

The Phonological Behavior of Prefixes

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Abstract: This paper investigates the linguistic features of English phonological prefixes from the view point of phonology. It is worth saying that phonological prefixes in English language are very importance to analyze other linguistic properties. Generally speaking, phonology is the basic branch in linguistics; a single prefix can change the change and meaning of a word. Based on the descriptions of other articles, this paper looks at what prefixes mean in terms of the pronunciation of English words, outline some of the morphological aspects of prefixed words.

Keywords: Phonological, Prefixes, Morphology, Syllabification.

Date of Submission: 11-03-2019

Date of acceptance: 28-03-2019

I. INTRODUCTION

The phonological behavior of English prefixes is fraught with difficulty – mostly because there is a paucity of published material available which examines in any detail the manner in which prefixes impact phonology. Despite that, this paper will argue that prefixes have a critical role to play in the phonological behavior of the English language – and in morphology as well. To start the discussion off, the next several pages will provide a context for investigating the phonology of English prefixes by offering up an overview of the morphology of English words and the syllabification of those words – both those with, and those without, prefixes. From there (chiefly because the study of pronunciation is so critical to phonological inquiry), the paper will look at what prefixes mean in terms of the pronunciation of English words, outline some of the morphological aspects of prefixed words (a section on the 2002 work of Alissa Melinger will be placed here in so far as it could not easily be incorporated into the initial section on morphology) and take a look at phonological transparency and at the phonological characteristics of derivational prefixes. Finally, because phonology is (as much as anything) the study of sound and of sound patterns as they occur within a language, the paper will finish up by examining research which investigates how prefixed words are processed cognitively (do we have an actual phonological ‘store’ upon which we draw when processing language?) and how auditory processing unfolds within the human mind. In the end, the phonological behavior of prefixes does play a role in how human beings process, and make use of, the English language.

Before going too far, this paper will examine syllabification within the English language in as much as it serves as a useful entrée into the topic of morphology. Understanding morphology, for its part, is crucial to really grasping English prefixes and their phonological behavior. Put another way, prefixes, roots and suffixes are really only understood when one understands the structure and content of English word forms; prefixes, after all, give meanings to words and native speakers – because of their tacit knowledge of word-formation within the language – are able to divine these meanings and grasp the ways in which the smaller units within a word interact to give meaning. Thus, if you wish to have a firm handle on the topic of prefixes and their phonological implications for the English language, studying the enveloping morphological and syllabic context is vital. In polysyllabic words, syllabification occurs in accordance with the Sonority Sequencing Generalization described by Selkirk (1982). Under the so-called SSG, sonority in on-sets increases while sonority in rhymes decreases from left to right. At the same time, the Maximal Onset Principle also comes into play in the sense that single consonants as well as consonant sequences form on-sets wherever possible (Giegerich, 1999). Under the Law of Initials (for a good discussion of LOI, please see Vennemann, 1972), “only such consonant sequences can form morpheme-medial on-sets as can also form morpheme-initial on-sets in the language” (Giegerich, 1999, p.237). Heinz Giegerich proceeds to offer his readers a look at some instances wherein SSG, MOP, and LOI are at work.

To start with, on page 237 of his text, Giegerich (1999) offers up a list of eight words that capture the syllabification of polysyllabic words shaped morphologically by SSG, MOP, and LOI. Words like “aroma,” “matron,” “discipline,” and “agenda” are words in which single consonants as well as the consonant sequences form on-sets because of the Maximal Onset Principle. That said, Giegerich (1999) reports that the (nd) consonant sequence in the word “agenda” is barred from becoming an on-set because of Sonority Sequencing Generalization. The example of the word “agenda” is quite interesting: is Giegerich (1999) suggesting that SSG

can take precedence over MOP in instances where single consonants and consonant sequences are present? The apparent answer is yes – though this is not stated explicitly by Giegerich and should be approached with caution.

