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"With this slip I prove thee real" The Psychological Reality of Some Linguistic Units: Evidence from Colloquial Cairene Arabic Speech Errors

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Abstract

Since the early 1970s, the field of psycholinguistics has witnessed a surge in speech errors research in English and various European languages. Research work done in Arabic in this respect remains little, however. This study, drawing upon evidence from a corpus of 1102 spontaneous Colloquial Cairene Arabic (CCA) speech errors addresses the psychological reality of various linguistic units on three levels of analysis: phonological, syntactic and lexical. On the phonological level, the study shows that segment or phone (consonants and vowels), phonetic features and the syllable are all psychologically real units of performance, while consonant clusters are not 'unitary units' of performance. On the syntactic and lexical levels, the study showed that the only way one can account for various speech errors that occur on those two levels will be by assuming the existence of syntactic features, syntactic categories morpheme, and the word as real performance units and not just hypothetical descriptive ones. The paper also investigates the controversial issue of the beginning of speech error research.

Keywords: Psycholinguistics, Speech errors, Arabic slips of the tongue, Language processing

1. Introduction

Linguists have been talking in their papers about various units of linguistic performance: segments, features, morphemes, syntactic categories, etc. – abstract units that were hypothesized in order to be able to describe the grammars of languages. Some linguists argued against the psychological reality of these units, while conceding that they are legitimate units for linguistic description (Twaddell 1935). Another group assumed, however, that the fact that these units were necessary to describe the grammar was in itself a strong reason to believe in their reality. With the advent of investigation of the various aspects of speech errors, such reality gained support. It was found that it was impossible to account for speech errors (part of speech production) without realizing the psychological reality of these discrete performance units. Thus, speech errors researchers in different languages used their data to prove the reality of those various performance units (Fromkin 1973, 1980; Fowler 1987 and Shattuck-Hufnagel 1987b among others). This has been done using speech error data from English, German and other European languages. This study, using a corpus of 1023 utterances that involves 1102 Colloquial Cairene Arabic (CCA) tongue slips, attempts to lend further support to the argument for the psychological reality of some linguistic units on phonological, syntactic and lexical levels. In the following section we will be briefly reviewing the two approaches of studying speech errors and addressing the controversial question of when the study of speech errors began and who the fore-founders of this discipline were.

1.1 What is a Speech Error?

According to many linguists, the object of their study is unbroken succession of unrelated, yet grammatical, utterances generated by a system of rules with the ultimate aim of accounting for these grammatical utterances. Yet, actual speech is not only characterized by these grammatical utterances but there are also ungrammatical utterances, restarts, stutterings, hesitations and errors (Boomer and Laver 1968).

A slip of the tongue is said to have occurred when the speaker's actual utterance differs in some way from the intended utterance. It involves unintentional movement, addition, deletion, blending or substitution of material within an utterance (Fromkin 1973, 1980; Stemberger 1983) and can be phonological, morphological, lexical or syntactic. It is not the product of intentional ungrammaticality, ignorance or language play. Thus, cases where the intended utterances of the speakers are identical to actual ones are not to be dealt with as tongue slips.

While children and aphasics make slips of the tongue, errors are also characteristic of normal, articulate adult speech. Speech errors are expected to occur once in every 1000 words of normal speech (Moller *et al.* 2007). Thus, a casual observer can detect at least one example of a broad variety of error types in a week's time (Garrett 1980). Yet, what makes errors slip away unobserved is the fact that both the speaker and the listener focus on the content of the message and not on the phonological components thereof. Knowing exactly what he/she wants to say, the speaker is unaware of the slip he/she committed. The listener, on the other hand, hears what

he/she expects to hear – grammatical, correct utterances (for details, see Boomer and Laver 1968; Clark & Clark 1977; Goldrick *et al.* 2011; Moller *et al.* 2007; Nooteboom 2005; Nooteboom & Quene 2008). This may explain why most of the tongue slips 'slip' away unnoticed.

Moreover, evidence suggests that some speakers may be more likely to make errors than others, and this tendency toward error may increase with fatigue, stress or distraction.

1.2 Two Research Traditions

Over the past century, slips of the tongue have been examined as scientific evidence within the context of two different traditions: psychological and linguistic.

1.2.1 The Psychological Tradition

The psychological approach in the study of speech errors is associated with Freud. Freud believed that errors represent the speaker's attempts to fulfill (or partially fulfill) suppressed goals (Freud 1924). These goals were said to be suppressed because of their socially inappropriate, and often immoral, nature. They struggle ceaselessly beneath the surface of consciousness. As Birnbaum and Collins (1992) put it, Freudian errors are meaningful psychological acts: a patterned, on-going expression of the inner state. Examples (1) and (2) are perhaps typical:

(1) (Motley, 1985)

T. Pleased to meet you.
Act. Pleased to beat you.
(Context: Two candidates for the job being introduced to each other).

In example (1), the speaker intended to greet another person to whom he has just been introduced and who happened to be applying for the same job as the speaker himself. What he said was an expression of what he really thought and desired.

(2) T. /?ihna hanuɤɤud ?emta/

When shall we sit?
Act. /?hna hanimʃi ?emta/
When shall we leave?

(Context: A person starting to sit in a social lunch she does not want to be in).

In example (2), the speaker meant to say /nuɤɤud/ (sit) at the beginning of a get-together lunch she did not want to join; instead, she said /nimʃi/ (leave). What the speaker actually said expresses her wish which she wanted to hide for social propriety.

Both environmental influences (including the speaker's unconscious thoughts) and similarity of phonological shape between target and utterance play a role in lexical substitutions (Fay and Cutler 1977; Harley 1984). In case of dramatic slips such as those in this section, it is often impossible to tear these influences apart. Although this Freudian view of speech errors is part of the layman's view of slips in general (tongue or actions), the fact remains that Freudian slips are fairly rare and account for only a very small percentage of errors in natural speech (Ellis 1980). This study has dealt with a corpus of over (1023) tongue slips. Less than one tenth of the present data can be explained according to the Freudian view.

