

**A Corpus Based Measuring of Morphological Productivity of Suffixes
“-able, -less, -ly, and -ment”**Iftikhar Khan¹, Rana Kashif Shakeel² (Corresponding author), Sadia Arshad³**Original Article**

1. PhD Scholar, Department of English, Air University, Islamabad, Pakistan.
Email: iftijadoon574@gmail.com
2. Lecturer in English, Department of Humanities & Linguistics, University of Agriculture, Faisalabad, Pakistan. Email: kashif.shakeel@uaf.edu.pk
3. Lecturer in English, School of Civil & Environmental Engineering, NUST, Islamabad, Pakistan.
Email: sadia.arshad@nice.nust.edu.pk

Abstract

This paper investigates corpus-based morphological productivity measuring of suffixes -able -ment, -less and -ly. Most words are formed by the addition of suffixes and the process is called derivation. In the process of derivation, derivational morphemes are used to form words from the existing words. To measure the morphological productivity of suffixes -able -ment, -less and -ly, a corpus of 30 blogs on the topic of education from The Express Tribune was compiled which composed of 26686 words. All the blogs on the topic of education in The Express Tribune constitute the population of the study. A purposive sampling technique was used for the selection of blogs on the topic of education from The Express Tribune from 2011 to 2019. Raw data (metadata) composed of 30 blogs was cleaned and converted into text files. All text files were uploaded to AntConc for obtaining the required data. To make the analysis process easier, a word list of the self-compiled corpus was searched out on AntConc and pasted it on Excel Sheet. A raw list of words consists of suffixes -able -ment, -less and -ly were obtained separately which was refined by removing undesired words. Finally, the productivity of each suffix was measured by dividing the number of word hapaxes with word token respectively. The findings of the study show that all suffixes are morphological productive. Suffix -able is more productive than the other three suffixes -less, -ly and -ment. Moreover, the findings also show that it can help the teacher to teach English language to the second language learners in a predictable manner.

Keywords: Morphological productivity, Suffix, -ment, -ly, -able, -less

1. Introduction

Morphological productivity refers to the formation of new words through different morphological operations. Schultink (1961) describes that language users coin new words unintentionally and devise new formation which is uncountable in numbers. A few decades back, work on this area was limited and no researcher directs his work on this side. However, different work has been started and various studies have been conducted on morphological productivity so far after significant attention given by research to this area. (Baayen 1992, 1993, 1994, 2003; Bauer 2001; Kastovsky 2005; Plag 1999, 2003, 2006; Štekauer 1998, 2001, 2005a, 2005b, 2006).

Words are derived in different ways and involve various morphological processes. New words are created by the process of suffixation to the existing words and the process is more productive than any other method in the morphological production. The process of suffixation creates words of different grammatical categories such as noun (nominalization), adjective (adjectivization), verb (verbalization) and adverb (adverbilization). The process of suffixation has been used in the evolution of language and also used nowadays in word formation, for instance, an adjective is derived from a verb and would likely to be used in future word formation (ease to easy). The affixes used in the creation of new word formation are called productive affixes (Baayen, 1992).

2. Literature Review

Morphology is one of the prominent branch of linguistics which can be defined as “a minimal unit of meaning or grammatical function” (Yule, 2010, p.67). Morpheme in morphology can act as a unit of meaning or unit of grammatical function. In morphology, the internal structure of words are studied along with rules which form these words (Hu, 2001). Two or more morphemes combine and form a larger unit called word, therefore, morphemes are also called the building block of words. Morphology like other branches of linguistics focuses on one area of language in which it is studied how to form words from the combination of the smaller units (morpheme) into a larger unit. Hence, the study of morphology gives insight into language and language nature in a better way. In addition, the study on morphology helps the learner to learn language through the learning of words. Various researches have been conducted on morphology and never ceased all over the world during the last four centuries owing to the significance of morphology (Lis & Shen, 2012). Research on morphology covers various areas but word formation is more prominent than all other areas. Linguists and researchers have conducted different researches on word formation process particularly how morphemes (affixes) combine and form words by following morphological rules in the English language. Previous studies investigate the most common suffixes like -ness,-ful,-y and -ical/ic in the process of word formation and how productive they are in the creation of new words. This study will focus on -ment,-ly, -less and -able suffixes and will measure the productivity of these suffixes in the process of word-formation.

