

Measuring Morphological Productivity of Noun Derivational Suffixes in *New York Times* Newspaper

قياس الإنتاجية الصرفية للواحد
الاشتقاقية للأسماء في صحيفة نيويورك تايمز

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Abstract

This study examines the productivity of noun derivational suffixes (NDSs) within The New York Times (NYT) newspaper, focusing on issues published on September 10th in the years 2009, 2012, 2015, 2018, and 2021. Both qualitative and quantitative research methodologies will be employed to explore the systematic structure and creative aspects associated with noun usage in the context of NYT. The aim is to reveal forms and changes in English as is used within this particular newspaper. Data collected from NYT editions are exposed to statistical analyses and thorough examination to identify trends in morphological productivity. The findings contribute to the comprehension of English development and the implementation of NDSs in the field of journalism, particularly within NYT. Moreover, this study lays the groundwork for future research endeavors focused on morphological productivity within this unique journalistic context. Within NYT, NDSs exhibit varying levels of productivity. The results demonstrate that the suffix -tion is the most productive process, followed by -er. The remaining suffixes show differing degrees of productivity. These findings provide valuable insights into the forms and productivity of noun derivational suffixes within NYT, highlighting the significance of suffixation in shaping the English used in this journalistic context.

Keywords: Productivity, Noun Derivational Suffixes, *New York Times*, Measuring, Time-Base Nouns, Frequency Analysis

الملخص

تتقصى هذه الدراسة إنتاجية اللواحق الاشتقاقية للأسماء في صحيفة نيويورك تايمز، وبالأخص الأعداد الصادرة في العاشر من أيلول في السنوات 2009 و 2012 و 2015 و 2018 و 2021. وبمنهجى البحث النوعي والكمي تستكشف الدراسة البنية النظامية والجوانب الخلاقة المتعلقة باستعمال الاسماء في سياق صحيفة نيويورك تايمز. ويكمن الهدف هنا في إظهار الأنماط والتنوعات في اللغة الإنجليزية في هذه الصحيفة بذاتها.

خضعت البيانات المجموعة من الصحيفة المعنية لعملية تحليل إحصائي وفحص متكامل من أجل بيان التوجهات في الإنتاجية الصرفية. وتسهم النتائج في فهم اللغة الإنجليزية و تطبيق اللواحق الاشتقاقية للأسماء في حقل الصحافة عامة و في صحيفة نيويورك تايمز خصوصاً. وأيضاً تضع الدراسة الأسس اللازمة لأي محاولات بحث مستقبلية عن طريق التركيز على الإنتاجية الصرفية في حقل الصحافة النادر هذا. و في حدود صحيفة نيويورك تايمز تُظهر اللواحق الاشتقاقية للأسماء مستويات متباينة من القدرة الانتاجية الصرفية، إذ تبين النتائج أن الملحق -tion هو أكثر اللواحق توظيفاً في تصويغ الأسماء وتليه الملحق -er.

و أما اللواحق الأخرى فتظهر درجات مختلفة من الإنتاجية. و تخلق هذه النتائج رؤية هامة في مجال أنماط إنتاجية عمليات تصويغ الأسماء في صحيفة نيويورك تايمز و بذلك تؤكد على أهمية التصويغ باللواحق في تشكيل اللغة الإنجليزية المستعملة في مجال الصحافة.

المفردات الدالة: إنتاجية، اللواحق الإشتقاقية للأسماء، نيويورك تايمز، قياس، اسماء الزمن، تحليل التكرار

1)Introduction

Morphological productivity and noun derivational suffixes (NDSs) are connected concepts in linguistics . Morphological productivity is the study of the formation of new nouns using derivational suffixes , which are added to root words to change their meaning or grammatical category . The degree of productivity indicates how successfully these suffixes may be employed to produce new nouns (Bauer, 2001,p.12) . The contrast between productive rules and creative neologisms complicates the determination of the productivity index .

Productive norms allow for the unconscious and unintended production of new nouns using existing suffixes, while creative neologisms include the deliberate generation of nouns that do not follow productive patterns . Haspelmath (2002, p.116) emphasizes this distinction, arguing that audiences readily perceive creative neologisms as novel and different.

