The Processing of Past Tense Verbal Inflectional Morphology by Moroccan EFL Learners

Fatima Zahrae EL MALAKI
Doctoral Candidate. Applied Linguistics Research Group. Faculty of Educational Sciences. Mohammed V University. Rabat, Morocco. malakifatimazahra@gmail.com

Abstract

Does the type of phonological pattern frequency affect the generation of past tense forms? This study investigates the way EFL learners generate regular and irregular past tense inflections. To this end, 260 respondents attending English for Specific Purposes (ESP) classes at four higher vocational schools took an elicitation task consisting of 50 items with four multiple choices. In this regard, nonce verbs were implemented along with other existing regular and irregular verbs to evoke EFL learners’ mental lexicon. The employed instruments in this study were a) an adopted past-tense elicitation task, and b) a semi-structured interview. Additionally, the correlation was utilized to measure the strength of the association between high phonological similarity and the generation of inflectional patterns of the nonce verbs. The researcher has opted for mixed-method approaches by reason of the fact that qualitative and quantitative data were simultaneously collected, analyzed, and interpreted. The findings demonstrated that the phonological similarity affects the generation of inflectional patterns of the nonce verbs, particularly, when there is a high or root similarity between the verb and the nonce verb.

Keywords: Mental lexicon, Word Recognition, Frequency Effects, Inflectional Morphology, Nonce Words, Psycholinguistics.

Le traitement de la morphologie flexionnelle verbale du passé par les apprenants marocains

Fatima Zahrae EL MALAKI
Doctorante à la Faculté des Sciences de l’Education. Université Mohammed V. Rabat. Maroc.
Groupe de Recherche Linguistique Appliquée

Résumé

Est-ce que le type de fréquence du modèle phonologique affecte-t-il la maîtrise des règles de conjugaison des temps du passé ? Cet article a pour objet d'examiner la façon avec laquelle les apprenants génèrent des inflexions régulières et irrégulières du passé. À cette fin, 260 étudiants suivant des cours d'anglais par champ disciplinaire dans quatre facultés et écoles techniques supérieures ont effectué un test d'elicitation composé de 50 questions dont quatre sont à choix multiples. À cet égard, des nonce verbes ont été mis en œuvre avec d'autres verbes réguliers et irréguliers existants pour interroger le lexique mental des apprenants. Les
instruments employés dans cette étude étaient ; a) un test d'éllicitation au passé, et b) un interview semi-structuré. De plus, la corrélation a été utilisée pour mesurer la force de l'association entre une similitude phonologique élevée et la génération de modèles flexionnels des nonce verbes. L'étude quantitative prône une approche mixte, basée sur l'analyse des données qualitatives et quantitatives collectées en respect des normes éthiques et méthodologiques. Les résultats ont montré que la similitude phonologique affecte sensiblement la génération de modèles flexionnels des nonce verbes, en particulier lorsqu'il existe une similitude élevée ou une racine commune entre le verbe et le nonce verbe.

Mots-clés : Lexique mental, Fréquence d'Occurrences, Reconnaissance des Mots, Morphologie Inflexionnelle, Psycholinguistique.

List of Abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>Second Language</td>
</tr>
<tr>
<td>SLA</td>
<td>Second Language Acquisition</td>
</tr>
<tr>
<td>EFL</td>
<td>English as Foreign Language</td>
</tr>
<tr>
<td>ESP</td>
<td>English for Specific Purposes</td>
</tr>
</tbody>
</table>

1. INTRODUCTION

The acquisition of past tense morphology is an extensively investigated area in language acquisition research. It is also among the most complicated but yet one of the most important fields in the acquisition of English language by L2 Learners. In the same line of thought, Brackenbury (2003) argues that the acquisition of the English past tense is not a simple and an easy process. According to Aitchison (2012), words are exquisitely important, we will be mislaid without them: “I wanted to utter a word, but that word I cannot remember; and the bodiless thought will now return to the palace of shadows”, said the Russian poet Mandelstam.

