The Elsewhere Inflection: Evidence from Nominal Patterns in Modern Standard Arabic

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This paper investigates the architecture of the 'elsewhere' inflection in Modern Standard Arabic (MSA). The data explored is taken from the extended plural inflection as this inflection has the broken plural form as its input though it takes the sound feminine inflection with -aat ending to form the so-called extended plural. The results show that there is evidence that the MSA plural system is a minority default, with regular sound plural applying to fewer extended plural forms than the idiosyncratic broken plural represented in the establishment of the extended plural represented in the lexicon. This conclusion is based upon the defaultness definition which refers to the application of the 'elsewhere rule pattern' on non-canonical forms in an 'openness' mechanism.

Keywords: *elsewhere, defaultness, extended plural, openness, sound feminine plural.*

1. Introduction

Major debate in cognitive morphology addresses the question of how human language users employ limited means to produce effectively unlimited combinations of words and utterances. In order to deal with this question, several more specific questions need to be investigated. One such question is whether the structural properties of regularly and irregularly inflected words correspond to their representational and processing properties. Focusing on the representational format would lead one to tackle the question of whether morphologically complex words are represented as full forms or as decomposed morphemes (Berent 2002; Butterworth 1983; Marslen-Wilson Tyler, Waksler, & Older 1994; Pinker 1991). Focusing on the processing aspect of the equation would lead one to raise the same question from a different standpoint, namely whether morphologically complex words are formed via a symbolic rule-based mechanism operating on grammatical categories or via a memory-based associative network that extracts probabilistic contingencies between them (Marcus 1998; Marslen-Wilson & Tyler 1998; Pinker 1991; Pinker & Prince 1988; Plunkett & Marchman 1993; Rumelhart & McClelland 1986). The acquisition of the English past tense has been extensively studied in an attempt to decide between the different approaches on this problem. The literature on the subject provides at least three different models. The first, and most traditional assumes that the regular past tense in English as in *walk-walked*', is formed by a rule, whereas irregular past tenses like *eat-ate*, *give-gave* are learned by rote (Berko 1958 and MacKay 1978). Because it fails to explain the sub-regularities among the irregular verbs and the generalization of irregular infection to phonologically similar nonce forms (Bybee & Moder 1983), this view has largely been superseded by a second model which claims that a rule-governed process inflects all the regular forms while an associative memory takes care of all the irregular forms. The associative memory identifies the irregular forms and blocks the default process from applying to them (Yi 2010; Clahsen 1999; Marcus

Brinkemann, Clahsen, Wiese, & Pinker 1995; Pinker 1991; Pinker & Prince 1988; Prasada & Pinker 1993). The third and perhaps most radical model is the connectionist one, which dispenses with rules and assumes that language learning is better accounted for using a single mechanism, namely a network of highly interconnected units (MacWhinney & Leinbach 1991; Rumelhart & McClelland 1986). Both regular and irregular forms are inflected using a pattern associator and no separate default process is assumed to exist to deal with regular or novel forms. On this account, the network's response to a novel form depends on that item's phonological similarity to already experienced patterns (Plunkett & Marchman 1993). Non-connectionist models like the network model (Bybee 1985), or the Analogical Model of Language (Skousen 1989) also account for morphological processing within a single mechanism. In this study, we deal with the symbolic accounts approach to inflectional morphology, and the debate it has sparked with the connectionist as far as the Arabic extended plural system is concerned. Both dual and connectionist models are able to handle an inflectional system like English because of its distributional characteristics. The English system is one in which the 'default' is regular both descriptively and psychologically: descriptively, because the lexicon is positively skewed towards regular forms with 95% of the verbs in the language taking the */-ed/* regular suffix and psychologically because speakers tend to generalize to this pattern as in *fax-faxed*, *xerox-xeroxed* (Marcus et al. 1995 and Ullman 1999). Accordingly, this is a relatively simple situation for a dual-route model, as it would easily deal with the low number of irregulars via associative memory and the rest via a default rule. A connectionist network is expected to account for these defaultness cases. Generally, this connectionist network will store information about all forms and the predominance of regular forms will trigger a regularization process, by virtue of the fact that any novel form is more likely to resemble a regular form than an irregular one (Rumelhart & McClelland 1986). Proponents of the dual route model have argued, however, that a dual mechanism can also deal satisfactorily with linguistic systems where the default is a minority as is the case of the German participle /-t/ and the plural /-s/ (Marcus et al. 1995). This is because rule-like behavior need not be dependent on the default pattern applying to a majority of the forms in the language. Rather, a default can be defined even in terms of the least frequent patterns, because this process merely depends on applying the same procedure to different items bearing the same symbol 'Verb' (Clahsen 1999; Marcus et al. 1995). Conversely, a connectionist network was predicted to be unable to simulate people's regularization of novel forms in languages which have a minority-default. Along with the German inflectional system, the Arabic plural is the most widely cited example of a minority default system (Hare, Elman & Daugherty 1995; McCarthy & Prince 1990; Pinker & Prince, 1994; Ravid & Farah 1999). One of our aims in the present study is to provide evidence that Arabic has a minority default plural system and to show that it presents a productive plural system resulting from what to be called the 'Extended Plural' for what is traditionally called 'the plural of the plural' (Wright 1967). We will begin by examining the morphological system of plurals in MSA and argue that this system exhibits a minority-default, using linguistic analyses of data for plural forms taken from different resources. All these sources of evidence converge on the idea that the Arabic plural system has a minority default of the type learnable by a dual mechanism model and this default is represented through the discussion of the "extended Plural" mechanism. We conclude by showing why minority default systems –Arabic and English- seem to be cross linguistically accounted for.

