1953) or a kind of copying according to Trask (1996). These borrowed words usually undergo “adaptation” processes to conform to the structural constraints of the borrowing language phonology. Such adaptation affects all facets of phonological structure, reflecting the segmental, phonotactic, suprasegmental and morphophonological restrictions of the borrowing language. Simply put, loanwords are lexical items borrowed from one language and incorporated into another (Crystal, 1997). Loanword adaptation on the other hand refers to the process in which a lexical form is adopted from a source language and incorporated into the lexicon of the target borrowing language, performed by a borrower (Rose and Demuth, 2006).

The phonologies of two languages are usually dissimilar enough to result in forms taken from one language being adapted in one or more ways to fit into the phonological system of the borrowing language (Hoffer, 2005; Kim, 2008). The essence of the study of loanword phonology, thus, is the investigation of the adaptations that take place when a loanword is applied to the second language’s phonological system. These adaptations reveal information about the second language’s phonological system. Crucially, there seems to be a requirement that the borrowed word remains as similar as possible to the source form (cf. Winford, 2003).

Loanword adaptation is a linguistic phenomenon that occurs cross linguistically whenever one language interacts with another language and generally when one word exists in one language but not in the second language. However, there are stipulations to borrowing; because loanwords must be adapted to fit the second language’s speech patterns. Kikuyu is a language of the Bantu family spoken primarily by the Gikuyu people (*Agĩkũyũ*) of Kenya. Numbering about 6 million (22% of Kenya's population), they are the largest ethnic group in Kenya. Phonologically, Gikuyu language has the following alphabet *a b c d e g h i ĩ j k m n o r t u ũ w y*. Kikuyu is written with seven vowels. Two of the additional vowels are *i-tilde* (*ĩ*) and *u-tilde* (*ũ*). These are: *a* (low /central), *e* (*ɛ* Mid-low/Front), *i* (high/front), *ĩ* (*e* Mid-high/Front), *o* (*ɔ* Mid-low /Back), *u* (High/Back), *ũ* (*o* Mid-high/Back). A study of the Gikuyu language is important as a Bantu language. Therefore, this study is necessary to understand Gikuyu language and to facilitate more studies and documentation so that it will become a written language like other languages. This study opened research in the adaptation paving the way for its development in technological words. Moreover, the scope of this study is important to those who are interested in studying language contact, development or furthering studies on adaptation into Gikuyu technological words. Moreover, this study may springboard for further studies on Gikuyu phonology.

Some studies have been carried on loan words. Mwihaki (1998) has carried out a phonological study of Gikuyu loanwords borrowed from English. The study identifies three aspects of loanword adaptation: phonemic, phonotactic and prosodic. Phonemic adaptation addresses the grammatical constraints of unitary sound substitution. Phonotactic adaptation defines the harmonic motivation for phonemic combination and distribution in the loanword. The current study borrows a lot from Mwihaki’s study. Guo (1999) has studied Mandarin transliterated American state names and typho on names using the Optimality Theory. He examines how the consonant clusters and illicit codas are modified in Mandarin loanwords transliterated

from English. Mwita (2009) looks at the adaptation of Kiswahili loanwords from Arabic. Using a constraint-based analysis, Mwita (2009) shows the processes that loanwords undergo when they are adapted from Arabic into Kiswahili. The paper shows that Kiswahili prefers vowel epenthesis to vowel syncope or apocope in the resyllabification of loanwords. Words borrowed into a language are rarely borrowed perfectly, but instead undergo modification regarding to their realization in the source language from which they were borrowed. The study entails studying the adaptation that occurs to English technological words as they find their way into Gikuyu language.

2. Optimality Theory

Optimality Theory (OT) as propounded by Prince and Smolensky (1993) is the view that forms of language arise from the interaction between conflicting constraints. Kager (1999) defines a constraint as a structural requirement that may either be satisfied or violated by an output form. A form satisfies a constraint if it fully meets the structural requirement, while any form not meeting this requirement is said to violate it. The surface forms of language reflect resolutions of conflicts between competing demands or constraints. A surface form is 'optimal' in the sense that it incurs the least serious violations of a set of violable constraints ranked in a language-specific hierarchy.