Human beings are persuaded that they need to know a lot of words, and become a bit frustrated if they cannot recall a word they want. In this regard, several questions have been raised by psycholinguistics and neurolinguistics among which; How does morphological processing occur in English as L2? How are words recognized? How could word meaning be processed? How could items could be inflected, particularly within the case of nonce words for which the EFL learners have no semantic context, nor lexical entries? Chomsky claimed that the principles determining the nature of the mental representations and the operations that apply to them form a central part of our biologically determined nature. These aforementioned principles constitute the human language faculty, which one might regard as an “organ of the mind/brain” (Chomsky, 1988, p.131).

2. BACKGROUND OF THE STUDY

Past tense conjugation has always been rough to handle by some EFL learners, particularly, what is labelled as irregular inflections. According to Pinker (1999) dual-system proposed that English past tense morphology is processed via two different routes: rule application for regular verbs and memory retrieval for irregular verbs. Nevertheless, Ullman
(2001a) admitted that studies in second language processing suggested that both verb types are retrieved from memory. Subsequently, Clahsen and Felser (2006) and Ullman (2004) agreed upon the fact that the past tense rule application can be automatised with experience by L2 learners and that is the core of this study.

In this paper the researcher intends to explore the specificities of regularity and the irregularity paradigms. And, how these paradigms are processed by the Moroccan EFL learners. The frequency that could affect the generation of the past tense production is also investigated along with the learners’ attitude towards the irregular verbs past conjugation.

To form past tenses and other inflections rules are said to be uniform according to Pinker and his collaborators in its application and independent of the meaning, phonology, frequency of occurrence, or of the verb stem to which it applies. In other words, learners’ acquisition of regular inflection could be sudden; by proposing two mechanisms a rule system and a lexical memory.

English verbs have both regular (stem + /ed/) and irregular (e.g. teach → taught) past-tense forms. At the very beginning of the learning process, children learn to form the past tense of high frequency irregular verbs and some high frequency regular verbs. At the time that more verbs are acquired, children begin to over-regularize the past tense of verbs, which they had previously formed correctly (e.g. teach → teached instead of taught). One explanation for this developmental trend is that the brain’s past-tense production system possesses two routes.

2.1. The predictions of the dual route account

Human cognitive mechanisms are said to be symbolic and innate from a broader perspective of language. In human language processing, abstract symbolic rules play a crucial role (Chomsky, 1957, 1959; Fodor, & Pylyshyn, 1988; Pinker 1988, 1991, 1999, 2001). These perspectives apply to many aspects of language, and, as Pinker and Ullman (2002) suggested, to many other fields as well, yet here the main focus is on inflectional morphology, especially the English past tenses. The idea of a past tense rule arose from noting that young children sometimes regularize irregular verbs, producing ‘goed’ or ‘felled’ (Ervin, 1964), and from the finding that children and sometimes adults typically generate regular forms for nonce or novel words in a past-tense elicitation task (Berko, 1958).

According to Prasada & Pinker (1993) the irregular past tense forms in the dual-route models have individual lexical entries are stored in an associative network. Furthermore, Bybee and Slobin (1982), and Bybee and Moder (1983) have demonstrated that these lexical entries and associative networks could influence similar items to existing irregulars to take the same irregular past tense forms.

Pinker (1999) stated that rules are discrete, symbolic, and categorical and the issue of the past tense rules was addressed by the several dual route accounts. It is also claimed that the rule is uniform in its application and independent in any attribute of the verb stem to which it applies. In English, the rule of the past tense takes the stem + [d] as in walked, loved, hated (/d/, /t/ or /Id/). A further characteristic often attributed to such rules is that their acquisition is sudden. For exceptions such as ‘went’, ‘rang’ and ‘slept’ that cannot be generated by adding [d] rule, Pinker (1999) proposed a theory claiming that irregular forms are dealt with by a lexical mechanism that is sensitive to frequency and similarity and entirely distinct from symbolic rules. For the nonce verbs, Pinker suggested that lexical memory has associative properties like
the parallel distributed processing PDP networks, and thus sometimes generates novel exception forms for inputs similar to known exceptions.

