

On a Notion of Markedness in Linguistic Systems:
Application to Aphasia

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The purpose of this paper is to propose and to illustrate the applicability of the linguistic concept of markedness to the study and analysis of aphasic language. Within current descriptive linguistics it has been argued (Greenberg, 1966) that the notion of markedness possesses a high degree of generality and is applicable to all levels of linguistic analysis, namely phonology, morphology, syntax and lexicon. We believe that it is appropriate to investigate whether markedness, as a general organizing principle, can be extended to the description of aphasic language. Further, just as markedness has been proposed as an explanatory principle underlying normal language organization (Schane 1973), we suggest that it can also have explanatory force in the analysis of aphasic deficits in terms of what persists and what is susceptible to loss in aphasia. Moreover, since markedness has been exploited in the study of language universals and language acquisition, it should provide a means of comparison of data among normals, aphasics and children.

As the first step we will give some criteria of the concept of markedness which we adopt in this paper. Among related categories which differ in markedness, we define the unmarked member as compared to the marked member as:

1. conceptually and/or formally simpler, and therefore more natural
2. usually statistically more frequent
3. usually acquired earlier in the process of language development

In the remaining part of the paper, we will try to define and describe the notion of markedness using evidence from aphasic language at various levels of structure in languages representing different

structural features. We will present evidence that the aphasic dissolution of language could be characterized by a tendency for the marked structures to be impaired in contrast to the relative preservation of the unmarked structures.

We will be considering the following manifestations of language disruption: substitutions, losses (of segments, morphemes, structures), inter- and intra-class confusion and abnormal distribution of linguistic units at various levels.

MARKEDNESS IN THE PHONOLOGICAL SYSTEM

We begin with considerations from phonology. We will consider several classes of phonological oppositions with a view to establishing the markedness value of the members of each pair. In each case we present evidence from both normal and pathological language. Evidence from normal language will consist, where available, of data from perceptual studies, from experimental studies of speech production, from language acquisition, from the frequency distributions of segments in the word's languages, and from generalizations about implicational universals. Evidence from pathological language will be taken from published studies of aphasic patients' performance in a variety of tasks and experiments.

We consider first four pairs of oppositions in the class of consonants.

1. Voiceless vs. Voiced

Evidence from normal language suggests that members of the class of stop consonants are most naturally unvoiced. That is, voicing need not be specified since these segments are ordinarily redundantly assigned [-voice]. Berlin et al (1973) report perceptual data from dichotic listening tests in which English CV sequences with voiceless consonants were perceived more accurately than those with voiced consonants. It is now well known that in normal, right-handed subjects there is a right ear advantage for linguistic material. In the Berlin experiment, this right ear advantage was more pronounced with voiceless CV sequences than with voiced, suggesting that the former type conforms more to a criterion of naturalness. Experimental phonetics suggests that more effort is required in the production of voiced consonants. J. Ohla's study, cited by Fromkin, 1970, of the action of the laryngeal muscles by means of electromyography reveals the additional action of the muscles required to sustain the voicing of oral obstruents. In a language acquisition study by Preston, Yeni-Komshian, and Stark (1968), a voicing lag ranging from 0 to 30 msec occurred during the production of 75% of the stops in the production of initial stop consonants of both English and Arab children. This suggests greater difficulty in learning to encode these consonants.

Let us now cite some of the evidence from aphasic language that voicedness is a marked feature in the class of consonants. Here we are simply trying to point out the consistency of aphasic data with observations made independently about normal language. Both phoneme substitution errors and phonetic errors will be taken as supportive data.

Shankweiler and Harris (1966) and Trost and Canter (1974) report frequent occurrence of errors of voicing in the study of phonetic disintegration. Another study of phonetic disruption was that of Zarebina (1973) in which out of 120 Polish aphasics 21 displayed intermediate voiced-voiceless articulation of the voiced consonants. Ombredame (1933) reports instances of voiced consonant phonemes replaced by their voiceless counterparts by French aphasics. Jargon aphasia in French (Lecours and Lhermitte, 1969) and in English (Green, 1969) shows phonemic transformations involving replacement of voiced by voiceless consonants. Blumstein's 1973 study of spontaneous speech of 17 Broca, conduction and Wernicke aphasics showed a tendency for voicing errors in stops toward the voiceless member of the pair.

2. Liquids vs. Nonliquids

Liquids (/l/, /r/; non-consonantal /w/) are articulatorily complex, requiring simultaneous opening and closure at different points in the oral cavity. They are obstruents in that they involve oral friction or partial closure, but are like vowels in their resonant quality. They can thus be considered highly marked with respect to the major class features [consonantal] and [vocalic], since [+cons] 'naturally' implies [-voc].