In morphological productivity derivational morphemes are mostly used in the formation of new words. The process in which new words are formed with the addition of affixation (suffixes) is called derivational process and this process is more productive than any other process. The term affix defined by Hu Zhuanglin as “a collective term for the type of morpheme that can be used only when added to another morpheme (the root or stem)” (Hu, 2001, p. 62). In his other book, ‘An Advance Coursebook’ Hu (2002) defines term affix such a way “affixes are forms that are attached to words or word elements to modify meaning or function” (p.132). In addition to it, Ingo Plag defines the term affix as “the cover term for all bound morphemes that attach to roots” (Plag, 2002, p. 13). Different linguists define the term affix in different ways according to its role in the process of word-formation. Another linguist Andrew Spencer, in his lecture, defines affix “morphophonological element added to the right (suffix) or left (prefix) of a base”. Linguists introduced one more term ‘base’ and defines as “a form to which affixes of any kind can be added” (Hu, 2002, p. 132).

Affixes are used in the process of word formation and their occurrence shows the degree of productivity of a particular affix. The degree of affixes may vary and depend on the genre in which certain affixes occur. The genre includes academic language, written language, formal and informal spoken language, fiction and non-fiction language, editorial language, business language (Plag, Dalton-Puffer & Baayen, 1999). It was observed that some derivational suffixes are more productive in written and academic language than in a spoken language like -ness. For example,-able and -

ness both are derivation suffixes but -ness is used more in written than spoken language whereas -able is used more in spoken than written language. If we check the productivity of both suffixes, we found that -able is more productive than -ness. However, Kastovsky (1986) and Baayen & Neijt (1997) showed in their work that -ness is more productive owing to its usage in the process of nominalization.

Words are formed in different ways and used various elements in the process of word-formation. The most common element in the process of word formation is affixing and among these affixes, some are used commonly whereas others do not. The formation of new words through affixes represents the productivity of that particular affix. Linguists use term productivity for affixes which involve the process of word-formation. Plag (2002) defines productivity as “the property of an affix to be used to coin new complex words” (p. 44). The simplex word and complex word are two-term used mostly in morphology and need to be clarified before move on. The term simplex word refers to the kind of a word that consists of one morpheme and could not be broken into different parts, for instance, put, need, seed, weed whereas the complex word denotes the kind of word that consists of two or more morphemes and could be broken into further part or categories, for instance, beautiful (beauty +ful) management (manage+ment).

Morphological productivity can be synchronic or diachronic. Various work has been done on morphological productivity synchronically. Furthermore, these studies (synchronic) provide help researchers to compare variant researches conducted on morphological productivity of suffixes within a single span of time (Prell, 1991; Habermann, 1994 & Stricker 2000). Both synchronic and diachronic studies of morphological productivity are significant but it could not be decided yet to conduct one study and leave the other. Different researchers tried to combine both synchronic and diachronic features of productivity in single research (Munske, 2002). Bauer (2001) describes in his statement “A second problem for word-formation with the distinction between synchrony and diachrony is that it is frequently the case that a diachronic event is evidence for a synchronic state” (p.27). Productivity can be measured in the best way when a researcher brings into consideration that it is a gradual development process (Cowie & Dalton-Puffer, 2002).

The different researchers proposed various methods to measure the productivity of affixes used in the process of word-formation. Among these researchers, Plag proposed four different methods of productivity measurement. The first one is “the productivity of an affix can be discerned by counting the number of attested different words with that affix at a given point in time” and named the type frequency of an affix (Plag, 2002, p. 52). The second method is the neologism in which productivity of affix is measured at a particular point of time by counting “those derivatives that were newly coined in a given period, the so-called neologisms” (Plag, 2002, p. 52). The other two methods for productivity measurement devised by Plag are directly related to the use of corpora. In the third method, the productivity of affix can be measured by counting the number of types (i.e. the number of different words) with a given affix and their token frequency in a proper corpus (Plag, 2002, p. 53). In the fourth method, some simple calculations are involved in which the productivity of affix can be measured by counting the “ratio of the number of hapaxes with a given affix and the number of all tokens containing that affix”. Hapaxes in the definition refers to “words that occur only once in a given corpus” (Plag, 2002, p. 54). So, the fourth method of productivity measurement shows that the higher the number hapaxes of that particular affix the more productive affix it would be.