2. Modern Standard Arabic Plural (MSA)

MSA displays two gender classes: feminine and masculine. The sound feminine plural is formed by attaching the suffix -aat to the end of some non-human masculine singular nouns, (e.g. *maṯaar / maṯaar-aat* 'an airport/airports') or feminine singular (human and non-human) nouns ending with the feminine marker -a- (e,g *sayaar.a / sayaar-aat* 'a car/cars'. This form of the plural is productive, i.e., it has broad application over different kinds of nouns regardless of their gender (masculine/ feminine) or category (human /non-human) in the singular form. To form the sound masculine plural, the suffix -iin is attached to the end of the singular human masculine accusative noun, (e.g. *muhanids / muhandis-iin* 'an engineer/engineers-acc.') and the suffix -uun (e.g. *muhanids / muhandisuun* 'an engineer/engineers-nom') to the singular human masculine nominative noun. MSA also has the so-called 'broken plural' forms, which are highly similar to the broken plurals in other dialects of Arabic (Radcliffe 1998 and Ryding 2005). This kind of plural is formed through a non-linear pattern shift referred to as the 'broken plural' in which the consonantal root is retained as the singular form but vowels are changed nonlinearly between the consonants in accordance with a strict template (El-Yasin 1985). For example, the singular *kursi* 'a seat' of the root *krs* has the iambic plural pattern *karaasi* 'seats' CVCVVCV. MSA can consist of four shape-defined prosodic categories: the *Iambic Patterns* CVCVV; the *Trochaic patterns* CVCVC *Monosyllabic* plural patterns. Finally, MSA contains collectives. Collectives form a separate morphological category used to refer to uncountable entities or to living things like fruit, animals, etc. In MSA, the collective plural form seems to be used less with the plural replacing it in collective contexts and there is a tendency towards the development of the analytic singular/ plural distinction by using free lexemes like one, a piece of, a single item of, a single example of, etc (Suleiman 1986). Another way of forming collectives in MSA is the deletion of the singular feminine marker -a (e.g.*samaka / samak* 'one fish/ fish').

3. Derived Forms: Extended Plurals

The category of derived nouns - derivatives or participles - is formed from other words by rules of morphological derivation. For instance, the existence of a verbal noun presupposes the existence of a verb from which it is derived. Extended Plurals in MSA are formed through pluralizing the plural forms in a way that the singular noun like *radʒul* 'a man' has the plural form *ridʒaal* 'men' and the plural form *ridʒaal* 'men' can be further pluralized to show more multiplicity in the so-called Extended Plural pattern to have *ridʒaal-aat* 'men'. So we have the following sequence of pluralization process *radʒul-ridʒaal-ridʒaalaat* 'man/men/men'. Derived nouns, i.e, the extended plural in MSA have the property of having a default inflection when pluralized. According to data to be displayed below, our assumption is that these derived forms take the sound feminine plural (-*aat*) due to the fact that these forms – when derived- have no canonical root; hence they have no access to the grammar of MSA and thus fall into the '*elsewhere*' category.