There are various manifestations of this complexity in normal language. Liquids are unknown to many languages of the world, e.g. some American Indian languages (Jakobson, 1968). Many languages, for instance Japanese, have only one member in the liquid class which has a wide range of free variation at phonetic level. Dialect studies report that reduction of /l/ and /r/ is a wide spread occurrence in New York City lower income dialects (Labov, Cohen, and Robins, 1968).

Studies in language acquisition report late emergence of /r/ and of the distinction of the liquids /r/ and /l/ in English (Menyuk, 1971; Salus and Salus, 1974), in Czech (Hlavacek, 1931; Kutvirtova, 1930), and in German (Froschels, 1918), in Latvian (Ruke-Dravina, 1975), and in Polish (Kaczmarek, 1953).

Turning to aphasic language, we can distinguish two types of abnormalities in the production of liquids. One type is exemplified by the phonetic change of trilled [r] into flap [r] in Polish aphasics (Zarebina, 1973; Mierzejewska, 1971), while another type is the replacement of the phoneme /r/ by /w/ and /l/ reported in the same study. Other examples of phoneme substitution are the mutual replacement of /l/ and /r/ in Czech (Hlavacek, 1931; Kutvirtova, 1930) and in German (Froschels, 1918). Some longitudinal studies show the late reemergence of /r/ in the recovery process in aphasia (e.g. Jakobson, 1966). Lastly we note the abnormal frequency of /r/ in spontaneous speech of aphasics compared to normals in Blumstein's data cited previously.

3. Back vs. Front Consonants

When we speak of the 'back-front' opposition here we are contrasting back with anterior consonants (apico-dental to palatal) rather than with labial or labio-dental. Backness appears to be a marked value for

consonants. In the languages of the world, many more subclassifications occur within the class of anterior consonants than back consonants. Velars and uvulars are among the latest phonemes acquired by children. Meumann, 1903, reports in his study of regressive assimilation in the language of German children that velars are commonly replaced by dentals; this suggests that backness is a 'vulnerable' feature in assimilatory processes.

Singh and Frank's 1972 study of data from children with consonant articulation problems but with normal hearing and organic structure showed a pattern of substitution in which the preferred substitute was the nearest fronted consonant.

In aphasic language, Jakobson (1966) reports that forward articulated consonants are more resistant to aphasic loss than palato-velar sounds. Substitution of back consonants by front is reported in Polish aphasics (Zarebina, 1973; Mierzejewska, 1971). However, it should be pointed out that the study of Shankweiler and Harris (1966) of 5 English speaking aphasics did not find that tendency.

4. Affricates vs. Fricatives and Stops

Affricates appear to be a highly marked class of consonants by several criteria. In the languages of the world, the presence of affricates implies the presence of fricatives (which in turn implies the presence of stops). Further, the implication generally is of the presence of homorganic fricatives. Affricates rarely form a neutral class, that is, affrication rarely cuts across other classes. Distinctions within affricates are usually made using major class-distinguishing features, e.g. voicing. Studies in language acquisition reveal that before the child acquires affricates he substitutes stops or fricatives for them (Jakobson, 1966; Burling, 1959). Frequency studies of spoken English show that affricates /c, j, z/ are the least frequent (see Blumstein, 1973, for a frequency ranking).

In aphasic language, frequent misarticulation of affricates and fricatives is reported in English in various studies (Shankweiler and Harris, 1966; Trost and Canter, 1974). Substitution of fricatives and affricates by stops is reported in Polish aphasics (Zarebina, 1973; Mierzejewska, 1971).

5. Nasal vs. Oral Vowels

We now examine one pair of oppositions in the class of vowels, that of nasal vs. oral.

By the criterion of physical complexity, nasal vowels are highly marked by virtue of the double opening of oral and nasal cavities, giving them an 'extra-buccal' component.

Typically, fewer distinctions are made within the class of nasal vowels than of oral vowels as exemplified by French, Polish, and Portuguese. Thus nasality is probably low in the feature hierarchy, and thus would be considered more marked abstractly as well. Further, if the analysis by most generative phonologists of nasal vowel into vowel + nasal consonant is correct, nasal vowels should be considered more complex by virtue of their 'fused' character.

Among the world's languages, the geographical distribution of nasal vowels is relatively limited (Isacenko, 1937).

Studies of language acquisition show late emergence of nasal vowels in French children (Gregoire, 1933) and in Polish children (Kaczmarek, 1953).