3. Research Methodology

Research methodology is defined by Leedy & Ormrod (2001) as “the general approach the researcher takes in carrying out the research project” (p. 14). Quantitative research design was used for conducting the study. Creswell (2002) describes that quantitative research is the process of collecting, analyzing, interpreting, and writing the results of a study. The method helps researcher to conduct study by following sequential steps and analyzing data by applying statistical tools. All the blogs on the topic of education in ‘The Express Tribune’ constitute the population of the study. These blogs are selected through purposive sampling which is also called selective, judgment or subjective sampling and these blogs are chosen for specific (Anderson & Arsenault 1998: 124). The sampling allows researcher to use his or her own judgment for the selection of members of population on the basis of particular characteristics required for the study (Cohen, Manion & Morrison, 2007). Sample for the study was selected on the basis of following criteria:

- (a) The blogs must be selected from single newspaper so blogs from Express Tribune were selected for the study.
- (b) The blogs must be selected on a single topic, therefore, blogs on education were selected for the study.
- (c) The blogs must be covered specific duration so blogs from 2011 to 2019 were chosen for the study.

The study measures the productivity of suffixes used in the formation of words in English language. For this purpose, a corpora of 30 blogs from Express Tribune was compiled, these blogs had 26686 words and covered period from 2011 to 2019. Collected data was organized into word files and named metadata. Metadata was raw data and cleaned for the development of word list and for measuring morphological productivity of suffixes. AntConc software was used as a research instrument for the development of word list. This tool counts all the words in the corpus and presents them in an ordered list. This allows you to quickly find which words are the most frequent in a corpus. The words can be ordered either by frequency or the start or end of the word, and the ordering can be inverted (Anthony, 2014).

4. Findings and Discussion

All cleaned files of 30 blogs were uploaded to AntConc software. The suffix -able was typed in the ‘advance tab’ of AntConc and obtained concordance of all words end with the suffix -able. To make the analysis process easier, a word list of the self-compiled corpus was searched out and pasted it on Excel Sheet. All the words with the suffix -able were obtained by filtering complete word list and this list of words with the suffix -able was named raw list owing to having anomalies in some words. In order to calculate the productivity of the suffix -able raw list of words with the suffix -able were refined by removing anomalies. Finally, the productivity of suffix -able was measured by dividing the number of word hapaxes with word token.

Table 1.
Productivity of Suffix -able

	Raw List	Refined List	Productivity
Token	66	41	P=0.43902
Type	33	26	
Hapax	22	18	

All cleaned files of 30 blogs were uploaded to AntConc software. The suffix -less was typed in the 'advance tab' of AntConc and obtained concordance of all words end with the suffix -less. To make the analysis process easier, a word list of the self-compiled corpus was searched out and pasted it on Excel Sheet. All the words with suffix -less were obtained by filtering complete word list and this list of words with suffix -less was named raw list owing to having anomalies in some words. In order to calculate productivity of suffix -less raw list of words with the suffix -less was refined by removing anomalies. Finally, the productivity of suffix -less was measured by dividing the number of word hapaxes with word token.

Table 2.
Productivity of Suffix -less

	Raw List	Refined List	Productivity
Token	33	20	
Type	16	13	P=0.4
Hapax	9	8	

All cleaned files of 30 blogs were uploaded to AntConc software. The suffix -ly was typed in 'advance tab' of AntConc and obtained concordance of all words end with the suffix -ly. To make the analysis process easier, a word list of the self-compiled corpus was searched out and pasted it on Excel Sheet. All the words with suffix -ly were obtained by filtering complete word list and this list of words with suffix -ly was named raw list owing to having anomalies in some words. In order to calculate the productivity of suffix-ly raw list of words with the suffix -ly were refined by removing anomalies. Finally, the productivity of suffix -ly was measured by dividing the number of word hapaxes with word token.

Table 3.
Productivity of Suffix -ly

	Raw List	Refined List	Productivity
Token	435	433	
Type	207	191	P=0.27945
Hapax	128	121	

All cleaned files of 30 blogs were uploaded to AntConc software. The suffix -ment was typed in 'advance tab' of AntConc and obtained concordance of all words end with the suffix -ment. To make the analysis process easier, a word list of the self-compiled corpus was searched out and pasted it on Excel Sheet. All the words with suffix -ment were obtained by filtering complete word list and this list of words with the suffix -ment was named raw list owing to having anomalies in some words. In order to calculate the productivity of the suffix-ment raw list of words with the suffix -ment were refined by removing anomalies. Finally, the productivity of suffix -ment was measured by dividing the number of word hapaxes with word token.