The theory contains three basic components: the first is the GEN which states that all the realization of words take an input and generates the list of possible outputs or candidates, some candidates might be identical to the input, others modified somewhat, others unrecognizable. The second is the CON. CON provides the criteria in the form of strictly ordered violable constraints, used to decide between candidates, and the third is the EVAL chooses the optimal candidate based on the constraints and this candidate is the output. Eval chooses the candidate that best satisfies a set of ranked constraints; this optimal candidate becomes the output.

OT supposes that there are no language-specific restrictions on the input. This is called richness of the base. Every grammar can handle every possible input. For example, a language without complex clusters must be able to deal with an input such as /flask/. Languages without complex clusters differ on how they will resolve this problem; some will epenthesize (e.g. [falasak], or [falasaka] if all codas are banned) and some will delete (e.g. [fas], [fak], [las], [lak]). Given any input, GEN generates an infinite number of candidates, or possible realizations of that input. A language's grammar (its ranking of constraints) determines which of the infinite candidates will be assessed as optimal by EVAL. The GEN component of OT identified the possible realizations of the technological term in Gikuyu language.

The second constraint is the CON. In OT, every constraint is universal. CON is the same in every language. There are two basic types of constraints; Faithfulness and Markedness. Each plays a crucial role in the theory. Faithfulness constraints require that the observed surface form (the output) match the underlying or lexical form (the input) in some particular way; that is, these constraints require identity between input and output forms. The following are examples of faithfulness constraints (Kager, 1999):

- (a) The output must preserve all segments present in the input.

(b) Output segments must have counterparts in the input.

(c) Output segments and input segments must share value for [voice]

Markedness constraints on the other hand impose requirements on the structural well-formedness of the output. Markedness constraints require that output forms meet some criterion of structural well-formedness. Kager (1999) points out that markedness is the general denominator for the grammatical factors that exert pressure towards unmarked types of structures. Faithfulness constraints prevent every input from being realized as some unmarked form and markedness constraints motivate changes from the underlying form. The following are some universal markedness constraints (Kager, 1999):

a) Syllables must have onsets.

(b) Syllables must not have codas.

(c) Obstruents must not be voiced in coda position.

The universal nature of CON makes some immediate predictions about language typology. If grammars differ only by having different rankings of CON, then the set of possible human languages is determined by the constraints that exist. OT predicts that there cannot be more grammars than there are permutations of the ranking of CON. The number of possible rankings is equal to the factorial of the total number of constraints, thus giving rise to the term Factorial Typology. However, it may not be possible to distinguish all of these potential grammars, since not every constraint is guaranteed to have an observable effect in every language. Two languages could generate the same range of input-output mappings, but differ in the relative ranking of two constraints which do not conflict with each other. If rankings with ties are allowed, then the number of possibilities is an ordered Bell number rather than a factorial, allowing a significantly larger number of possibilities. The CON component was applied in analysis of the words in terms of Faithfulness and Markedness.

EVAL is the definition of optimality. Given two candidates, A and B, A is better than B on a constraint if A incurs fewer violations than B. Candidate A is better than B on an entire constraint hierarchy if A incurs fewer violations of the highest-ranked constraint distinguishing A and B. A is optimal in its candidate set if it is better on the constraint hierarchy than all other candidates. For example, given constraints C1, C2, and C3, where C1 dominates C2, which dominates C3 ($C1 \gg C2 \gg C3$), A is optimal if it does better than B on the highest ranking constraint which assigns them a different number of violations. If A and B tie on C1, but A does better than B on C2, A is optimal, even if A has 100 more violations of C3 than B. This comparison is often illustrated with a tableau.

The pointing finger marks the optimal candidate and each cell displays an asterisk for each violation for a given candidate and constraint. Once a candidate does worse than another candidate on the highest ranking constraint distinguishing them, it incurs a crucial violation (marked in the tableau by an exclamation mark). Once a candidate incurs a crucial violation, there is no way for it to be optimal, even if it outperforms the other candidates on the rest of CON. An example is the manifestation of the English plural: /'kæt/ + /z/ → ['kæts].