Not content simply to outline examples of words that can form word on-sets, Giegerich (1999) examines words wherein the consonant sequences cannot be word on-sets and are barred by the Law of Initials from becoming word-medial on-sets. On page 237 of his text, Giegerich lists the words “pentathlon,” “enigma,” “Edna,” and “atlas”. Giegerich asserts that the syllabifications found in these words (and, presumably, in other words which do not feature on-sets) are supported by stress regularities. What he apparently means by this is that the ‘penultimate syllable’ in a word like ‘pentathlon’ is heavy and stressed while the penultimate syllable in ‘discipline’ is light and unstressed. Giegerich (1999) likewise reports that syllabification in the latter four words are also supported by what he terms ‘allophonic phenomena’; in other words, in the (tl) sequence of ‘atlas,’ the ‘t’ has glottal reinforcement and the ‘l’ is completely or fully voiced. Giegerich (1999) proceeds onward to write that the (pl) sequence of the word ‘discipline’ has no glottal reinforcement and the ‘l’ tends to ‘devoice’ (for more on what Giegerich apparently means by devoicing, please see Anderson & Jones, 1974). In any case, what it seems that Giegerich (1999) is after, most of all, is to re-affirm the following: SSG, LOI, and MOP are all operative in the English language. What is also clear, though it may seem a small point, is that stress regularities and allophonic phenomena go hand-in-hand with syllabification and syllabification can only be understood within this context.

Having offered a generic introduction into the complex topic of syllabification and morphological structure, the next order of business is to look closely at the relationship between prefixes and syllabification. In addressing this topic, Giegerich (1999) lays out the conventional form of morphological bracketing. Specifically, prefixes are distinguished symbolically from suffixes and roots in a way that highlights the distinctions which exist within morphologically complex forms. The proliferation of brackets, as it turns out, in no way impacts syllabification – but bracketing does give a student the opportunity to see clearly how syllables are not formed across the morphological bracket (Giegerich, 1999). In any event, it is appropriate to look closely at some common English words that appear to feature a morphological boundary (bracket) separating prefixes from the root of the word because they reveal some striking things about how prefixes impact (or do not impact) the pronunciation of words.

To begin with, Giegerich writes that words like “re-invest,” “pro-active,” “de-escalate,” “re-produce,” “a-moral,” “be-calm,” “in-eligible,” “mis-inform,” and “un-even” may have a pre-vocalic glottal stop at the morphological boundary when pronunciation is slow; at the same time, words like “re-produce,” “a-moral” and “be-calm” have aspiration. Glancing at words like “sub-lunar,” “dis-proportionate,” and “mis-place,” the consonant sequences straddling the bracket do not form on-set clusters. This is actually rather intriguing insofar as the principles of on-set formation (which have been looked at previously) would permit these words to do so (Giegerich, 1999).

Staying with the role of prefixes in pronunciation, Giegerich (1999) reports that it has been argued that some English words featuring the prefix “in” have a preferred pronunciation featuring onset-(n) before a vowel-initial base. The words listed on page 239 of Giegerich’s text are “inebriation,” “inept,” and “inert” and these simple words are dealt with in some detail by Heinz Giegerich. Particularly, Giegerich (1999) maintains that these words involve bound ‘Cranberry’ bases and, as such, are to be treated as ‘morphologically simple’ and un-bracketed items when being put through the process of syllabification. Giegerich (1999) goes on to write that cases like the three words outlined above do not definitively prove or demonstrate ‘stratum-sensitive’ differences; in his estimation, no on-set formulation takes shape across the bracket or boundary in the lexical phonology (for a closer look at Giegerich’s reasoning, please see pages 239-240 of his text).

The blocking effect of the morphological boundary on syllabification – at least within the English language – is confirmed (at least in Giegerich’s mind) by glancing at compound commonly found in the English language. In words like “zoo animal,” “eye ointment,” “sea elephant,” “shoe shop,” “fee payment,” “tea-cup,” “pop art,” “talk assessment,” and “school inspector,” pre-vocalic glottal stops are possible but not any liaison across the morphological bracket (Giegerich, 1999). One interesting thing about Giegerich’s list of compounds on page 240 of his work is that it bears an eerie resemblance to his aforementioned list of pre-fixed words. Besides the predominance of pre-vocalic glottal stops, words like “shoe shop,” “fee payment,” and “tea-cup” have aspiration; likewise, words like “camp leader,” “bird reserve,” and “off-license” (these words constitute the fourth and final grouping of words Giegerich furnishes on page 240 of his text) have on-sets that are not “maximized” across the bracket even though LOI would seemingly permit it (Giegerich, 1999). When all is said and done, the existence of the morphological bracket has obvious implications for pronunciation in words featuring prefixes attached to roots.