Table 4.
Productivity of Suffix -ment

	Raw List	Refined List	Productivity
Token	297	276	
Type	53	39	P=0.1087
Hapax	37	30	

Table 5.
Overall Results of the Study

	Word Token	Word Type	Hapax	Productivity
-able	41	26	18	0.43902439
-less	20	13	8	0.4
-ly	433	191	121	0.27944573
-ment	276	39	30	0.10869565

Graphical Representation of Overall Results of the Study

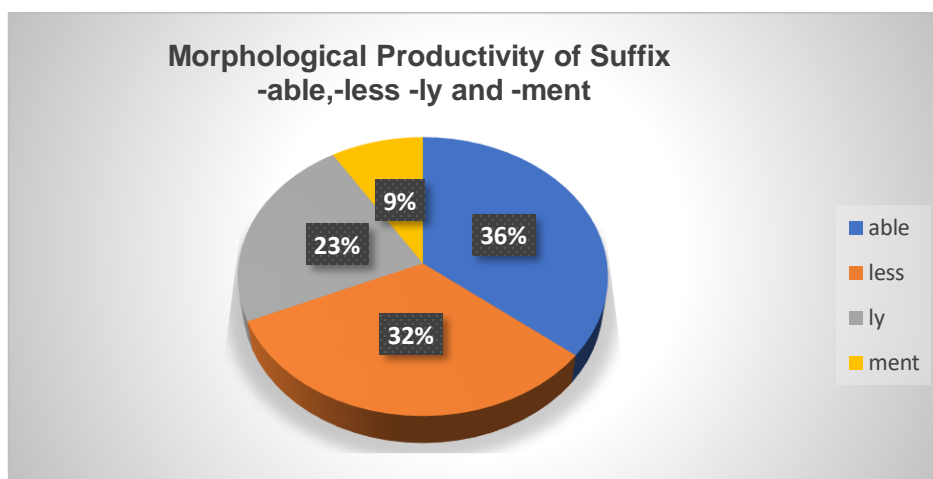


Fig .1 Overall Results of the Study

5. Recommendations

In the light of the study following recommendations were made:

- i. This study would help learners of morphology and corpus linguistics to measure morphological productivity of suffixes.
- ii. Theoretical framework provided by the study can be used in any other study for measuring morphological productivity of suffixes.
- iii. Different studies can be conducted to measure morphological productivity of different suffixes, on different topics and in different corpora.

- iv. These suffixes can be used in the teaching-learning process for the students of second language in a predictable manner.
- v. The student can enhance their vocabulary by using these suffixes in the process of word-formation.

6. Conclusions

The study was conducted to measure the morphological productivity of four suffixes (-able, -less, -ly and -ment) used in the process of adjectivization, adverbilization, and nominalization. The data was collected and analyzed by using AntConc and MS Excel. The following conclusions were drawn from the findings of the study after data analysis: Findings of the study show that all suffixes -able, -less, -ly and -ment are productive and convert different parts of speech into an adjective, adverb, and noun through the process of derivation. The morphological productivity of each suffix was measured separately which shows that all suffixes are morphological productive. The findings of the study show that morphological productivity of suffix depends on the number of hapaxes of words contained that particular suffix. The suffix -able is more morphological productive than -less, ly, and -ment used in the process of word-formation. Moreover, the findings of the study can also help English language teachers to teach English language to second language learners in a predictable manner.

References

- Anderson, G., & Arsenault, N. (1998). *Fundamentals of Educational Research* (second edition). London: Routledge Falmer.
- Anthony, L. (2014). AntConc (Windows, Macintosh OS X, and Linux) Build 3.4.3 Center for English Language Education in Science and Engineering, School of Science and Engineering, Waseda University, 3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan.
- Baayen, H. (1991). Quantitative aspects of morphological productivity. In: J. M. Geert Booij (ed.), *Yearbook of Morphology*: 109–149. Dordrecht-Boston-London: Kluwer.
- Baayen, H. (1992). Baayen, R. Harald (1993). On frequency, transparency, and productivity. In: Geert E. Booij and Jaap van Marle (eds), *Yearbook of Morphology 1992*. Dordrecht: Kluwer Academic Publishers, 181-208.
- Baayen, R. Harald (1994). Derivational productivity and text typology. In: *Journal of Quantitative Linguistics* 1, 16-34.
- Baayen, R. Harald/Neijt, Anneke (1997). Productivity in context: a case study of a Dutch suffix, *Linguistics* 35, 565-587.
- Baayen, R. Harald (2003). 'Probabilistic approaches to morphology'. Rens Bod, Jennifer Hay, and Stefanie Jannedy, eds. *Probabilistic Linguistics*. Cambridge: MIT Press. 229-87.
- Bauer, L. (2001). *Morphological productivity*. Cambridge: Cambridge University Press.
- Cohen, L., Manion, L. & Morrison, K. (2007). *Research Methods in Education* (Sixth edition), Routledge Taylor & Francis Group, USA.
- Cowie, C., Dalton-Puffer, C. (2002). Diachronic word-formation over time: Theoretical and methodological considerations. In: Javier Díaz Vera. *A Changing World of Words*. Studies in English Historical Lexicography, Lexicology and Semantics: 410–437.
- Creswell, J. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, NJ: Merrill Prentice Hall.