The underlying form surface forms would include: /kaetz/ /kats/, /gats/, /gatz/, /kat/ etc. This is the candidate set determined by GEN which takes an input then generates the most possible candidates as output. Using CON the phonological violations of each candidate are identified as below:

/kets/- none

/katz/- deletion, insertion, voicing

/gatz/- voicing, deletion, voicing

/gaetz/- voicing,insertion, voicing

/kat/- deletion, deletion

Using EVAL these candidates are ranked in an ascending order of the number of violations. The candidate with the smallest number of violations is considered the optimal candidate. Another example is the word “flask” the underlying representation will be /flask/. Different realizations of the same word can exist in different speakers of the word. Eg A child can pronounce it as /las/, /lask/, / vlask/, /flaks/ etc. In such a case, the most appropriate phonological form of the word can be realized using the optimal theory. The realizations of the word are termed as outputs or surface realizations. The most appropriate representation of the word is called the optimal character. The major components OT are used in identification of processes that technological loanwords adapt to. This was in terms of epenthesis, voicing, deletion or insertion.

3. Research Methodology

This study adopted a descriptive approach to analyze Kikuyu technological loanwords. The research targeted 100 nativized nouns in the semantic fields of technology, medicine, education and agriculture. The researcher purposefully sampled 80 words for the study. The sample size is within the limits of the minimum sample for academic studies (Shroeder, 2003). The researcher determined various semantic fields where technology plays a role and the researcher collected 20 words in each domain. The study was guided by the following research questions:

- i. To investigate the processes adopted by native Gikuyu speakers to nativise English technological words.
- ii. To account for the processes in Gikuyu technological words.

4. Results and Discussions

4.1 Loanword adaptation Processes in Gikuyu technological words and accountability of the processes involved

Borrowing relates largely to lexical items especially words in the fields of technology, government, education, and commerce according to Odlin (1989). Thus, the data for the current study comprised 80 loanwords collected from the semantic fields of Information Communication Technology (ICT), medicine, agriculture and education. The processes include insertion, deletion, preservation and substitution. The next section examines these processes in detail.

4.1.1 Insertion

This is a process that involves the insertion of a segment. The two types of insertion – epenthesis and prosthesis were found to operate on Gikuyu loanwords. Epenthesis refers to the addition of one or more

sounds in the middle or final position of a word while prothesis is the insertion of a segment in the initial position. The point of departure in this section is that inserted vowels in loanwords are "perceptually intrusive" in that they fill the perceptual gap between two consonants (or gestures) clustered in a given phonetic context. Epenthesis violates faithfulness as the inserted vowel in the output does not have an input correspondent. However, it satisfies the open syllabicity requirement (NOCODA) and helps to break consonant clusters hence achieving the unmarked syllable structures. Some illustrations are given below:

Input Modem ['məʊ.dem]

Outputmondemu /Mɔndemu/

In this example, the optimal output form is selected through the interaction of highly ranked markedness constraints in Agikuyu: NOCODA and *COMPLEX and faithfulness constraint: DEP-V = no V epenthesis. The input has two syllables. The first syllable has a coda while the second one has a consonant cluster and a coda. The vowel /u/ has, therefore, been used to break the consonant cluster and deal with the illicit codas. After the resyllabification, we get an output form which has three syllables compared to the disyllabic input.

Another example from the semantic field of education is the word term

Input: term /tɜ:m/

Output: /tamu/ /tam/ /ta.mu/

The output of the word term in Kikuyu language has at least three realizations that is candidate a) /tamu/ b) /tam/ c) /ta.mu/. Candidate b. and c. seriously violate NOCODA so their chances of being optimal are very minimal. Candidate a. wins as it only minimally violates one constraint. Due to the epenthesis of /u/ to deal with the coda, the syllables in the output double.

Another example of epenthesis is from the educational domain which shows that three candidates, which are all possible realizations of the input are generated by Gen.

Input: Secondary /sekəndrɪ/

Output: sekondarĩ /sekəndale/

In the above example the resyllabification leads to an increment in the number of syllables in the output form as the input has three syllables and the output four.

Another form of insertion is prosthesis. Prosthesis is the addition of a sound or syllable at the beginning of a word without changing the word's meaning or the rest of its structure. A vowel or consonant added by prosthesis is called prothetic or prosthetic. Prosthesis is different from the adding of a prefix, which changes the meaning of a word. There were several examples in the data collected from the various domains as discussed such as new words in the field of medical practice and healthcare such as *Thibitari* (hospital),

ndagitari (Doctor) depicted forms of prosthesis. The point to note about word borrowing in this area is that the new terms were introduced and their meanings became part of new thinking and linguistic environments.