In aphasic language, nasal vowels disappear earliest in French aphasics as reported by Ombredane (1926).

In Polish aphasics nasal vowels are usually replaced by their oral counterparts, e.g. $\text{ɛ̃} \rightarrow \text{e}$, $\text{ɔ̃} \rightarrow \text{o}$, or by sequence of oral vowel and nasal consonant /n/, e.g. $\text{ɛ̃} \rightarrow \text{en}$, $\text{ɔ̃} \rightarrow \text{on}$ (zarebina, 1973; Mierzejewska, 1971).

Pertinent here also is Blumstein's discussion (1973) of the (inconsistent) manifestation of phonetically nasalized vowels as sequences of vowel + nasal in data from a group of 17 aphasics.

MARKEDNESS IN GRAMMATICAL SYSTEM AND LEXICON

Now we will discuss grammar and lexicon, the remaining levels of linguistic structure, in a single section. We will again present evidence from normal and pathological language. The data from normal language falls into two categories; one bears on characteristics inherent in language structure, while the other is related to behavioral characteristics of performance.

Let us review some points relevant to establishing markedness value in grammar.

In morphology, in general, any addition of affix (inflectional or derivational) produces a more complex form both phonologically and morphologically and this is usually the marked form (Schane, 1970).

Corresponding to phonological neutralization is the phenomenon of syncretization where the distinctions existing in the marked member are often neutralized in the marked categories (Jakobson, 1968): for example, French, Russian gender in the plural in adjectives and verbs in Russian.

The marked member is lower in frequency in the languages of the world than the unmarked member (Greenberg, 1966).

Language development studies indicate later acquisition of forms morphologically more complex. Pertinent data include the following:

a. Plural as opposed to singular, oblique cases as opposed to non-oblique case in English (Jakobson, 1968; McNeill, 1970; Menyuk, 1971), in Finnish (Argoff, forthcoming), in Latvian (Ruke-Dravina, 1959), in Russian (Gvozdev, 1949), and in Luo (Imedadze, 1960).

b. Comparative superlative as opposed to positive adjective. Only one out of 80 first grade children produced superlative form (Berko, 1958).

c. Diminutive/nondiminutive. No child in the group of first graders used diminutive suffix (Berko, 1958).

d. Present verb form vs. past. Better performance on present (Berko, 1958).

In syntax, the unmarked order SOV and the SVO in Russian was observed in the second year (Slobin, 1966). In Hebrew where order of clause elements is relatively flexible since it is an inflectional language, the unmarked order of SOV is used at first by children (Bar-Adon, 1971).

Donaldson and Wales (1968) and Donaldson and Balfour's (1968) reports of children's acquisition of such relational and antonymous terms as less and more, same and different, and large and small indicate that more, same and large, since they appear earlier, are the unmarked forms.

In word association studies of positive/comparative/superlative degree manifestation of the marked-unmarked hierarchy is shown, where the unmarked category appears in responses to both marked and unmarked stimulus while marked category response was not elicited with the unmarked category used as a stimulus (Jones and Fillenbaum, 1964). For example, a stimulus such as hotter would more often elicit a response like warm rather than warmer or warmest.

Recall studies (Fillenbaum, 1973) show that since the marked form is always more complex by at least one additional feature, the memory processes are such that this additional feature may be lost independently, with the result that at recall there is a systematic drift toward the simpler, unmarked form. Thus, progressives may be recalled as non-progressives, and perfect verbs as nonperfect, which suggests either syntactic or semantic simplification.

We will now give evidence from aphasic language for the applicability of markedness to morphology. We will report on six pairs of morphological oppositions.

1. Singular vs. Plural. Most of the nouns in the aphasic speech are in singular. Frequent substitutions of plural by singular are reported for Polish, thus indicating the markedness of plural (Maruszewski, 1966; Zarebina, 1973).

The same tendency is reported in English aphasics (Goodglass, 1968).

2. Nonoblique Case vs. Oblique Case. In Polish substitution of the marked oblique case by the unmarked nonoblique (nominative) case is reported (Maruszewski, 1966; Zarebina, 1973).

In English the loss of oblique is manifested by omission of prepositions marking the cases such as of (possessive) to (dative) with (instrumental) in production of language (Goodglass, 1968).

3. Masculine Gender vs. Feminine Gender. Feminine is replaced by masculine in the pronoun system and in the inflectional markings on verbs and adjectives (Maruszewski, 1966; Zarebina, 1973).

In English frequent substitutions of she by he have been reported (Goodglass, 1968).

4. Present vs. Nonpresent Tense. In Polish most of the verbs occur in present in the third person singular which is the unmarked form.