4. The Elsewhere Accounts

Evidence of regular inflection as a default can be captured with the inflection which is assigned to borrowings, names, and denominals in English and Hebrew; all of which fail to trigger default irregular patterns as a stored association, because these 'elsewhere' forms lack a canonical root which to be explained later in this paper (Berent 1999, Kim et al 1991, 1994 and Marcus et al 1995). These words can be classified as forms that are outside the system of the canonical roots. They can be like onomatopoeic words which are conceived of not as standard –format arbitrary phonological objects but as forms of sounds in the world, they refer to (Pinker and Prince 1988).

Similar to the borrowings, names and denominals, the Extended Plural forms in MSA are assigned the regular inflection as presented in the data shown below (Suleiman 1985; El-Yasin 1985; Boudella and Gaskell 2002; Wright 1967 and 1995; and Levi 1971).

Singular	Plural	Extended Plural	Gloss
bait	buyuut	buyuut-aat	" a house/houses"
radʒul	ridʒaal	ridʒaal-aat	" a man/men".
dʒamal	dʒimaal	dʒimaal-aat	"a camel/camels"
Saħiba	Sawaaħib	Sawaaħib-aat	"a friend/friends/
ħadiidah	ħadaa?id	ħadiid-aat	" a piece of metal/pieces of metal"
mawlah	mawaali	mawaaliy-aat	"servant/servants"
ʕain	?aʕyun	?aʕyun-aat	" an eye/eyes"
dʒazuur	dʒuzur	dʒuzuur-aat	" a baby camel/baby camels"
t̪ariiq	t̪uruq	t̪uruq	" a way/ways"
daar	duur	duur-aat	" a house/houses"
ʕaa?iθ	ʕuuθ	ʕuuθ-aat	" a help seeker/help seekers"
ħimaar	ħumur	ħumur-aat	" a donkey/donkeys/
ðiraaʕ	?aðruʕ	?aðruʕ-aat	"an arm/arms"

Table 1 *Extended Plural with the -aat*

The plural forms are derived from roots of different categories which are incapable of bearing the inflectional marker. The Extended Plural forms in the data are plural nouns that are recognized by speakers to be based on a different entry which is the already existing form with a different canonical root. Thus extended plurals, hence, have regular default plural forms, even when homophonous with an irregular noun, as in tˤariiq/tˤuruq/tˤuruq-aat 'a way/ways/ ways'. The explanation is that a plural form like tˤuruq 'ways' cannot have an

irregular plural associated with it because the notion of the 'plural form' makes no sense for a noun and thus cannot have a canonical root. Accordingly, the regular form, being the default, is available to derive such non-canonical root forms, hence tˤuruq/tˤuruq-aat making the extended plural. Similarly, nouns, in English for example, can take the regular suffix whenever they are derived from other grammatical categories (e.g. *ifs, ands, buts*) even when there is a competing irregular sound pattern. Thus, nouns derived from other nouns, the extended plural forms in our case, are exocentric and thus form regular plurals, even if homophonous with, and ultimately derived, from that noun. For example, the word *ridʒaal* 'men' is homophonous with the word *kitaab* 'a book' yet both take different plural forms while *'ridʒaal'* has the extended plural form *ridʒaal-aat* with the default marker *-aat* the word *'kitaab'* takes the irregular form *kutub*. This assumption is supported by Kiparsky (1982:144-146) and Kim et al. (1991:101-102), for more examples, documentation of sources, and experimental data showing that college students, non-college adults, and 4-to-8-year old children reliably regularize denominal verbs. This hypothesis can be accounted for through the canonical root evidence. In other words, the word *ridʒaal* is said to exist outside the system of canonical roots.

Based upon the discussion related to the mechanism forming the Extended Plural form in MSA and how it is relevant to the notion 'defaultness' above, it is necessary to maintain that the symbolic mechanism account confounded the notion of 'regularity' with the notion of 'defaultness'. In other words, the regular inflection is viewed as the default as it applies to any target that fails to activate stored associations by the 'elsewhere condition' which can be defined as the application of a general linguistic process upon the failure to trigger a more specific process (Kiparsky 1973). The notion of confounded 'regularity' and 'defaultness' is replicated by Clahsen (1992: 251-252) and Clahsen & Neubauer (2010: 262) in the proposal that 'regular' and 'default' inflections could be the same based upon Kiparsky's level–ordered phonology. Clahsen (1992: 252-255) also found that the German regular affixes (like-*s* and -*n*), which were overregularized by children, are omitted within compounds. In compounds, the regular inflection occurs after the irregular inflection. Moreover, Pinker (1999: 77) and Huang & Pinker (2010: 119) assume that the English plural -*s* is simultaneously the regular form and default.