These loan words were used in a Gikuyu linguistic environment which is different from their habitual foreign groupings with other key terms while new semantic constructions were created in order to represent new ways of thinking and acting. Therefore, the word hospital (*thibitari*) is associated with new healthcare practices while the terms such as *ndagitari*(doctor), *woondi*(ward) have introduced relatively similar semantic perceptions and interpretations.

In many instances the loan words are merely simplified in order to conform to Gikuyu pronunciation patterns. The inventory of medical and scientific loan words is reasonably wide and it shows that most words were sourced from English, Latin, Italian and Hindi within the disciplines of science, medicine and engineering. Vowel insertion, both epenthesis and prothesis, has led to an increase in the number of syllables. For example, in the above mentioned words collected it is observed that syllables of the word doctor increases to 4 from 2 when prosthesis occurs

Input doc'tor (two syllables)

Output nda'gi'ta'ri (four syllables)

Insertion is a case of phonological assimilation process. The above data shows a case of Perception Approach by (Peperkamp & Dupoux, 2003). In this approach, Peperkamp & Dupoux (2003) argue that adaptation results from misperception and is processed at the phonetic level. Therefore, the loan words discussed above are a case of perceptual assimilation that maps the non-native sounds and structures at the perceptual level onto the phonetically closest native ones. Moreover, this example shows how more syllables are inserted in order to conform to the syllable structure of Gikuyu language.

4.1.2 Deletion

Deletion refers to the omission of a segment or segments from a word. This is another nativization strategy that Gikuyu speakers use to modify complex onsets and codas in loanwords. Deletion of any segment involves violation of MAX-I O (maximum input-output) that requires every segment in the input to have a correspondent in the output. There are various forms of deletion; apocope, aphaeresis and syncope. Apocope is the loss of a sound or sounds at the end of a word. In the nativization process, this is done to deal with codas and syllabic consonants which are not allowed in Agikuyu as illustrated by the word below from the medicine domain:

Input: Cell /'sel/

Output: Cero /'sero/

The output of the word Cell in Gikuyu shows that the /l/ sound is lost in the Kikuyu language. Another example is from the Agricultural domain in the word machinery as shown below:

Input Machine /mə'ʃi:n/

Output Macini /mas:n/

The output shows the loss of /ʃ/ in the Agikuyu language. This is because the word machine has a sound that is not present in the phonology of the recipient language (Gikuyu language), thus the word goes through adaptation to make the loan word sound native and less foreign. The second method of deletion is Aphaeresis. Aphaeresis is the loss of a sound or sounds at the beginning of a word, e.g., in the derivation of *adder* from *nadder*. In Gikuyu loan words this was seen in the following instance from the ICT technology:

Input:hospital /'hɒspɪtəl/

Output: thibitari / ðibitari/

In this example, the onset and the nucleus of the first syllable in the input are deleted. The intention, however, is to delete /h/ which is not found in the phonemic inventory of Gikuyu but the entire syllable ends up being deleted. In this case the Gikuyu language dominates the loan phonology. That is Gikuyu speakers try to fit the borrowed word from English into the Gikuyu phonological system.

There are instances in Gikuyu language where the voiceless glottal fricative /h, r, l/ is deleted in loan words that have the sound. This consonant is deleted in all word positions in loan words that have this sound. The main reason for the deletion is that this consonant is not part of Gikuyu consonant inventory system. The examples in below illustrate how this process of deletion takes place in loan words. Thus, in an attempt to satisfy NOCODA and *COMPLEX constraints, faithfulness is violated. Table 1 below further illustrates cases of deletion in Gikuyu language

Table 1: Consonant Deletion

English	Gikuyu	Consonant Deleted	Gloss
/bɔ:(r)d/	bɔ̃ndi	R	Board
/mə'tɪəriəl/	Matiriũ	L	Material
/mə'ʃi:nəri/	Macini	h/r/y	Machinery

The above examples of consonant deletion in Gikuyu loan words reveal the fact that Gikuyu uses deletion as a strategy in adapting loan words into its lexicon. This adaptation strategy also shows that Gikuyu speakers try to remain faithful to the English language as much as they conform to Gikuyu language. Table 1 also show how bilinguals reflect their competences in both the donor and recipient languages to discern equivalences between phonological categories and structures that abstract away from the details of their phonetic realization in each grammar (cf. Paradis 1996).