Freud's claim that all slips have hidden meanings is rather impossible to believe for it is difficult to imagine, for example, that examples (3) and (4) were the result of repressed anxieties on anything of that kind. It should be noted here that no translation of the Actual utterance will be given if the error is on the phonological level.

(3) T. /ɣatti ʒe:nik iljimi:n/

Cover your right eye.

Act. /ɣatti ʒe:nik iʃʃima:l/

Cover your left eye.

(Context: A doctor trying to test the eyesight of his patient).

(4) T. /fi: **m**ajja **f**u:?/

(Is there water upstairs?)

Act. /fi: **f**ajja **m**u:?/

In example (3), it seems that the speaker simply used /iʃʃima:l/ (left) instead of /ʔiljimi:n/ (right). In example (4), the only meaning one can read into it is that the /m/ and the /f/ were switched.

Such a conclusion does not lead to rejecting the Freudian slips altogether; rather, it proves that there are many questions left unanswered by the Freudian hypothesis that need to be accounted for, and that found their answers in the linguistic tradition.

1.2.2 The Linguistic Approach & a Controversial Beginning

The linguistic approach of studying tongue slips in contrast to the psychological tradition focused on the actual utterance itself. But when exactly such an interest among linguists began is a point we find controversial. In the literature dealing with tongue slips, there has been an agreement that the linguistic interest in speech errors was instigated by Herman Paul in 1886 who was the first linguist to suggest that an examination of speech errors might uncover the reasons behind certain types of linguistic change. It is Meringer in 1895, however, who is considered to be the "father" of the linguistic interest in speech errors "If for no other reason

than that his published collection … has provided the data for other researchers," (Fromkin 1973). Meringer published a collection of over eight thousand speech reading and writing errors which have provided data used in many subsequent studies. In his published corpus of several thousand German speech errors, he carefully documented each utterance, target, details of context and even minutiae about each speaker such as date of birth and mood. Meringer saw speech errors as "deviant" utterances which "revealed an unconscious breakdown in articulatory process," (Fromkin 1973). According to Meringer, speech errors represent problems in the articulatory execution of speech.

This idea that Meringer is the "father" of speech errors was predomimant till Anwar (1981) published a paper claiming that the Arab linguists are "the legitimate fathers of speech errors." According to Anwar, the Arab linguists began their research in the field of speech errors twelve centuries ago. Anwar stated that the "Arab linguists were interested in different types of speech errors." He cited examples of some of their works and their interests as Al-Zubaydi (d. 379/989) who was interested in errors from everyday speech in his book "*Lahn Al-Awaam"* (i.e. errors of the commoners), where he cited errors made in certain professions and social situations, and Ibn Al-Sikkeet (d. 244/858), in his book *'Al-qalb wa Al-Ibdal'* (i.e. substitution and replacement). Other Arab linguists were interested in reading and writing errors such as Al-Safadi (d. 764/1362) in his book '*tas'hih Al-Tas'heef wa Tahrir Al-Tahreef*' (i.e. correcting deviations in language). Other linguists dealt with more specific errors: Ibn Il-Imam (d. ca 827/1423) who collected errors resulting from the influence of sounds on one another in his book '*Al-Jumanah fi Izalt Al-Ratana'* (i.e. fundamentals of eliminating lingo), and Al-Jahiz who dealt with malapropisms in his book '*Al-Bayan wa Al-Tabyeen*'. Anwar also mentioned the fact that some linguists collected errors made in reading such as Ibn Al-Sikkeet, in his book '*Islah Al-Mantiq*'.

Anwar claims that Arab linguists tried to provide explanations for speech errors. They attributed many of them to assimilation (Ibn Makki: *Tathqif* II) or to substitution, closeness of point of articulation, anticipation, deletion or addition.

Anwar's paper made a change among speech error investigators. Fromkin and Cutler accepted his claim and started to trace the interest in speech errors back to the Arab linguist Al-Kisa'i in the ninth century (Cutler 1982a; Fromkin 1988).

That the linguistic interest in speech errors can be traced down to the Arab linguists who are said to have begun investigating, collecting and analyzing them eleven centuries before Meringer is, by all means, a very attractive idea. However, when we investigated this point, it was clear that though the Arab linguists dealt extensively with speech errors, what they meant by "errors" differs completely from the notion of speech errors investigated and collected by Meringer and modern linguists**.** In section (1.1) above, it was stated that a speech error is said to be committed when the actual utterance "deviates" from the intended or target utterance. This is what Meringer and modern linguists consider a speech error. On the other hand, an overview of the speech errors literature of the early Arab linguists shows that they were

concerned with "deviations" from the classical Arabic spoken in the Arabian Peninsula. After the spread of Islam outside Arabia, the language of Al-Quran was influenced by different non-Arab dialects. The Arab linguists started to collect such deviations in a series of books entitled '*lahn Al-Amah'* (i.e. errors of the commoners). What they meant by '*lahn'* (error) was a wrong usage of the language either on the phonological, syntactic, morphological or lexical level (Matar 1981). In their books, they collected the errors resulting from deviations from classical Arabic and corrected them, explaining the reasons behind such deviations. Their aim was to purify the language of Al-Quran of any deviations from the Arab tongue in an endeavour to preserve the integrity of the language (Abdel Tawab 1982).

This is supported by what they stated in their books about the reasons behind their works. Ibn Mikki, in his *Tathqif* states:

> People continued to commit errors till they started to err in the well-known *Hadith* (Sayings) of the Prophet, Peace be upon him … (The Jurisprudence books) are read in a wrong way and nobody is aware of this deviation, and even when one hears the correct usage, he rejects it due to its longstanding erroneous usage… From my fellow countrymen, (I have) collected the errors which are not acceptable among the Arabs, or those which have better alternatives of which the people are ignorant. (Matter 1981:44)

The first Arab linguist known to have collected such errors was Al-Kisa'i (d.189 A.H.) in his book "Errors of The Commoners." After that, many linguists followed in his footsteps like El-Faraa' (d. 208 A.H.), al-Mathnay (d. 210 A.H.) and Al-Asma'i (d. 216 A.H.).