NDSs illustrate linguistic variation and change by allowing for the formation of new nouns with various suffixes. Nonetheless, the production levels of NDSs vary. Plag discovers that certain suffixes are conservative , resulting in limited or more reliable noun formation , while others are expansive , allowing for a wider lexical output (Plag, 1999, p. 42) . The productivity of NDSs can be evaluated by considering the number of words they can derive under different conditions, as well as the type of input word being used. For instance, the rule " happy + -ness = happiness " is more productive with adjectives than with nouns , as it produces a greater number of words when applied to adjectives (Trask and Stockwell,2007,p.233) .

The exploration of NDSs has been advanced by several notable studies, including those conducted by Ingo Plag , Merja Kytö and Johan van der Wurff , and Theofanis Papoutsis . These studies have made valuable contributions to our understanding of the mechanisms and factors influencing NDSs.

Ingo Plag (2014) explores how word-formation patterns may differ in productivity using hapax legomena and suggests that a measure based on first attestations is a good substitute . Examining nominal suffixes in English letters, Merja Kytö and Johan van der Wurff (2014) draw attention to the shortcomings of hapax-based measurements because of the limited size of historical corpora .

They suggest a multimodal strategy that draws on methods from recent morphological productivity studies to evaluate historical shifts in English nominal suffixation . Theofanis Papoutsis (2020) studies the suffixes in Greek and English, emphasising their frequency , use, and different kinds of nouns. He also highlights the cognitive and linguistic aspects that affect the use of suffixes in different languages.

My research varies from the previous studies in terms of emphasis and approach. While other investigations looked at word formation in various languages, using a comparative or corpus-based method, my work focuses on measuring the morphological productivity of NDSs in the context of the New York Times newspaper. Furthermore, my study looks at how these suffixes have changed in productivity throughout time.

2) Approaches to Measuring Productivity

Scholars have developed a variety of ways for measuring the productivity of noun derivations. Haspelmath (2002, p.129) recommends four essential methods for assessing productivity.

1. The first approach looks at the quantity of actual words (also known as type frequency). Researchers can calculate the frequency of a certain noun derivation by using an extensive dictionary. For example, the English suffix "-ment" occurs often in the dictionary, yet it is regarded as ineffective, with just a few new words with "-ment" discovered in the Oxford English Dictionary during the twentieth century.
2. The second approach considers the number of possible words , often known as token frequency. Researchers determine the constraints on a noun derivational pattern . If there are no general limitations on unproductive rules, it suggests a significant possibility for creating new terms. For instance, in English, the prefixes " em- " and "en-" can be added to any noun indicating a container -like object , producing words like "entomb," "ensnare," and "embody ."
3. The third approach reflects the ratio of actual words to possible words , known as the degree of exhaustion . However, this approach is less practical since it requires exact counting of the number of viable words. Furthermore, the collection of potential words, which includes complicated terms developed productively, becomes open-ended, making it difficult to calculate the ratio actual to possible words.

4. The fourth approach, diachronic production, measures the quantity of neologisms during a certain time period. This measurement requires access to a credible historical dictionary or the examination of enormous text collections. However, it is crucial to highlight that extremely productive patterns may lead lexicographers to neglect novel words.

In this study , productivity will be measured largely by calculating the actual number of words created , also known as type frequency, to estimate the production level of NDSs . This approach gives a simple way to assess the productivity of NDSs , providing actual evidence of how noun-suffixes contribute to the growth of the vocabulary. It ensures impartiality and the capacity to reproduce findings in assessments , allowing for consistent comparisons across research . Furthermore, it is a practical and accessible strategy, particularly in situations where language corpora are not readily available (Haspelmath, 2002, p. 5).

3)Methodology

The study examines the morphological productivity of NDSs in NYT newspaper editions published on the 10th of September in the years 2009, 2012, 2015, 2018, and 2021. Combining quantitative and qualitative research methods , this study aims to uncover patterns and changes in the English language usage within this specific newspaper context . This daily newspaper typically consists of approximately 40-44 pages with an average word count ranging from 1000 to 1500 words per page.

The proportion of topics and word count may vary from year to year based on the events and subjects covered . For example, on the 10th of September in 2009, around 300-350

topics were featured, resulting in an estimated word count range of 300,000 to 400,000 words. In 2012, the number of topics decreased to approximately 150-200, yielding a word count range of 150,000 to 200,000 words. In 2015, the range was 250-300 topics, with a word count range of 300,000 to 350,000 words. In 2018, the range was 150-200 topics, resulting in a word count range of 1500,000 to 200,000 words .