The last method of deletion is syncope. Syncope is the omission of sounds or letters from within a word, e.g., when *probably* is pronounced 'præblē. In the data collected we observed that the word below had undergone syncope in Gikuyuloan words.

Input: picture \pɪktʃə\

Output: Visa \vɪsə\

In the example above, the coda of the first syllable in the input is deleted to make the syllable open. The recipient language prefers consonant deletion to vowel epenthesis in nativizing the loanword. The consonant phonemes which have no Gikuyu equivalents with the foreign ones such as /p/, /v/, /z/, /s/, /ʃ/, /ʒ/ have been remolded and changed.

4.1.3 Vowel Preservation

Some words in loan word adaptation had vowel preservation. In vowel preservation, some vowels within the loan words do not change once they enter the recipient language. Vowels that are preserved in Gikuyu include the following, /i, o, u and a/

Table 2: Vowel Preservation

English	Kikuyu	Vowel Preserved	Gloss
/ˈdeɪtə/	Ndata	A	Data
/ˈmɒdəm/	Mɔndemu	O	Modem
/əˈniːmiə/	Animia	E	Anemia
/məˈʃɪːnəri/	Macini	I	Machinery

From the above data in, it is evident that various vowels such as /a, e, i, o and u / are preserved in the loan words from English as they enter Gikuyu language.

The following consonants are preserved in Gikuyu language as loan words from English enter Gikuyu language:

Table 3: Consonant Preservation

English	Kikuyu	Consonant preserved	Gloss
/ˈreɪdiəʊ/	Rindio	R	Radio
/ˈkiːbɔː(r)d/	Kiibondi	k/b	Keyboard
/ˈnjuːtriənt/	Nutirienti	n/t	Nutrient
/breɪk/	<u>mburiki</u>	b/k	Break

The above loan words from English and Kiswahili respectively show that all consonants are preserved in loan words except for the voiceless velar stop /k/ which can be realized as /k, g, or ɣ / and the voiceless bilabial plosive /p/, which can be realized as /p, b, or β/. These findings are in line with Paradis’s (1996) Theory of Constraints and Repair Strategies (TCRS) that adheres to his first principle that says that segmental information is maximally preserved within the limits of the Threshold Principle The Threshold Principle states that all languages have a tolerance threshold to segment preservation and that this threshold

is set at two steps (or two repairs) within a given constraint domain (Paradis’s, 1996). Moreover, table 2 and 3 shows cases where lexical items from English language do not conform to Gikuyu language. Gikuyu speakers in this case maintain some elements of English language intact which partially are adapted to Gikuyu language.

4.1.4 Vowel Substitution

In vowel substitution, vowels in the loan words are substituted with those found in the recipient language and it is a strategy used by the recipient language to incorporate the loan words in the language. In table 4 below /ə/ and /ɜ/ are replaced by /a/ in Gikuyu as seen in the following loan words:

Table 4: Vowel substitution

English	Gikuyu	Gloss
/ˈfɜ:(r)təlaɪzə(r)/>	Batarai th a	Fertilizer
/ˈsɜ:(r)və(r)/>	Caba ^a	Server

The consonants that are not found in the language (Gikuyu) are substituted with those sounds found in the language. Since most consonants in English languages are not found in Gikuyu, there is need for such sounds to be substituted with those found in the language as shown in the following examples: Labio-dental fricatives, /f/ and /v/ is substituted with the voiced bilabial fricative /B/ as shown below in examples of loan words

Table 5: Consonant Substitution

English	Gikuyu	Gloss
/ˈfaɪbə(r)/	Baimba	Fiber
//flæʃ/dɪsk/	Burathidiciki	Flash disk
/ˈfɜ:(r)təlaɪzə(r)/	Batarai th a	Fertilizer
/fi:/	Biithi	Fees
/ˈvaɪrəs/	Bairaci	Virus
/ˌju:nɪˈvɜ:(r)səti/	Unibathit ^ī	University

The voiced alveolar fricative, /l/ is substituted with /r/ as shown below in examples of loan words

Table 6: Consonant Substitution

English	Gikuyu	Gloss
/ˈlaɪbrəri/	Raimburar ^ī	Library
/ləˈbɒrət(ə)ri/	Rambūratū ^{ri}	Laboratory
/ˈles(ə)n/	Rɛconi	Lesson
/ləʊˈkeɪʃ(ə)n/	rɔk ^ī coni	Location
/ˈklɪnɪk/	Kiriniki	Clinic