Al-Bahly (d. 231 A.H.), Al-Mazny (d. 284 A.H.), Al-Sigstani (d. 255 A.H.), Al-Dinory (283 A.H.), Al-Oqly (d. 300 A.H.) and others collected errors under the title "Errors of The Commoners." Other grammarians wrote books with different titles dealing with the same topic, among them were Ibn Al-Sikkeet, in his '*Islah Al-Mantiq'*; Ibn Qutayba (d. 276/889), in his '*Adab El-Katib*'; Ibn Makki, in '*Tathqif Al-Lisan wa Talqih Al-Janan'* and Al-Lawati, in his '*Al-Rad Ala Tathqif Al-Lisan'* .

To further clarify this point, the following quotations and examples are taken from some of the works of the Arab linguists whom Anwar mentioned in his paper. These quotations leave no doubt of the fact that the errors studied by early Arab linguists are different from those studied by modern linguists. Al-Kisa'i, in example (78) in his "Errors of The Commoners," states that: "It is said someone is /maʒ**d**in/ of knowledge and it is not said /maʒ**d**an/" (Abdel Tawwab 1982). While Ibn Al-Sikkeet, in his *Al-Ibdal,* deals with the phenomenon of letters switching places within a word, or being substituted by another letter without violation of the meaning. There was a chapter on the substitution of the /n/ and /l/ in which he drew examples like the following: "Both /halak/ and /hanak/ are correct usages (Sharaf & Nasif 1978).

Thus, it is obvious that the early Arab grammarians used the term 'error' primarily in reference to wrong usage by non-native speakers of Arabic or speakers of non-standard dialects. This

may have paved the way toward the modern interest in speech errors in the 'modern' sense of the word.

The idea that speech errors are non-random and predictable was introducted in 1917 by Sturtevant (reviewed in Fromkin 1973). This finding was pursued in subsequent studies. The most eminent of these was Lashely's paper entitled 'The Problems of Serial Order in Behavior', where he investigated the same point.

Yet, it was not until the publication of Victoria Fromkin's work in the mid-1960s that a real interest in speech errors began to emerge. Researchers, including Fromkin (1973), Fry (1973), Harely (1984), Hockett (1973), Levelt (1983) and Shattuck-Hufnagel & Klatt (1979), investigated speech errors to gain insights into the language. Others were interested in the nature of linguistic performance and evidence drawn from speech errors (among them were Cutler 1980b; Dell 1988, 1990 ; Dell & Reich 1981**,** Dell & Repka 1992; Fay & Cutler 1977; Fromkin 1988; Garrett 1975, 1980a, 1980b; Goldrick *et al*. 2011; Humphreys *et al*. 2010; Jaegar 1992a, 1992b; Levelt 1983; Nooteboom 1973,1980, 2005; Nooteboom & Quene 2008; Shattuck-Hufnagel 1987a, 1987b; Stemberger 1982,1983, 1985; Moller *et al.* 2007)

1.2.3 Arabic Studies of Tongue Slips

There are two Arabic studies mentioned in the speech errors literature. The first is that of Anwar (1979, 1981). Anwar wrote two articles arguing that the early Arab linguists were the first to study speech errors (See Section 1.2.2). His work was confined to this argument and he did not attempt to collect or analyze errors.

The first attempt to analyze Arabic tongue slips is attributed to Sayed (1992) who collected a corpus of (131) natural tongue slips in colloquial and standard Egyptian Arabic. Furthermore, there is a study on the universality and language specificity of speech errors (Nayef, forthcoming). That is based on an unpublished dissertation of the author. This paper is an attempt to shed more light on this somehow neglected area of research in the Arab world.

2. Aim and Methodology

2.1 Aim

Drawing evidence from 1102 (CCA) speech errors, this paper attempts to investigate the validity of the psychological reality of some performance units on various linguistic levels. On the phonological level of analysis the paper investigates the psychological reality of the following units: the segment or phone (consonants and vowels), phonetic features, the syllable and consonant clusters. On the syntactic level, the study addresses the reality of the syntactic features, syntactic categories and the morpheme. The paper also discusses the reality of the word as a linguistic unit based on the speech errors data of this research.

2.2 Data Collection

The data are a collection of spontaneous speech errors collected by the traditional pen-and-pad method over a four year period. It consists of 1023 spontaneous utterances that involved 1102 speech error cases. However, we encountered many errors we chose not to include in the data. This was due to the fact that neither the author nor the speaker was sure of exactly what the speaker said or meant to say.

In order to capture an error, three things are recorded. First, the utterance, what the speaker said, was written down as accurately as possible. When the error was simply a word substituted without distortion of any kind, writing the error in Arabic orthography was seen to be sufficient. In other cases, simple phonetic transcription was adequate. Second, the target, what the speaker intended to say, was specified. Since the speaker is usually the only one who can unequivocally report the target of the utterance, his/her opinion, in cases where there were two possible targets as in the case of lexical blends, overruled that of the author.

Finally, in order to classify the error, the source of the disturbance was noted. When the contaminating element was present within the utterance itself, this was simply a matter of recording enough of the utterance to include it. In other cases, details of the context in which the error was made were noted.

Unless the author was reporting her own error, details of the target, interfering factors or exact environmental or mental context were sometimes not obvious. In such cases, similar to what was mentioned above, the speakers were questioned about these points as they often know with certainty what influences in the environment or in competing targets contributed to their own erroneous utterances.

It should be noted that no translation will be given if the 'Actual' utterance involves a phonological error.

2.3 Data Categorisation

The data were classified according to the type of error, the linguistic level, the unit involved in the error and the source of error.

2.3.1 Type of Error

When classifying errors in speech, the first task is to determine the types of errors which occurred. This is decided according to the relation between the units involved in the error. Errors are categorized into four major types: exchange errors, blend errors, substitution errors and deletion errors.

A. Exchange errors: are those errors in which the units which are involved and exist in the utterance switch positions.

B. Blend errors: are such errors in which the two error units blend together to produce one word, or, in rare cases, the two words appear side by side.

C. Substitution errors: are those errors where the speaker replaces the intended unit by another unit which did not occur in the utterance.