The broad topics of syllabification (and the role prefixes play in syllabification) and morphology lead us evermore deeply into the thicket of complexities that arise when considering how prefixes shape pronunciation. One of the best scholars of recent years when it comes to English linguistics is the Czech academic, Josef Hladky. A number of years ago, Hladky (1987) added his own view on the role of

morphological boundaries vis-à-vis the pronunciation and articulation of English words that feature affixes. Specifically, Hladky (1987) writes that English prefixes ending in an unstressed vowel or in a vowel carrying secondary stress before a syllable that happens to have primary stress are preserved “intact” in pronunciation. Three examples Hladky provides in defense of his work are the words “de-militarize,” “bi-lingual,” and “be-friend”. Ultimately, sharing the general view of Giegerich (1999), Hladky asserts in his 1987 work that the morphological boundary between a prefix and the stem of a word (at least in English) is recognized to “varying degrees”; he also mentions, though, that the boundary is more often observed in word division than in pronunciation. To wit, agreement between word division and syllabification in English pronunciation (where prefixes and stems are involved) is only possible if the prefix ends in an unstressed vowel or if the prefix carries the main stress and is not recognizable as a prefix. Hladky (1987) then goes on to mention that word division and syllabification may not utilize the same boundary if the prefix happens to end in a consonant. When all is said and done, phonology is fundamentally about determining which phonetic sounds in a language are significant (and which ones are not) and explaining how those sounds are interpreted by the native speaker; it is also, more than anything else, the study of the sound patterns of a language. Suffice it to say, by looking at the complex interplay between morphology and prefixes within the context of the English language, an observer can ascertain the rules of English and the sound patterns of English – and pronunciation tells us a great deal about how various sounds are interpreted by speakers of the English language.

The pronunciation of English and what it means for grasping the import of prefixes – and suffixes, too – has been handled competently by other scholars, as well. Richard Wiese, in his 1996 text, *The Phonology of German*, argues that prefixes are words while suffixes usually aren't; as such, they warrant special attention when pondering the ways in which sounds function to make our language what it is. Staying with the theme of “sounds,” Edward G. Fichtner (1976), in a thoughtful study, stresses how the usage of affixes (prefixes) influences the actual pronunciation of a word. Fichtner's work goes onward to write that the phonemes depicted in digraph can be predicted when the structure of the word is considered. Fichtner (1976) also seems to be of the mind that the degree of phoneme-grapheme correspondence in English is more than eighty percent – a figure which gives the lie to notions that the English language is a comparatively unpredictable language where pronunciation is concerned. In any case, Fichtner's 1976 work, while chiefly devoted to elucidating the relationship between phonemes and graphemes within the English language, does a credible job of illustrating how affixes are an important component to the phonological features of a language that is more predictable than commonly supposed.

McMahon (2002) offers her own interpretation of English prefixes that tends to agree with Heinz Giegerich (1999). Like Josef Hladky, her research interest – phonology within the English language – is motivated by a need to understand how prefixes determine the sound patterns of a language that is not always intuitive. After some deliberation, she follows Giegerich's position insofar as she accepts his premise that stems and affixes are lexically stored but that, whereas affixation on Level 2 is achieved by Kiparsky-type rules, on Level 1 it is achieved by listing. Similarly, she accepts his view that roots, prefixes and suffixes are distinguished by bracketing. Her position, which appears to be a fairly conservative one, is that morphological brackets condition – and may even block – phonological rules (McMahon, 2002). The importance of McMahon's 2002 work is that it shows how the morphological bracketing that Giegerich (1999) considers so important (and which was touched upon at some length at the start of this paper) is an integral part of really grasping the phonological influence of English prefixes.