2.2. The mental lexicon

The notions of regular or irregular inflections are ordained by historical and psychological determinants and thus they are known to have crucial implications for theories of the mental representations of language. Mental lexicon could be defined as “a person’s mental store of words, their meaning and associations” (Richards and Schmidt, 2002, p. 327). Several irregular verbs fall into clusters with similar sounds, for instance, (e.g., sing-sang, ring-rang, drink-drank; find-found, wind-wound, bind-bound), and when learners tend to provide past-tense forms for nonce words such as plip or splung, they demonstrate high agreement in guessing plipped and splung (Bybee & Moder, 1983; Prasada Pinker, 1993).

Pinker and Prince (1988) suggested that pairs such as lied and lay could not be inflected by any model of language whose input contains uniquely a phonological representation of an item. Similarly, to Rumelhart and McClelland’s (1986) the prominent connectionist model of past-tense formation and others developed models. Within connectionism, there is no explicit learning algorithm for local connectionist models. It is claimed that all lexical and phonological components are presented as discrete nodes and are activated simultaneously. For instance, in (Figure 1) the node walk connects to the nodes /w/, /a:/, and /k/, and /k/ connects to the nodes [Dorsal], [-voice], [-continuant] (Stemberger, 1998). When in fact, distributed models are linked to learning algorithms. Lexical and phonological processing done simultaneously and interactively, with each influencing other; such interactions dominated the local connectionism literature.

Figure 1. General rules within a local connectionist model

Antithetical models, rule-based models in particular as Stemberger (2001) suggested that there are two different ways in which inflected forms are processed, one path for irregulars and another for regulars. Regular inflected forms are not stored in the lexicon at all except at the very early stages of language acquisition. Whereas, the irregular system is not one in which the irregular form is simply stored in the lexicon, either as an independent lexical entry or as
sub-entry under the base form. Instead, it is an associative network like distributed connectionist model.

2.3. Language Processing and Word Recognition

Before embarking on the morphological processing of past tense production, this research sheds light on a specific area in the human brain that has been of great concern to cognitive neuropsychological studies. Broca’s area is located in the frontal lobe within the left hemisphere. Its major function is to processes language production and comprehension. Cognitive control is primordial in word construction as (Figure 2) illustrates a) the syntactic operations in both production and perception of speech emanated from the Broca’s Area syntactic operations in both production and perception of speech b) Wernicke's area is the region of the brain that is crucial for language development. It is located in the temporal lobe on the left side of the brain and is responsible for accessing the essence of speech.

![Broca's and Wernicke's areas regarding language production and development](image)

**Figure 2.** Broca’s and Wernicke's areas regarding language production and development

Sahin et al (2009) have proved that the role of Broca’s area is not merely about linguistic processing but it does also differentiate between specific circuits dealing with lexical, grammatical, and phonological information in a period up to 450 milliseconds.

On the other hand, morphological processing is fundamental for information treatment during word extraction. Words recognition and processing is a benchmark in language production. Researchers in the fields of psycholinguistics and neurolinguistics have been of great concern words recognition and lexical access in the previous century. Mayer (1895) and Meringer (1908) attested that adult and child speakers of German sometimes regularize irregular verbs. This was observed by the aforementioned researchers at the beginning of the modern work on morphology in language production. (Stemberger, 1998) After a significant hiatus, MacKay (1970) draws attention back to these data, when he suggested that speakers actively utilize morphological rules to build up inflected forms. Ibid

In the present study, the morphological processing of English inflected verbs in past-tense generation was investigated. The type of frequency affects strongly the conjugation of
regular verbs and irregular verbs. In this regard, (Estivalet & Meunier, 2015a) experiment demonstrated an obligatory decompositional model with atomic representations in the fully regular verbs, underlying abstract phonological representations in morpho-phonological verbs, and allomorphic stem representations in the irregular verbs.