Lastly , in 2021, the range was 200-220 topics, contributing to a word count range of 250,000 to 300,000 words. Each issue covers a diverse range of topics , contributing to varying word counts depending on the nature and type of subjects covered.

4)Data Analysis and Discussion

This study mainly investigates the analysis of the New York Times newspaper , specifically analyzing the NDSs in editions dated September 10th for the years 2009,2012,2015,2018 and 2021 . In English , suffixes play a crucial role in modifying the form and function of nouns . The study identifies several common derivational suffixes, which include:

- ❖ tion / -sion: Attached to verbs to form nouns that represent actions, processes, states, or results.
- ❖ ing: Used to create gerunds, which are nouns derived from verbs.
- ❖ er / -or: Forms nouns that typically refer to individuals or things performing specific actions.
- ❖ ment: Transforms verbs into nouns, often indicating the result or means of an action.
- ❖ ity: Converts adjectives into nouns, generally denoting a state or condition.

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- ❖ **ist**: Commonly used to form nouns associated with particular activities or things.
- ❖ **ness**: Creates nouns from adjectives, typically representing a state or quality.
- ❖ **ance / -ence**: Turns verbs into nouns denoting a state or quality of being.
- ❖ **ism**: Forms nouns related to practices, systems, or philosophies.
- ❖ **ure**: Used to create nouns from verbs, often associated with the action or its result.
- ❖ **ship**: Forms nouns that indicate a state, quality, or condition, often related to skills, relationships, or statuses.
- ❖ **ancy / -ency**: Creates nouns from adjectives or verbs, typically indicating a state, quality, or capacity.
- ❖ **ary**: Often used to form adjectives but can also create nouns, especially abstract nouns.
- ❖ **y**: Transforms adjectives or verbs into nouns, usually representing a characteristic or state.
- ❖ **al**: Frequently turns verbs into nouns, denoting the act or process of the verb.
- ❖ **age**: Used to form nouns describing a collective amount, the result of an action, or a related concept.
- ❖ **hood**: Forms nouns often referring to a state, condition, or period in one's life.
- ❖ **ory**: Used for forming adjectives and nouns. As an adjective, it often indicates a relationship with or characteristic of the root word. As a noun, it can denote a place for something.
- ❖ **dom**: Forms nouns that refer to a domain, collection of persons, or a state of being.

- ❖ "th": Used to create nouns from verbs or adjectives, often representing a state or quality.
- ❖ ant / -ent: Creates nouns (and sometimes adjectives) indicating someone or something performing the action of a verb.
- ❖ ee: Forms nouns denoting the person who is the object or beneficiary of an action.
- ❖ ess: Used to create feminine nouns, particularly denoting the female counterpart of a male role or profession.

To investigate the productivity of these NDSs, the study examines their occurrences in the New York Times newspaper starting from September 10th, 2009. Notably, the suffix "-tion" exhibited the highest frequency, appearing 216 times, followed by "-ing" with 112 instances. The analysis also revealed less productive suffixes, such as a complete absence of occurrences for the suffix "-ess."

By meticulously examining the usage and productivity of these suffixes within the context of the New York Times, this study enhances our understanding of how derivational suffixes contribute to noun formation in English.

(Table-1) Noun Suffixations, 2009

<i>Noun suffixations</i>	<i>Frequency</i>
-tion	216
-ing	112
-er	92
-ment	67
-ity	62
-or	35
-sion	30
-ist	29

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-ness	25
-ance	19
-ence	18
-ism	14
-ship	9
-ure	9
-ary	8
-ency	7
-y	4
-al	4
-age	3
-hood	2
-ant	2
-ee	2
-dom	1
-th	1
-ent	1
-ancy	1
-ory	1
-ess	0

The suffix -ing had 54 occurrences in 2012, indicating a decrease in productivity compared to the previous period. The suffix -tion continued to be the most productive, with 187 instances. The absence of any occurrences in the ant/ent category suggests an absence of productivity. Furthermore, the suffix -ess exhibited a developmental trajectory in its occurrence, indicating that linguistic patterns are evolving.