In English the occurrence of the marked verb form without any ending or only with the ending -ing is reported by Goodglass (1968), Myerson and Goodglass (1972), and de Villiers (1974). In his recent article Schnitzer (1974) reports that one of his subjects omitted the verb be functioning either as a copula or auxiliary only when completely unmarked, that is, when it had present time reference as opposed to past.

5. Positive vs. Comparative and Superlative Degree. Maruszewski and Zarebina report frequent loss of the marked forms of comparative or

In English the same phenomenon is reported by Goodglass (1968) and Myerson and Goodglass (1972).

6. Neutral vs. Diminutive and Augmentative. In Polish only in certain posterior lesions a tendency to produce the marked member, the diminutive or the augmentative is reported. Some of the instances can be regarded as pseudo-diminutives and pseudo-augmentatives since they are formed from the words which do not normally have diminutives, e.g. place names. Note that the same phenomenon was reported in certain cases of jargon aphasia in English (Ulatowska and Richardson, 1974) when the ending -ie is added. However, in other types of aphasia both in Polish and English diminutives are rare.

We may note that the last two oppositions are instances of implicational rules.

We will briefly illustrate some notions of markedness in syntax using examples of oppositions in word classes and order classes.

1. Markedness in function words

a. Definite vs. Indefinite Article. In English the definite article, being the unmarked member, is more resistant to damage than the indefinite (Myerson and Goodglass, 1972).

b. And vs. But. Conjunction and being the unmarked member is more often preserved than but (Myerson and Goodglass, 1972). This too is an instance of an implicational rule.

2. Markedness in word order

a. Basic Word Order vs. Other Variants. While the languages of the world display a great variety in the permitted order of syntactic elements, most languages have a preferred or neutral word order. In Polish the unmarked SVO sentence type is the more resistant to damage. However, SOV has also been reported especially in a stage of recovery. Interestingly enough the latter phenomenon was observed also in English (Ulatowska and Richardson, 1974; Myerson and Goodglass, 1972; and Ulatowska and Baker, in press).

b. Statement vs. Question. Poor performance on the marked question-type sentences reported in sentence construction test (von Stockert, 1972; Ulatowska and Baker, in press) and by other studies of language production (Goodglass, 1968).

c. Initial and Final Adverbs vs. Verb Embedded Adverb. Both in Polish and English the unmarked initial or final position of adverbs as opposed to verb embedded was reported as the most common in spontaneous speech (Zarebina, 1973; Myerson and Goodglass, 1972).

We will conclude with some illustrations from the lexical level of language structure. The aphasic impairment of the marked category in the lexicon can be illustrated by the following pairs of features:

Concrete/Abstract

Poor relative performance on reading tasks of abstract terms was reported in English (Marshall, et al, 1971; Kehoe and Whitaker, 1973), in German (Weigl and Bierwisch, 1970) and in Polish (Zarebina, 1973). Note, however, that the markedness of abstract terms results not only from the conceptual complexity but also morphological since in the three languages mentioned above abstract terms have either prefixes or suffixes.

Universal Verb/Specific Verb

Tendency to substitute the marked specific verb by unmarked universal verb such as have or do has been reported in Polish (Zarebina, 1973), and in English (Goodglass, 1968; Whitaker, 1971).

Polarity Adjectives

The markedness of polar adjectives such as big, small; wide, narrow; where the first member of the pair is the marked one, was reported to be preserved on a reading task (Marshall, et al, 1971). Substitution of the marked member by the unmarked was reported in some aphasics in Polish (Zarebina, 1973).

CONCLUSION

Having illustrated some of the phenomena which can be explained as loss of the marked member of a set, we would like to emphasize the relation of the approach to other current work in both theoretical linguistics and in experimental language studies including neuro- and psycholinguistics, in particular the connection with work on language acquisition and language universals. Recent years have witnessed a great expansion of activity in the collection of experimental and descriptive data from many different languages. Evidence has accumulated to justify the assumption that beneath the surface diversity of languages, there are structural similarities which follow from biologically and neurologically based constraints on what form a language can have. This universally shared basis of language should also find verification in the data of language dissolution. We posit that the concept of markedness provides a framework for formulating the processes of language disruption in universal terms.

Specifically, we would like to propose that markedness be used to guide the design of evaluative tests of linguistic abilities of the brain-damaged. Such tests should be not merely inventories of linguistic units but should test for integrity of classes of oppositions of the type we have outlined. We expect that such tests will lead to a finer discrimination of the deficits involved and ultimately in a finer definition of the underlying mechanisms of aphasic impairment.

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