2.4. Frequency Effect

Zobl (1998) examined spontaneous productions rather than experimentally elicited data. And he displayed a different way of accounting for frequency effects. For instance, the frequency of a given form is determined not on an individual basis, but inferred by reference to large corpora (Francis and Kucera 1982). In this paper, a small corpus study is conducted to compare between the frequency of the selected verbs (go, walk, become, strive, shrink, bulge, satisfy, backdrop) in British National Corpus BNC and Corpus of Contemporary American English respectively (table 1).

According to Bybee (1983), there are mainly three effects of token frequency; conserving effect, autonomy, and reducing effect. Token frequency refers to the number of times a construction appears in a specific context. Considering the conserving effect, Mańczak (1980) assumed that the forms of a paradigm that are most frequently used are the ones that resist change and serve as the basis of change when new forms are created. Furthermore, token frequency plays an important role in morphology by making the higher-frequency or low-frequency forms of a paradigm the anchoring points for the other forms. Lower-frequency forms can be analysed and learned in terms of these more robust forms, creating a relationship of dependency.

2.5. Nonce Words Formation

Based on a terminological perspective, a distinction needs to be made between neologism and nonce formation; whether the new word has joined the common language vocabulary for good or it is coined solely for a specific use. Hohenhaus (1996) stated that nonce formation or occasionalisms is the first phase in the life of a new word just upon its production by the language user. The most elementary condition is that the formation is new in a psycholinguistic sense, as Hohenhaus (2007) argued it is newly, actively formed in performance, as opposed to being retrieved from in the lexicon.

There are other existing characteristics of nonce formation displayed as the following: a) newness – the formation has to be formed anew rather than retrieved ready-made from the mental lexicon. b) context-dependence – “nonce formations are typically interpretable, or indeed usable, only with contextual support” (Hohenhaus 1998). c) deviation – “many nonce formations must also be considered to be deviant, or not conforming to the language’s word-formation rules or well-formedness conditions” (Hohenhaus 1998). d) non-lexicalizability – as a result of context-dependence and deviation, many nonce formations cannot be listed, or cannot be listed as part of the mental lexicon.

Almost all authorities of the field compiled the different aspects of nonce items formation in four main points (1) nonce words are novel lexical creations, (2) they are not (yet) part of the lexicon, (3) they are formed afresh for a particular purpose in order to meet a lexical need, (4) they may (sometimes) be used only once and never catch on with other speakers. Therefore, it would be interesting to find out whether the EFL learners also recognize the
implemented nonce verbs and engage consciously in analyzing and categorizing them as existing regular and irregular verbs.

3. MATERIAL AND METHODS

3.1 RESEARCH DESIGN

Before proceeding into the design and variables included in this inquiry, a recapitulation of the main research hypotheses and how they are connected to the previous section of this article is off crucial importance. This study investigates whether the verb frequency affects the generation of inflectional patterns of the past tense of regular, irregular, and nonce verbs. English past tense is just one domain that exhibits quasi-regularity presuming that every exception has some degree of regularity. Along this line of thought, the same units and connections that produce regular past tenses from regular stems also process the irregulars or the quasi-regular, so the network has an inherent tendency to do the same thing to the exceptions that it does to regulars—namely copy the features of the stem to the past tense form and add /d/, /t/ or /d/ depending on the final consonant (Rumelhart & McClelland model, 1986). This paper has adopted a mixed research method to ensure validity and reliability of the research. The data collection past tense elicitation task was utilized to provoke EFL learners’ mental lexicon. These instruments advocated the hypothesis of the study, which aimed at finding answers to the following question: Would subjects generate similar inflectional patterns of regular and irregular verbs to the nonce verbs?