- Habermann, M. (1994). *Verbale Wortbildung um 1500. Eine historisch-synchrone Untersuchung anhand von Texten Albrecht Dürers, Heinrich Deichlers und Veit Dietrichs*. Berlin: de Gruyter.
- Hu, Z. L. (2001). *Linguistics: A Course Book*. Beijing: Peking University Press.
- Hu, Z. L. (2002). *Linguistics: An Advanced Course Book*. Beijing: Peking University Press.
- Kastovsky, D (1986), *The Problem of Productivity in Word Formation*. In: "Linguistics" 24, 585-600.
- Leedy, P. & Ormrod, J. (2001). *Practical research: Planning and design* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall. Thousand Oaks: SAGE Publications.
- Liu, W. & Shen, H. (2012). *A Corpus-based Analysis of English Suffix -esque*. *Theory and Practice in Language Studies*, Vol. 2, pp. 767-772. doi:10.4304/tpls.2.4.767-772.
- Munske, H. (2002). *Wortbildungswandel*. In: Habermann et al. (ed.), *Historische Wortbildung des Deutschen: 23–40*. Tübingen: Niemeyer.
- Plag, Ingo/Dalton-Puffer, Cristiane/Baayen, R. Harald (1999), *Productivity and register*. In: "English Language and Linguistics" 3, 209-228.
- Plag, Ingo (1999): *Morphological Productivity: Structural Constraints on English Derivation*. Berlin and New York: Mouton de Gruyter.
- Plag, I. (2002, p.44, 52, 53, 54). *Word-formation in English*. Great Britain: Cambridge University Press.
- Plag, Ingo (2003), *Word-formation in English*. Cambridge: Cambridge University Press.
- Plag, Ingo (2006) 'Productivity'. Keith Brown, ed. *Encyclopedia of Language and Linguistics*. Boston: Elsevier. 121-28.
- Prell, H.-P. (1991). *Die Ableitung von Verben aus Substantiven in biblischen und nichtbiblischen Texten des Frühneuhochdeutschen*. Frankfurt am Main: Lang.
- Štekauer, Pavol (1998) *An Onomasiological Theory of English Word-Formation*. Amsterdam and Philadelphia: John Benjamins.
- Štekauer, Pavol (2001) 'Fundamental principles of an onomasiological theory of English word-formation'. *Onomasiology Online* 2: 1-42. <<http://www.ku-eichstaett.de/SLF/EngluVglSW/stekauer1011.pdf>> (Accessed 28 July, 2005).
- Štekauer, Pavol (2005a) *Meaning Predictability in Word-formation: Novel, Context-Free Naming Units*. Amsterdam and Philadelphia: John Benjamins.
- Štekauer, Pavol (2005b) 'Onomasiological approach to word-formation'. Pavol Štekauer and Rochelle Lieber, eds. *Handbook of Word-Formation*. Dordrecht: Springer. 207-32.
- Štekauer, Pavol (2006) 'Onomasiological theory of word-formation'. Keith Brown, ed. *Encyclopedia of Language and Linguistics*. Boston: Elsevier. 34-7. Štekauer, Pavol, Don Chapman, Slávka Tomaščíková
- Stricker, S. (2000). *Substantivbildung durch Suffixableitung um 1800: untersucht an Personenbezeichnungen in der Sprache Goethes*. Heidelberg: Universitäts-verlag winter.
- Yule, G (2010), *The Study of Language* (4th ed). Cambridge: Cambridge University Press.