D. Deletion errors: occur when the unit in which the error takes place or part of it is omitted, and not replaced by another unit. Figure (1) illustrates the various types of errors and their subcategories.

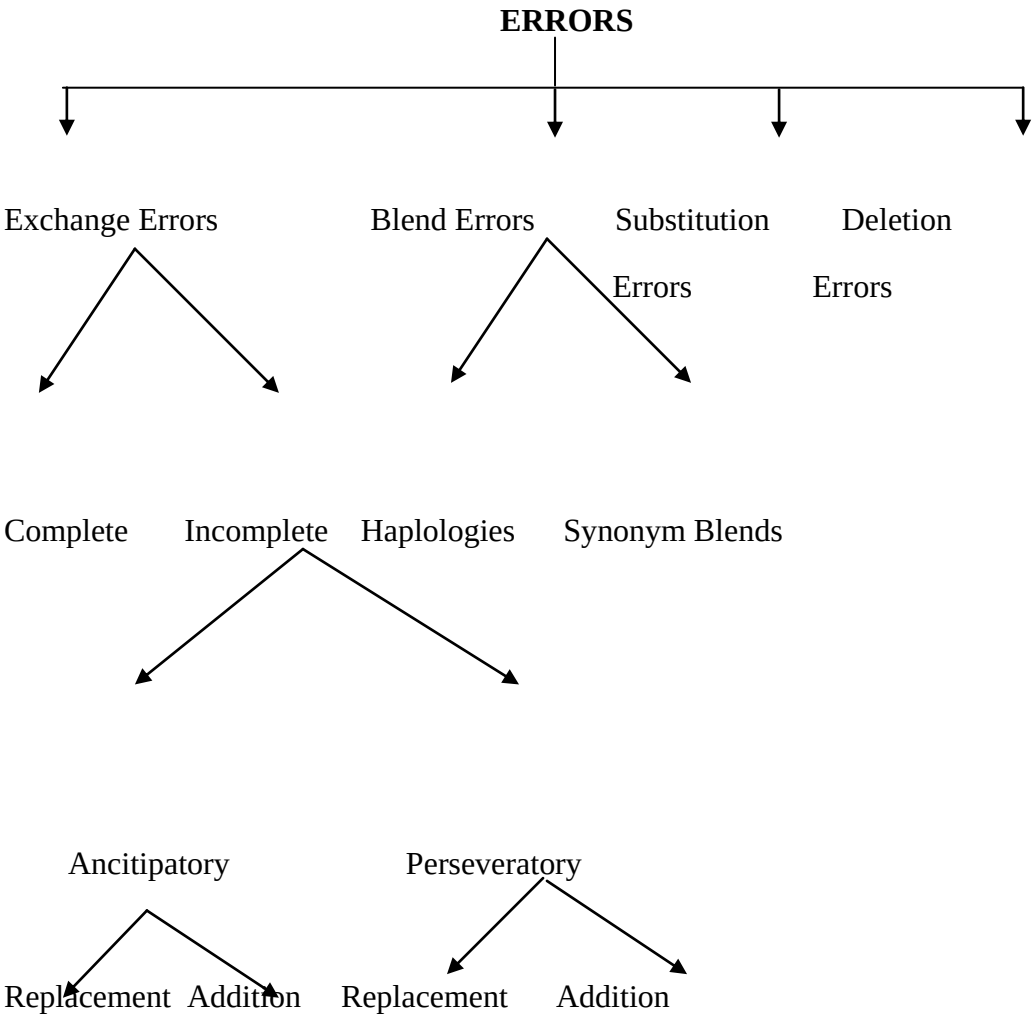

Figure (1). Various types of errors and their subcategories

2.3.2 Level of Errors

After the type of error was determined, errors were then categorized as to the linguistic level (phonological, morpho-syntactic or lexical) at which the error occurred. This classification was fairly straightforward.

2.3.3 Unit of Error

The next step in the process of classification, after deciding the type of the error and its linguistic level, was to classify the unit involved in the error. Table (1) below illustrates the list of possibilities.

Table (1). Description of Units Involved in Errors

Phonological level	Feature Consonant Vowel Vowel and consonant
Morpho-syntactic	Feature Clitics
Lexical	Whole word closed / open class

2.3.4 Sources of Error

There are three main sources of speech errors: syntagmatic, paradigmatic and non-plan internal. In the syntagmatic source, the contaminating element is present within the utterance itself. Phonological, morpho-syntactic and lexical perseverations and anticipations fall within this category. Secondly, the paradigmatic source takes place when the contaminating element lies not in the utterance but within the system of elements from which the form is selected. The prototypical paradigmatic error is an incorrect lexical choice. A paradigmatic error can also include morpheme or phoneme substitutions in which the source did not occur in the utterance. These are referred to as non-contextual errors.

2.4 Orthographic and Other Conventions

The phonetic symbols used here are those of the International Phonetics Association (IPA). For typographical reasons, however, some symbols were slightly changed. The following is a description of the phonemic repertory followed in this study.

2.4.1 Consonants

Arabic Orthography	Symbol	Description
	Plosives	
ب	/b/	Voiced bilabial
ت	/t/	Voiceless alveolar
ط	/t̲/	Voiceless emphatic alveolar
د	/d/	Voiced alveolar
ض	/d̲/	Voiced emphatic alveolar
ك	/k/	Voiceless velar
ج	/g/	Voiced velar
ق	/q/	Voiceless uvular
همزة	/ʔ/	Voiceless glottal
	Fricatives	
ع	/ʕ/	Voiced pharyngeal

ف	/f/	Voiceless labiodental
ث	/θ/[2]	Voiceless dental
ذ	/ð/	Voiced dental
ظ	/ð̰/[3]	Voiced emphatic alveolar
س	/s/	Voiceless alveolar
ص	/s̲/	Voiceless emphatic alveolar
ز	/z/	Voiced alveolar
ج:	/Z̲/	Voiced palatal
ش	/ʃ/	Voiceless palatal
خ	/x/	Voiceless velar
غ	/ɣ/	Voiceless uvular
ح	/h̲/	Voiceless pharyngeal
هـ	/h/	Voiced/voiceless laryngeal
	Trill	
ر	/r/	Voiced alveolar
	Lateral	
ل	/l/	Voiced alveolar
	Nasal	
م	/m/	Voiced bilabial
ن	/n/	Voiced alveolar
ن	/ŋ/	Voiced velar
	Approximants	
ي	/j/	Voiced palatal
و	/w/	Voiced labial/velar