3.2 DATA COLLECTION AND ANALYSIS

3.2.1. SAMPLE OF THE STUDY

Founded on convenience sampling, 260 subjects were assigned to an experimental group for this study. Most of the participants have attended English for Specific Purposes (ESP) along with general English classes in different vocational institutions; Ecole Noramel Superieure de l’Enseignement Technique Mohammedia (ENSET), Faculté des Sciences Techniques de Tanger (FST), Ecole Superieure de Technologie d’Essaouira (EST), Institut Agronomique et Vétérinaire Hassan II (IAV).

3.2.2. RESEARCH INSTRUMENTS

The researcher has employed semi-structured interviews and the past-tense elicitation task with 50 sentences; 20 nonce verbs (NV), 16 regular verbs (RV), and 14 irregular verbs (IV). The learners’ performance in this task requires a production of the past by choosing the most appropriate answer to the given verbs be it regular, irregular or nonce regular, nonce irregular verbs;

“Yesterday, I…………. to school. (palk)”

a. Palk b. Palked c. Neither of these

“Last week, her shirt…………. slightly. (chrink)”

a. Chrank b. Chrinked c. Neither of these
Unlike the earliest elicitation task used in previous studies where respondents were asked to produce the past given the present (“Every day I wash my clothes; yesterday I……….. my clothes.”) or of the present given the past (Yesterday I washed my clothes; every day I………… my clothes”). Pinker and Ullman (2002) attested that the idea of a past tense rule emanates from noting that young children sometimes regularize irregular verbs, producing ‘goed’ or ‘felled’ and from the finding that children frequently produce regular forms for nonce verbs in a past-tense elicitation task. The time allotted to the learners to complete the gap-filling task ranged from around 20 to 30 minutes.

4. RESULTS AND DISCUSSION

4.1. Frequency Effect in L2 Learners’ Past Inflectional Morphology

All subjects (n = 260) were English SLL enrolled at the four above-mentioned Moroccan Universities. There were 56.2% women and 43.8% men, ranging in age from 20 to 26 years. A summary of nonce verbs responses provided by Moroccan Engineering respondents is presented in figure.3. Before proceeding into nonce verbs presentation and interpretation, let us embark on a small corpora study of the implemented in the elicitation task. The main purpose of this corpora study is to distinguish the most from the least frequently used verbs in English language based on British National Corpus BNC and Corpus of Contemporary American English COCA. As can be seen, the first range of verbs went/walked/became/satisfy are more frequent than strove/shrank/bulged/c according to BNC and COCA corpora.

Table.1 Small BNC/COCA Corpus Study

<table>
<thead>
<tr>
<th>VERB</th>
<th>High Frequency</th>
<th>Low Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BNC</td>
<td>COCA</td>
</tr>
<tr>
<td>went</td>
<td>45368</td>
<td>376940</td>
</tr>
<tr>
<td>became</td>
<td>21552</td>
<td>158626</td>
</tr>
<tr>
<td>walked</td>
<td>8572</td>
<td>81075</td>
</tr>
<tr>
<td>satisfied</td>
<td>3420</td>
<td>18486</td>
</tr>
</tbody>
</table>

4.2. Regular Inflection

Based on the small corpus study conducted for the purpose of this research, the selected verbs from the employed research instrument were classified into categories high frequency and low frequency. Commencing by the first category, table.2 displays both high and low frequency regular verbs. For highly frequent verbs walk/satisfy, the researcher implemented nonce verbs palk/satisfy that it has a high phonological similarity to the stem of the real verbs. As can be seen, since there is a high phonological similarity as well as high frequency the subjects automatically inflected both real and nonce verbs regularly.

a) Walked 91.1%; Palked 81.2%/ Satisfy 88.5% Satisfy 81.1%
b) Bulge 90.7%; Dulge73% /Backdrop78%; Foredrop 78.3%
Despite the fact that there is low frequency for the regular instances, the majority of SL learners have applied the ‘ed’ suffix. As for the regular N.V Palk 81.2% of the subjects have inflected the verb regularly, 14.4% have inflected the verb irregularly, and 4.4% have opted for none of them. Moreover, what was confounding is the case of equal results obtained for the R.R backdrop and N.V foredrop. This shows that probably the respondents assumed that foredrop is a R.R.V and then generated regular past tense.