On the other hand, it is still unclear how the definitions of 'defaultness' provided by the dual mechanism approach can explain the status of the sound masculine plural (Noun (sing.) + -*iin*) as 'regular' but not 'default' because these accounts make no distinction between the 'regular' and the 'default' forms. This correlation of regular and default forms raises a question about the possibility of having non-default regulars crosslinguistically as in the case of MSA. For instance, the notion of having a regular and a default form at the same time may be challenged by the data on MSA which contains 'regular' forms like the trochaic plurals as regular inflections but not as defaults.

5. Canonical Root Account

According to the data provided in table (1), the emergence of the default inflection for the extended plural forms is marked with the suffix -*aat*. This default representation is accounted for in terms of the notion of the canonical root. Canonical root can be indispensible in the generality of the default inflection to words that have no access to the memory such as borrowings, denominals, names, diminutives, etc. So, the default inflection is assigned to diminutives which fail to trigger stored associations due to their lack of the canonical root. A

canonical root has the implication that words cannot be represented in the mental lexicon as random collections of information, one of the prominent features of the 'canonical root' is that it has a representation format for these words. The phonological representation must conform to a canonical template for words in the language (McCarthy and Prince: 1990). In MSA, for example, canonical roots are marked by their inflection in the plural. For instance, the majority of two-syllable words ending with the feminine marker *-a* take the sound feminine plural-e.g. *madʒalla>madʒall-aat* 'a magazine/magazines'). There are many examples of such words which take a broken plural, including *madrasa>madaaris* 'school/schools' ,*maktaba>makaatib* (alongside *maktab-aat*). On the other hand, MSA presents instances of noncanonical root words like the extended plural forms as in *ʕain/ʔaʕyun* (nonregular plural)/*ʔaʕyun-aat* (an eye/eyes/eyes-an extended plural form).

6. General Discussion

The issues raised in this research are how defaultness can be represented and in what domains this defaultness can be analyzed cross-linguistically, i.e., Modern Standard Arabic. To manipulate these inquiries, the issue of how the Extended Plural formation has been investigated. In the sections that follow, we will summarize the main conclusions of this study. Then I will show how the present work fits within future research by exploring some problematic areas.

This paper provides accounts on the distinction between symbolic and connectionist accounts of generalization and how these embody different approaches to human cognition. However, we provided evidence that the MSA plural system is a minority default, with regular sound plural applying to fewer extended plural forms than the idiosyncratic broken plural represented in the establishment of the extended plural represented in the lexicon.

This research offers the so-called morpho-semantic arbitrariness. While the extension of the plural form is expected to add multiplicity to the lexical form bearing the number mentioned, we actually notice that the extended plural number is not generally intended for multiplicity; rather it indicates less multiplicity. So for example, the extended plural form *buyuu-taat* 'houses' indicates a fewer number of houses than the non extended-i.e. the broken plural form *buyuut* 'houses'.

One of the most critical challenges that this research puts forth is the Openness/ Productivity dichotomy. While openness is related to the ability of the inflectional system to be extendible to accept new forms in the grammar of a language system, 'productivity', the other hand - has a tight relation with type frequency, i.e. productive forms usually have high frequency across the language. Openness, on the other hand, refers to the extendibility of a process to accept forms from outside the phonological space of the grammar system. As presented in MSA, the definition of 'openness' can predict how the sound feminine plural is able to accept new forms in the grammar The notion of 'openness', thus, is shown to explain why minority default languages, like German and MSA of course, would take that 'minor default' despite the fact that this form has low type frequency-productivity. So, it would be reasonable for us to view the influence of 'openness' in any language as a component in the morphological module in the grammar without being confined to the specific features of any language like productivity which is not expected to explain the occurrence of the default inflection. Thus Openness is indispensable for the establishment of defaultness and 'openness' is dissimilar to 'productivity' which is of a peripheral role in the establishment of 'defaultness' in the inflectional morphology in particular.

The architecture of defaultness in MSA was shown to have a more crosslinguistic dimension than a theory internal one. This conclusion is based upon the defaultness definition which refers to the application of the 'elsewhere rule pattern' on non-canonical forms in an 'openness' mechanism.

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