2.4.2 Vowels

/i/ A short, front, unrounded vowel between close and half open

/i:/ A long unrounded, front or central vowel ranging between close to half close

/a/ A short, open vowel

/a:/ A long, open vowel

/u/ A short, rounded, back vowel, ranging between close to half open

/u:/ A long, rounded, back vowel, ranging between close to half vowel

/e/ A short, front, close-mid vowel

/e:/ A long, front, close-mid vowel

/o/ A short, back, open-mid vowel

/o:/ A long, back, open-mid vowel

When reporting a speech error, the intended target utterance is labeled (T) while the actual speech error is labeled (Act.).

3. Findings and Discussion

In this section, evidence drawn from speech errors in this study is given for the reality of some linguistic units.

3.1 The Reality of the Segment or Phone

The data showed that the highest percentage of speech errors of all types is that which involves replacement, exchange, substitution, addition or deletion of segments of the size of phone which occurs within or across word boundaries (99.02% of the phonological errors). And almost all of these errors cannot be accounted for unless one realizes the existence of the segment. Consider the following examples:

(1) T. /ru**s**u:m iʃtira:k/
(Subscription fees)
Act. /ruʃu:m iʃtira:k/
(2) T. /hatʃu:fi ʃʃams/
(You'll see the sun.)
Act. /hatʃu:fi **s**ams/
(3) T./?ilfira:x bi**h**alha/
(The chicken are uneaten.)
Act. /?ilfira:x bi**x**alha/
(4) T. /lilmux**r**ig ju:sif ʃahi:n/
(Directed by Youssef Shahin)
Act. /lilmux**l**ig ju:sif ʃahi:n/
(5) T. /?illinti ʕajza:/
(Whatever you like.)
Act. /?illinti **h**ajza:/
(6) T. /?ilxina:?a n**f**addit/
(The quarrel is over.)
Act. /?ilfina:?a n**x**addit/
(7) T. /na:**w**i aʕmil/
(I intend to do)
Act. /na:**m**i aʕwil /

(8) T. /ʔe:h ilrawa:jih iggami:la di/
(How inviting this smell is!)
Act. /ʔe:h ilra**h**wa:jih iggami:la di/
(9) T. /sibtilak risal**t**e:n/
(I left two messages to you.)
Act. /sibtilak risale:n/

The only way one can explain these error cases is by realizing the existence of segments in the light of which examples (1-4) are considered as illustrative of replacement of a segment by another segment present in the utterance. Furthermore, example (5) illustrates the substitution of a segment by another segment which is not part of the intended utterance. Examples (6) and (7) show complete exchanges of segments and example (8) shows addition of segments while (9) is seen as an example of segment deletion.

All of the above examples reflect errors involving consonants. Vowels are also replaced, exchanged, substituted and deleted. Consider the following examples:

(10) T. /ʔag**i:**b gibna ru:mi/
(Should I get ras cheese?)
Act. /ʔag**u:**b gibna ru:mi/
(11) T. /biju?ʕud min iddhr lilʕ**a**sr/
(He stays from noon till afternoon.)
Act. /biju?ʕud min iddahr lilʕ**u**sr/
(12) T. /sana sanate:n sihhitak tid**i:**ʕ/
(You will lose your health in one or two years.)
Act. /sana sanate:n sihhitak tid**u:**ʕ/
(13) T. /ʔa:m midabbis biddab**u:**s/
(He pinched a pin.)
Act. /ʔa:m midabbis biddabs/

Example (10) is an example of vowel replacement; example (11) is illustrative of vowel exchanges; while example (12) shows a case of vowel substitution and example (13) shows a case of vowel deletion. Though there has been no incident of vowel additions in the corpus, yet this may be due to the rare number of vowel errors in general; as there is no reason to assume that vowels are not added.

Moreover, another evidence for the existence of the segment as a psychologically real performance unit is the fact that interactions occur only between segments of the same type: consonants with consonants and vowels with vowels. There has not been one case of the 616 phonological errors that violates this principle. (For detailed discussion, see Nayef 2014 forthcoming)

The above examples were errors of replacement, exchange, substitution, addition and deletion of individual segments, which may be either vowels or consonants. Further justification for

assuming that individual segments are units of speech performance is suggested by the fact that, in many errors where the intended utterance included consonant clusters, only one segment of the cluster is involved. Consider the following example:

(14) T. /da ʃa**k**l kart ilhurrija/

(This looks like *al-hurriyya* card.)

Act. /da ʃa**t**l kart ilhurrija/

(15) T. /xit**m** innisr xaṯi:r/

(The eagle stamp seal is serious.)

Act. /xit**r** innisr xaṯi:r/

In example (14), the intended /ʃakl/ has been pronounced /ʃatl/. This can be explained as an anticipation of the /t/ in /kart/, causing the replacement of the intended cluster /kl/ by /tl/. Similarly, the consonant cluster /tm/ in /xitm/ (example 15), is broken when the /r/ of either /?innisr/ or /xa:ṯi:r/ replaces the /m/ in /xitm/. Thus, if one seeks an explanation for the two previous errors, it seems highly likely that they are cases of single segmental errors, but this time the segments involved occurred in consonant clusters.

Furthermore, the deletion of elements or segments in clusters also gives justification for the assumption that clusters are not "unitary units of performance" (Fromkin 1973). Examples (16) and (17) illustrate this point.

(16) T. /nilif ḥawale:n ḥadiqt ittif**l**/

(We turn around the children garden.)