Table.2 The Processing of Regular Past Tense Inflections

<table>
<thead>
<tr>
<th></th>
<th>R.R. Inflections</th>
<th>N.R. Inflections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>91.1 % R.I</td>
<td>Palk</td>
</tr>
<tr>
<td></td>
<td>8.4% I.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 % N</td>
<td>81.2% R.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14.4% I.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.4% N</td>
</tr>
<tr>
<td>Satisfy</td>
<td>88.5% R.I</td>
<td>Satistify</td>
</tr>
<tr>
<td></td>
<td>10% I.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5% N</td>
<td>81.1% R.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.9% I.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16% N</td>
</tr>
<tr>
<td>Bulge</td>
<td>90.7% R.I</td>
<td>Dulge</td>
</tr>
<tr>
<td></td>
<td>1.8% I.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.5% N</td>
<td>8.8% I.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18.1% N</td>
</tr>
<tr>
<td>Backdrop</td>
<td>78% R.I</td>
<td>Foredrop</td>
</tr>
<tr>
<td></td>
<td>7.5% I.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.1% N</td>
<td>78.3% R.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.4% I.I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.3% N</td>
</tr>
</tbody>
</table>

4.3. Irregular Inflections

This section provides an antithesis to the researcher’s presuppositions. It was expected that past high and low frequency would be noticeably higher solely with the regular past. The results obtained in this section shows that frequency affects to a great extent irregular past tense as it was the case for regulars. For highly frequent verbs walk/satisfy, the researcher implemented nonce verbs become/bring that it has a high phonological similarity to the stem of the real verbs. It is worth mentioning that frequency along with high phonological similarity play significant role in production rates of verb forms;

c) Become 90.1%; Besame 72.9% /Bring 86.5% Dring 56.2%
d) Strive 74.3%; Strife 13.5% /Shrink 64.8%; Chrink 60.2%

Despite regularity or irregularity, the elicitation task demonstrated that whenever there is a high frequent past form pattern respondents tend to apply it on a similar phonological pattern.

Table.3 The Processing of Irregular Past Tense Inflections
According to BNC and COCA strive is the least frequently employed verb. Consequently, the respondents were confused between using the R.I or I.I. and, for nonce irregular verbs strife the majority of respondents opted for none of the options by 53.4%, followed by 13.5% of irregular inflection I.I, and only 10.9% had Inflected the nonce verb regularly.

5. CONCLUSION

In sum, the notion of verb nonceness was recognized and processed similarly to existing English verbs. The findings demonstrated that the phonological similarity affects the generation of inflectional patterns of the regular, irregular, and nonce verbs, particularly when there is a high or root similarity between the verb and the nonce verb. EFL learners tend to regularize the real regular R.R verbs and nonce regular N.R verbs. They also, applied the pattern of the real irregular R.I over the nonce irregular N.I when real irregulars R.I are highly frequent and phonologically similar. The current study investigated only verbs with high phonological similarity. Therefore, the results obtained from one set of homogeneous elicitors may not be a reliable measurement of a learner’s propensity. This further undermines and stresses the urgency of reproducing a piece of research that provides some reflection regarding the effect of low frequency and low phonological similarity on past tense inflections.

References


— Hohenhaus, Peter 2007 How to do (even more) things with nonce words (other than naming). In Lexical Creativity, Texts and Contexts, J. Munat (ed.), 15–38. Amsterdam/Philadelphia: John Benjamins.


— Stockall, L., Stringfellow, A., & Marantz, A. (2004). The precise time course of lexical activation: MEG measurements of the effects of frequency, probability, and density in lexical decision. Brain and Language, 90(1-3), 88–94. doi:10.1016/S0093-934X(03)00422-X.