Because it would have interrupted the continuity of the paper if it was included at length earlier, Alissa Melinger's 2001 dissertation on the morphological complexity of English prefixed words has been set aside until now. Be that as it may, Melinger's work is quite compelling in laying out how prefixes shape phonology and morphology. Melinger (2001) begins by noting that there is evidence that bound root words with semantically transparent prefixes produce a different set of results than free stem words with semantically transparent prefixes. Conversely, bound root words and free stem words with what Melinger (2001) describes as “semantically opaque” prefixes were not substantially different from the mono-morphemic control condition. In a related vein that ties in closely with her above-mentioned discussion on the impact of semantically transparent prefixes upon word morphology, Melinger (2001) makes mention of the fact that the semantic transparency of a prefix was a strong cue or predictor of morphological complexity. Not to overlook the phonology of prefixed English words, Melinger (2001) informs her audience that the evidence indicating that the phonological form of the root is a reliable cue for morphological decomposition is weak (Melinger, 2001). While densely-written and occasionally meandering, Melinger's work is good at showing the complexities of English words affixed with prefixes.

If Melinger's 2001 dissertation largely preoccupied itself with the consequences of semantically transparent prefixes on word morphology, then William Marslen-Wilson et al (1994) explore in greater depth the role of prefixes in phonological phenomena – albeit they are much more interested as researchers in securing a keener perception of morphology within the context of the English speaker's mental lexicon. Still, Marslen-

Wilson et al (1994) furnish the careful reader with many interesting bits of information. For one thing, the scholars state that derivational prefixes rarely change the phonological form of their word stems; this stands in direct contrast to various classes of derivational suffixes that *do* trigger morpho-phonemic alternations which affect the stem. To illustrate their point, Marslen-Wilson et al (1994) cite the changes which take place in words like “chaste” and “decide” when derivational suffixes are involved; specifically, these words suddenly metamorphose into “chastity” and “decision” – which are phonologically quite distinct from the original stems. In any case, one of the things Marslen-Wilson, Komisarjevsky-Tyler, Waksler and Older (1994) want to impress upon newcomers to the field of linguistics is that derivational prefixes are chiefly passive things from a phonological perspective.

Phonological transparency, as opposed to Melinger’s (2001) obsession with semantic transparency, is another thing Marslen-Wilson et al (1994) talk about at length. Seeking to add subtlety to the novice’s understanding of prefixes and their phonological properties, the research team takes pains to remind their audience that there are varying degrees of phonological transparency depending on how the stem exists in isolation or in its affixed form. To elaborate, the team of academics juxtaposes cases like “pirate/piracy” against a more phonologically opaque example like “sign/signal”. As Marslen-Wilson (1994) put it, cases like “sign/signal” are phonologically opaque – which seems to be the writer’s way of saying that the latter case features a much more dramatic change in terms of how the stem sounds with its new suffix attached than it does without it.

The phonological behavior of prefixes also raises some interesting points about the manner in which people process morphologically complex words that have prefixes – or even suffixes – as part of their structure. To wit, Philip T. Smith and Christopher M. Sterling (1982) took the time to investigate the performance of various university undergraduates vis-à-vis their judgments concerning the morphemic status of prefixes. Perhaps not surprisingly, the authors found that, when trying to identify the morphemic status of prefixes in poly-morphemic words, undergraduates performance was best if the prefixed word was long, had the form prefix and word, was of low frequency of occurrence, had come into the language relatively recently, and showed little phonological evidence against prefixation. As an addendum, the study also found that the ‘e’s in affixes and in non-affixes (in poly-morphemic words) comprised of the same syllables were missed more often than the ‘e’s in other syllables (Smith & Sterling, 1982). Of the numerous insights the study offers, the most pertinent one for our purposes is the fact that the surveyed young people’s ability to make accurate judgments about the morphemic status of prefixes was greatly enhanced if there was a paucity of phonological evidence against prefixation. In short, it may be said that the phonological behavior of prefixes (the ‘evidence’ they provide about their morphemic status) is critical in whether or not people are able to accurately perceive the morphemic structure of words.