Act. /nilif ḥawale:n ḥadiqt ittif/

(17) T. /?iʃʃam**l** hajiktamil/

(The reunion will be made)

Act. /?iʃʃam hajiktamil/

In example (16), the /l/ in /?ittifl/ was deleted. This cannot be explained unless it is assumed that the consonant cluster /fl/ was broken down into individual segments; namely, /f/ and/l/ and that the latter was deleted. The same can be said about example (17) where the consonant cluster /ml/ in /?iʃʃaml/ is broken and the /l/ is deleted. Thus it can be concluded that consonant clusters are sequences of discrete phones or segments.

Yet, the fact remains that there are some cases that involve the movement of whole clusters (see example (18) below). These cases should not be seen as a proof that clusters are "indissoluble units," but rather as evidence that "(they are themselves) composed of a sequence of segments" (Fromkin 1973).

(18) T. /malh wʕasal na**hl**/

(Salt and bee honey)

Act. /malh wʕasal na**lh**/

In this example, the consonant cluster /lh/ in /malh/ ('salt') replaces the consonant cluster /hl/ in /nahl/ ('bees'), changing it into /nalh/. Thus the case is considered an anticipation of clusters. Note that it can be argued that this case is a segmental exchange in which the consonant cluster /hl/ is broken down to allow the re-ordering of the two constituting segments.

All the above-cited error cases give substantial evidence of the existence of segments as psychologically real units of performance.

3.2 *The Reality of Phonetic Features*

Research on the perception of speech has shown that units smaller than the segments are perceived and confused. Speech errors corpora have been used as evidence to the existence of these hypothetical features.

In the corpus subject to study, some error cases have been classified as feature errors.

(19) T. /**t**a:ni nasja jimi:n/

(Second corner to the right)

Act. /**t**a:ni nasja jimi:n/

(20) T. /sa:kin fi ma**d**i:nit nasr/

(Residing in Nasr City)

Act. /sa:kin fi ma**d**i:nit nasr/

(21) T. /?ilʕa**d**dala lamma titʕab/

(When the muscle gets tired)

Act. /?ilʕa**d**dala lamma tiṭʕab/

These examples show a change in the value of the feature [emphasis]. In example (19), the [+emphatic] in /s/ is anticipated to replace the [-emphatic] in /t/, producing /ṭ/. Similarly, in example (20), the feature [+emphatic] in /s/ was anticipated to replace the [-emphatic] in /d/. Some may argue that the previous explanation can be dismissed and that the two cases can be classified as segmental substitution. Yet, looking at example (21), it is found that the [+emphatic] in /d/ of /ʕadala/ replaced the [-emphatic] in /t/ of /titʕab/, producing /tiṭʕab/. Again, that can be judged as a segmental substitution. However, since /d/→ /d/, or since the value of the emphasis feature in the /d/ of /ʕadala/ switched from [+emphatic] to [-emphatic] –

all other features remaining the same – a better explanation for the error is that what occurred was a single feature switch, or else no explanation is provided for the /d/→ /d/ substitution.

3.3 The Reality of the Syllable

As speech errors corpora have been used to prove the psychological reality of segments and features, they also gave evidence of the existence of the syllable – a unit larger than the segment and feature – as part of speech performance. That is because the reality of the segment and feature does not negate the existence of the syllable.

For example, in this corpus, like other corpora in other languages, there have been error cases which involved the movement of a whole syllable (see example (22) below).

(22) T. /bitiddi iggamʕa aktar min **hagmaha**/

(You give the university more than it is worthy of)

Act. /bitiddi iggamʕa aktar min **gamʕaha**/

In this example, it can be claimed that the /g/ and /m/ in /hagmaha/ were anticipated within the same word to replace the initial segment /h/ and the medial (in in-word position) /g/. The /g/ was anticipated to replace the /h/ and the /m/ was anticipated to occupy the original place of the /g/. Simultaneously, the /ʕ/ in /?iggamʕa/ perseverated to occupy the original place of /m/ in /hagmaha/. This segmental explanation, though possible, is complicated; since it involves anticipation and perseveration movements – a case which is rare in errors – as well as movements both within and across word boundaries. This is also a matter which is not common in errors. A more simple and better explanation is that the whole syllable /gam/ perseverated, replacing the syllable /hag/ each of which occupies the same word-initial position. While the whole /ʕa/ syllable, or it can be only the /ʕ/ segment, perseverated to replace the /ma/ or /m/. This explanation involves one type of movement only (perseveration) and it happens across word boundaries.

/hag/ → /gam/

/ʕa/ or /ʕ/ → /ma/ or /m/

Another piece of evidence of the existence of syllable is the syllabic structure. It has been observed by many researchers in different languages that the syllable structure is important and that segmental slips abide by a structural rule with regard to syllable place; that is, initial segments in the origin syllable replace initial segments in the target syllable, "nuclear replace nuclear, and final replace final" (Boomer & Laver 1968; Fromkin 1973; Jaeger 1992b; Jensen 1999; Mackay 1970). The data under investigation supported this. In (78.44%) of the phonological errors complied with this rule and in (21.56%) cases there has been a violation to this principle. Also, it has been found that the majority of segments in their interactions work according to this sequential ordering. Thus, onsets tend to interact with other onsets; nuclei

with nuclei and codas with codas, in errors that occur both within and across word boundaries. Consider the following examples:

(23) T. /ʔus-ta:-**z**a f ta?-li:-dik/

(She's a master of imitating you.)

Act. /ʔus-ta:-**d**a f ta?-li:-dik/

The /d/ of the onset of one syllable in /ta?-li:-dik/ is anticipated to replace the /z/ of the onset of another in /ʔus-ta:-za/.

(24) T. /ʔil-ji-m**i:n** miʃ iʃ-ʃi-ma:l/

(The right not the left)

Act. /ʔil-ji-m**a:l** miʃ iʃ-ʃi-mi:n/

The nucleus /i:/ of /ʔil-ji-mi:n/ exchanges places with the nucleus /a:/ of /ʔiʃ-ʃi-ma:l/, producing /ʔil-ji-ma:l/ and /ʔiʃ-ʃi-mi:n/.

Another explanation for the previous example would be that the whole final syllable /mi:n/ in /ʔil-ji-mi:n/ switches position with the final syllable /ma:l/ in /ʔiʃ-ʃi-ma:l/. A third explanation would be that the two syllables /ma:l/ and /mi:n/ were broken down and that the vowel-consonant sequence of each switched position with the other. Thus, all of the three explanations prove the importance of the syllable structure.