The voiced alveolar fricative /z/ and /s/ is also substituted by its counterpart /c/, as seen in the following examples:

Table 7: Consonant Substitution

English	Gikuyu	Gloss
/ˈsɒf(t), weə(r)/	Cɔbutuwia	Software
/dəʊs/	Ndūci	Dose
/ˈenzaim/	ɛnithamu	Enzyme
/ˈfɜː(r)təlaɪzə(r)/	Bataraiha	Fertilizer

From the above examples of consonant substitution, it is clear that Gikuyu like any other natural language uses substitution as a strategy for adapting non-native sounds in the language by utilizing those sounds found in the language. In conclusion substitution occurs because these sounds are not present in the phonology of the recipient language (Gikuyu), thus the sounds in this language undergo adaptations or substitutions to cause the lexical item to sound more native and less foreign (cf. Major, 2001).

5.3 Conclusion

The present study is an attempt to investigate the processes adopted by native Kikuyu speakers to nativise English technological loan words. Based on the data collected English loanwords appear in the Kikuyu language in form of insertion, deletion, substitution and preservation. First the study concludes that English language has been the most popular source of lexical borrowings for Kikuyu language. Countless words describing various domains such as technology, Agriculture, Machine and Education have been borrowed from English. The study, therefore, concludes that Kikuyu language is open to the influence of the English language that has allowed the creation of news words. The study of English loanwords in Kikuyu language therefore is one of the elements which must be taken into consideration, because it supplies specific and significant material. The study established that loanwords adaptation from English language to Kikuyu language occurs due to distinctive features of phonology between the two languages. A further study should examine how cultural, political and economic factors influence the creation of loan words in Kikuyu language.

References

Crystal, D. (1997). *Dictionary of Linguistics and Phonetics*. Oxford: Blackwell Publishers Ltd.

Guo, H.L (1999). Mandarin loanword phonology and Optimality Theory: Evidence from transliterated American state names and typhoon names. Graduate Programme in Linguistics.National Chenghi University, Taipei, Taiwan.

Haugen, E. (1953). *The Norwegian Language in America: a study in bilingual behaviour*. Philadelphia: University of Pennsylvania Press.

Hoffer, B. L. (2005). Language borrowing and language diffusion: An overview. In *Intercultural communication studies*, XI: 4 200.

- Kager, R. (1999). *Optimality Theory*. Cambridge: Cambridge University Press.
- Kim, H. (2008). Loanword adaptation between Japanese and Korean: Evidence for L1 featuredriven perception. *Journal of East Asian Linguistics*. doi:10.1007/s10831-008-9034-8
- Major, R. C. (2001). *Foreign Accent: The ontogeny and phylogeny of second language phonology*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Mwihaki, A.N. (1998). Loanword nativization: A generative view of the phonological adaptation of Gĩkũyũ loanwords (Unpublished PhD thesis). Kenyatta University, Nairobi
- Mwita, L.C. (2009). The adaptation of Swahili loanwords from Arabic: A constraint-based analysis. In *The journal of Pan African studies*, vol.2, no.8, 46-60.
- Odlin, T. (1989). *Language transfer: Cross-linguistics influence in language learning*. Cambridge: Cambridge University Press.
- Paradis, C. (1996). The inadequacy of filters and faithfulness in loanword. In Durand, J., Laks, B. (Eds), *Current Trends in Phonology: Models and Methods*, Vol. 2, European Studies Research institutes, University of Salford, Salford, pp. 509-34.
- Peperkamp, S. & Dupoux, E. (2003). Reinterpreting loanword adaptations: The role of perception. *Proceedings of the 15th International Congress of Phonetic Sciences 2003*, 367-370.
- Prince, A. and P. Smolensky, (1993). *Optimality Theory: Constraint interaction in generative grammar*. Rutgers Center for Cognitive Science Technical Report TR-2.
- Shroeder, K (2003). *Researching Audiences*. New York: Arnold
- Rose, Y. & Demuth, K. (2006). Vowel epenthesis in loanword adaptation: Representational and phonetic considerations. *Lingua* 116, 1112-1139.
- Trask, R.L. (1996). *Historical Linguistics*. London: Arnold.
- Winford, D. (2003). *An introduction to contact linguistics*. Malden, Massachusetts: Blackwell Publishing Ltd.