The phonological behavior of morphological units – like prefixes – does not only instruct us as to the proficiency of university undergraduates in identifying morphemic structure: it also can unveil much about the linguistic development of children. For instance, during the first 5-6 years of a child’s life, he or she must acquire phonological knowledge; it is not enough to simply possess semantic knowledge by the initial years of formal education. Indeed, studies dating back to the dawn of the 1970s have shown that most children by the age of two are forming utterances that have an internal structural relationship; research during this epoch also shows that, by the pre-school years, an understanding of how prefixes shape and modify word meanings is taking root (Turton & Clark, 1971). Seen against this backdrop, a good way of assessing a child’s linguistic development is assessing the child’s ability to discern the phonological (and morphological) behavior of such things as prefixes. Undeniably, prefixes are a good tool for seeing if a child can grasp language in context – and can appreciate the dynamism of the English language.

The next order of business is to assess the entire concept of the phonological store – in part because our discussion of the processing of the English language begs the question of how much of what we grasp and recall about words with similar phonological characteristics is rooted in an instinctive phonological ‘store’ that English-speaking individuals have. Dylan M. Jones, William J. Macken and Robert W. Hughes (2006) made some interesting discoveries with regards to this matter when they argued successfully that a perceptual-gestural view explained the survivability of the phonological similarity effect (PSE). To be specific, Jones et al (2006) wanted to know “whether the survival of the phonological similarity effect (PSE) under articulatory suppression for auditory but not visual to-be-serially-recalled lists is a perceptual effect rather than an effect arising from the action of a bespoke phonological store” (abstract). By using a list of five auditory items and a list length that would seem to favor phonological storage, PSE was removed “at recency” by a suffix (in the first experiment the duo conducted) and removed throughout by a suffix combined with a prefix (experiment two). Last of all, in their third experiment, the PSE under suppression was restored by decreasing the acoustic similarity between the prefix-and-suffix and the “to-be-remembered” list. Again, to make a long story short, the authors concluded that a perceptual-gestural explanation for PSE is preferable to a “dedicated-system view of short-term memory” (Jones et al, 2006, abstract). As much as anything else, prefixes - when used in scholarly examinations of the

phonology of language and our human mastery of it – act as a tool for exposing how language is really processed by the human mind.

Staying on the topic of auditory processing, Lee Harold Wurm (1997a) takes the topic in an intellectually exciting new direction. Wurm asks whether or not prefixed words in English are processed just like other words, or whether they are decomposed into constituent morphemes prior to “lexical access”. Put another way, Wurm (1997a) wanted to know whether or not continuous models of auditory word perception took precedence or whether decompositional models of auditory word perception were dominant. Across two experiments, Wurm (1997a) found that full-form UPs predicted human performance vis-à-vis word recognition better than root UPs, thereby indicating that continuous processing models were at work. Not to be passed over in silence, Wurm (1997) also found that “further support for continuous models was provided by various word frequency measures; those corresponding to the full-forms were consistently related to performance (higher frequencies were associated with faster performance), while measures corresponding to roots were not consistently significant” (Wurm, 1997a, abstract). However, Wurm (1997a) also found evidence of decompositional word processing in both experiments. In the end, he proposed that auditory processing of prefixed English words is both continuous and de-compositional. In a follow-up study he completed a matter of months later, Wurm (1997b) suggests that a more precise model for evaluating the human auditory processing of prefixed English words is to have two models at work simultaneously: a whole-word routine and a decompositional routine that considers only un-bound roots that can combine with the prefix under review. In this way, it is surmised, researchers can find out new information – or reinforce old suspicions – about how the minds of English speakers process the sounds of the native tongue.

II. CONCLUSION

This paper has delved into the phonological behavior of English prefixes. In so doing, it has glanced at the morphology of English words, the nature of syllabification in English, and at how prefixes shape the ways in which words (and syllables) are pronounced and how the mind processes and “makes sense” of prefixed words. When everything is glanced at in its entirety, prefixes do more than simply re-mold the manner in which we speak: they re-shape meaning and can be useful tools in assisting individuals as they strive to determine the morphemic structure of words. No less importantly, they can be an entrée into the cognitive development of individuals and an entrée into how language is stored by the mind. While undoubtedly complex, developing a sense for the phonological properties and impacts of prefixes in English can be an excellent means of learning more about the neurological subtleties of the typical English speaker’s mind.

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Salem Ettaher Abu Talag. " The Phonological Behavior of Prefixes." IOSR Journal of Humanities and Social Science (IOSR-JHSS). vol. 24 no. 03, 2019, pp. 35-40.