(25) T. /ji-la:-ʕib mahallit dumja:t/

(It (a team) plays (a match) with *mahallit* Damietta.)

Act. /ji-ʕa:-**l**ib mahallit dumja:t/

This example is a within-word exchange. The onsets /l/ and /ʕ/ in /ji-la:-ʕib/ switch positions, resulting in /ji-ʕa:-lib/.

(26) T. /nus ri-ɣi:**f** be-ʕa-sal/

(Half a loaf with honey)

Act. /nus ri-ɣi:**s** be-ʕa-sal/

The coda /l/ in /be-ʕa-sal/ is anticipated to replace the coda /f/ in /ri-ɣi:f/, producing / ri-ɣi:s/ instead.

These examples prove the importance of the syllable structure. This point is further confirmed by the fact that in speech errors, replacements are more common than deletions and additions – a phenomenon which can be explained in terms of the importance of the syllable structure. That is why it is suggested that replacement, unlike addition and deletion, does not change the syllable structure. Additional evidence which further substantiates the existence of the syllable

as a unit of performance can be drawn from the cases termed ‘haplologies’ or ‘sequential blending’. Consider the following example:

(27) T. /haj-ku:n maw-gu:d fi/

(He will be there in…)

Act. /haj-gu:d fi/

In this example, the first syllable /haj/ in /haj-ku:n/ is added to the second syllable /gu:d/ in /mawgu:d/, resulting in one word instead of two. Though not all sequential blend cases (haplologies) follow this behaviour, the fact remains that the majority of cases are best explained in terms of a whole-syllable movement.

3.4 The Reality of Morphemes and Syntactic Categories and Features

Speech errors also provide evidence that morphemes are real units involved in speech production and not just hypothetical abstract units in the minds of linguists. There are many error cases involving the movement, exchange, substitution, addition and deletion of morphemes. Consider the following examples:

(28) T. /?usta:z ʕulu:m il?aʒzija/

(A nutrition professor)

Act. /?usta:z **il**ʕulu:m il?aʒzija/

The prefix [?il-], which is the definite marker in /?il?aʒzija/ is anticipated to be added to /ʕulu:m/.

(29) T. /ha:gi liba:ba bukra/

(I will come to Dad tomorrow.)

Act. /ha:gi liba:ba **li**bukra/

The prefix [li-] in /liba:ba/ perseverated to be added to /bukra/.

(30) T. /gabli lhad ʕandi/

(He brought … right to my place)

Act. /gabli lhad ʕandaha/

(He brought … right to her place)

The suffix [-i] in /ʕandi/ is substituted by the suffix [-ha] to produce /ʕandaha/ instead.

(31) T. /?a:kul ana:m lita:ni ju:m/

(I eat (then) I sleep till the next day.)

Act. /?a:kul ana:m ta:ni ju:m/

(I eat (then) I sleep the next day.)

The prefix [li-] 'till' is deleted and does not appear in the actual utterance.

(32) T. /?ibni: lli f baṯnik/

(It is my son who is in your abdomen.)

Act. /?ibnik illi f baṯni:/

(It is your son who is in my abdomen.)

The two suffixes [-i:] of /?ibni:/ and [-ik] of /baṯnik/ switch positions to produce /?ibnik/ and /baṯni:/.

Furthermore, the data showed two facts that stems and affixes do not interact and that suffixes and prefixes do not replace each other. This gives substantial evidence that these are real discrete units, stored as such in the mental lexicon, or else how can it be explained that they do not interact with one another? (For details, see Nayef, 2014 forthcoming). Examples (33-35) illustrate this point.

(33) T. /xamsa w sabʒi:n/

(Seventy five)

Act. /sabʒa w xamsi:n/

(Fifty seven)

The two stems [xams] in /xamsa/ and [sabʒ] in /sabʒi:n/ travel to each other's places, resulting in /sabʒa/ and /xamsi:n/.

(34) T. /fakkartik bi:hum/

(I reminded you of them.)

Act. /fakkartuhum bi:ki/

(I reminded them of you.)

The two suffixes [-ik] and [-hum] switch positions.

(35) T. /?amma inti ti:gi/

(Till you come)

Act. /?amma ana ?a:gi/

(Till I come)

The prefix [ti-] in /ti:gi/ is replaced by the prefix [?a-], resulting in /?a:gi/. There is also a substitution of the subject pronoun /?inti/ by the subject pronoun /?ana/ which may be responsible for the morphological substitution to agree with the subject. This provides yet another strong evidence of the reality and discreteness of these units.

Another significant point here is that there has not been a single case in the data in which the prefix [?il-] interacted with any other affix or stem on any of the three (phonological, morpho-syntactic and lexical) levels. In other words, [?il-] has not replaced, or has not been replaced by, any other linguistic unit. Besides, it was not broken down into its constituent segments; i.e., /?/, /i/ and /l/. The only error cases [?il-] was involved in were either a complete addition or omission of this definite marker.

Furthermore, tongue slips provide evidence of the reality of syntactic categories. The fact that when whole words and clitics interact, they tend to interact with words and clitics of the same syntactic group – a case which proves the reality of these units.

There were many cases in the present study in which when a word of a syntactic category shifts its place within the utterance, it changes its syntactic category to be of the same category of the word it replaces (example 36).

(36) T. /hagahhiz wara?i ʒaʃan asa:fir/

(I'll prepare my papers to travel.)

Act. /hagahhiz safari ʒaʃan asa:fir/

(I'll prepare my travel to travel.)

The verb /?asa:fir/, when anticipated to the place of the noun /wara?/, changes its syntactic category to be a noun /safar/.

(37) T. /taʒa:li niʃrab ha:ga f gara:Z ilbusta:n/

(Let's drink something in *Il-Bustan* garage.)

Act. /taʒa:li niʃrab ha:ga f ʃara:b ilbusta:n/

(Let's drink something in *Il-Bustan* drink.)

In this example, the verb /ni?ʃrab/ shifts position to replace the noun /gara:Z/ and changes its syntactic category to be a noun.

These cases, though almost non-existent in the English data, were recurrent in the syntagmatic lexical errors. They constituted "more cases than are expected in random distribution," to borrow Nooteboom's (1973) expression. If the fact that words interact with words belonging to the same syntactic category is used as evidence of the reality and discreteness of these units, we hold that the behavior of some syntagmatic errors provides further evidence of the reality of these categories, not less strong than the first. A reason for this is that the present data have

proved that units of the same syntactic category substitute one another. Moreover, in syntagmatic interactions, if the two interacting units are of different syntactic classes, the replacing unit changes its syntactic class to suit that of the unit it replaces as if a syntactic slot were assigned to this unit and any unit occupying this slot must be of the same syntactic class.

In addition, speech errors are used to give evidence to the reality of syntactic features. Many error cases can be accounted for in terms of syntactic features. Consider the following example:

(38) T. /?aʕʕud aʕamilha maʕa:k**i**/

(I stay to do it with you.)

Act. /?aʕʕud aʕamilha maʕa:k**um**/

(I stay to do it with (all of) you.)

(39) T. /wihna mawgudi:n/

(And we were there.)

Act. /wihna muʃ mawgudi:n/

(And we were not there.)

In example (38), the syntactic feature [-plural] in /maʕa:ki/ was replaced by [+plural] resulting in /maʕa:kum/. Similarly, in example (39), the syntactic feature [-negative] in /mawgudi:n/ is substituted by [+negative] resulting in /muʃ mawgudi:n/.

3.5 The Reality of the Word

Speech errors are also used to prove the reality of the word as a unit in linguistic performance. There are many error cases which cannot be accounted for unless one realizes the existence of the word as a discrete unit. Speech errors literature abounds in cases involving the movement, substitution, deletion and addition of whole words. Consider the following examples:

(40) T. /kita:b istaʕartu min maktabit iggamʕa/

(A book I borrowed from the university library.)

Act. /kita:b istaʕartu min kita:b iggamʕa/

(A book I borrowed from the university book.)

(41) T. /ga:b gu:n fi ka:s ilʕa:lam/

(He scored a goal in the World Cup.)

Act. /ga:b ka:s fi gu:n ilʕa:lam/

(He scored a cup in the World goal.)

(42) T. /ʔaʕat aʃtaɣal ʔabl mat ʔu:mi/

(I had worked before you rose up.)

Act. /ʔaʕat aʃtaɣal ʔabl matna:mi/

(I had worked before you slept.)

(43) T. /ʕa:jiz anzil asalli iddhr/

(I want to go down to perform the noon prayers.)

Act. /ʕa:jiz anzil iddhr/

(I want to go down noon.)

(44) T. /fi: na:s wa?fa/

(There are people standing.)

Act. /fi: had na:s wa?fa/

(There is someone people standing.)

The previous examples cannot be explained unless one realizes the reality of the word as a unit of performance. Thus, example (40) is considered as an anticipation case in which the word /kita:b/ replaces /maktabit/. Number (41) is an example of exchange error with the two words /gu:n/ and /ka:s/ switching positions. Example (42) is a substitution case in which the word /ti?u:mi/ is substituted by /tina:mi/. Example (43), on the other hand, is a lexical deletion error where the word /?asalli/ is deleted and does not appear in the actual utterance. Finally, example (44) is an addition case with the word /had/ being added to the actual utterance, though it was not originally there in the intended utterance.

It is clear that these previous examples cannot be accounted for unless the reality of the word as a unit of performance is realized. As it is shown above, any attempt to understand and explain the types of speech errors that occur in natural speech (and those elicited in the lab) will not be possible without the basic linguistic units (feature, segment, syllable, stem, affix, word). This necessity of the existence of the various linguistic units to account for speech errors is in itself evidence of the psychological reality of these units. Furthermore, the speech error data, as it was seen, are rich in evidence of the discreteness of these units.

4. Conclusion

Speech errors were studied mainly to shed light into the hidden internal workings of various speech processes. Speech is like a household electrical system, which is composed of some relatively independent circuits. When lamps and sockets are working perfectly, one cannot find out much about these circuits. Yet, if a mouse “gnaws” through a cable in the kitchen and fuses one circuit, then one can immediately discover which sockets are linked together in

normal working conditions. Thus, speech errors (the fused circuits), seen as breakdowns in the language system, are now studied for insights into speech production (Atchison 1989).

Yet, with the advent of the study of speech errors, researchers started to use the results of their studies to validate or refute various hypotheses on language, production, processing and learning. The psychological reality of various linguistic units is one of these issues. This paper is an attempt to use CCA speech error data to achieve this target. In other words, the study aims at proving that the hypothetical abstract linguistic units scattered on various pages of linguistic books are psychologically real units of performance. Using evidence from the corpus of 1102 spontaneous CCA speech errors, the paper addresses three levels of analysis: phonological, syntactic and lexical. On the phonological level, the study shows that segment or phone (consonants and vowels), phonetic features and the syllable are all psychologically real units of performance. It also lends support to the argument that consonant clusters are not "unitary units of performance" but rather sequences of discrete phones or segments. On the syntactic and lexical levels, the study showed that the only way one can account for various speech errors that occur on those two levels is to assume the existence of syntactic features, syntactic categories, the morpheme, and the word as real performance units and not just hypothetical descriptive ones.

Though not the main objective of the study, this paper addressed a point we found controversial; that is, when did research on speech errors begin? We have found out that Anwar's (1979) argument of tracing it to the Arab linguist Al-Kisa'i in the ninth century, which was later adopted by speech error scholars, is an invalid one. What those early Arab grammarians have studied is the wrong usage by non-native speakers of Arabic or speakers of non-standard dialects. What they intended of the word 'errors' differed from the sense the term is used to refer to in modern times, though it may have paved the way for speech error reseach in its modern sense.

Thus, as it was shown above, the paper has proved that speech errors are truly our windows to the human mind (Fromkin 1988), a window that enabled us to prove the reality of long-hypothesized units and one that will continue to give us insights into other hidden internal workings of the brain.

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