(Table- 2) Noun Suffixations,2012

Noun suffixations	Frequenc y
-tion	187
-er	76
-ity	54
-ment	46
-sion	34
-ing	33
-or	25
-ence	22
-ist	20
-ism	17
-ance	17
-ness	11
-ship	9
-ure	9
-ary	9
-ency	6
-age	5
-ee	3
-y	3
-ory	3
-hood	2
-al	2
-ess	2
-dom	1
-th	1
-ancy	1
-ant/ent	0

There was a substantial shift in productivity rates in 2015, which was a departure from the trends that had been observed in previous years . It is crucial to acknowledge that suffixes which were previously characterised by low productivity experienced a significant and noteworthy increase in output. This transformation was particularly apparent in suffixes like "ity" and "er," that demonstrated a substantial increase in their productivity over time.

Until the final suffix, "ancy," was evaluated, this trend persisted throughout the analysis. It demonstrated minimal to no productivity in the particular context of 2015. This observation functions as a focal point, emphasising the complex dynamics of suffix productivity over the designated time frame and highlighting the conclusion of the study.

(Table_3) Noun Suffixations, 2015

Noun suffixations	Frequenc y
-tion	203
-er	71
-ity	64
-ment	58
-or	33
-sion	30
-ing	27
-ness	23
-ist	20
-ance	16
-ship	14
-ence	13
-ism	13
-ure	7
-ee	7

-al	7
-th	4
-age	4
-hood	3
-ant	3
-y	2
-ency	2
-ent	2
-ary	2
-ory	1
-ess	1
-dom	1
-ancy	0

In the year 2018, each suffix had its own production in terms of the number of produced instances, and this does not differ from the previously mentioned years. However, what is notable is the variation in productivity of each suffix from one to another. In this year, it is observed that there are several suffixes with similar and close productivity rates, such as the suffixes "ism/ing/sion." Undoubtedly, the most productive suffix is "tion," despite the difference in word proportions. This fact does not negate the reality that it is more productive than the other suffixes.

As for unproductive suffixes in this year, the suffix "ory" falls into this category. These types of suffixes do not rank second in productivity; their productivity changes with the passage of years. It is evident that these suffixes were mentioned once or twice in previous years, but as the years progress, their productivity decreases to zero.

(Table-4) Noun Suffixations, 2018

Noun suffixations	Frequenc y
-tion	146
-er	72
-ment	42
-ity	32
-or	22
ence	19
-ist	18
-sion	16
-ism	14
-ing	14
-ance	14
-ship	10
-ure	10
-ness	7
-al	2
-hood	2
-age	2
-ee	2
-y	2
-th	2
-ary	2
-ency	2
-ent	2
-ant	1
-ancy	1
-ess	1
-dom	1
-ory	0

The nominal productivity of 2021 is distinct from that of prior years due to the production of a significant number of nouns using a variety of suffixes . The suffix "tion" demonstrated the highest level of productivity, followed by the suffixes "ity" and "er. " The natural and noticeable variation in productivity for specific suffixes across the aforementioned years is evident. Nevertheless, in this specific year, there was an abundance of unproductive suffixes, including "ory," "ess," and "dom."

(Table _5) Noun Suffixations, 2021

Noun suffixations	Frequenc y
-tion	166
-ity	49
-er	46
-ment	41
-ing	37
-sion	25
-ance	17
-or	17
-ism	16
-ence	15
-ness	15
-ist	13
-ure	11
-ship	9
-ee	6
-al	6
-y	4
-ary	3
-hood	3
-ency	3

-ancy	2
-th	2
-age	2
-ant	1
-ent	1
-ory	0
-ess	0
-dom	0

5)A Comparative Analysis

There are many suffixes in forming nouns in the English language, approximately 28 in total. These suffixes are not fixed and have evolved over the years . During the analysis of the New York Times newspaper for the years 2009, 2012, 2015, 2018, and 2021, several suffixes were observed to have changed in productivity over the years.The most productive suffix, in terms of noun production, is "-tion." This suffix consistently ranked first in productivity across the selected years, despite variations in production levels from year to year. It is noteworthy that it consistently outperformed other suffixes in noun production.

The second most productive suffix is "-er." Although it had slightly lower noun production than other suffixes in the years 2009 and 2021, it consistently ranked third in productivity during those years. However, it is undeniable that it was more productive in noun production compared to other suffixes. Notably, in the years 2018, 2015, and 2012, it ranked second in noun production.

Following "-tion" and "-er," the suffixes "-ity" and "-ment" demonstrate good productivity in noun formation. However, their productivity varies from year to year. It is evident that the suffix "-ment" ranked fourth in productivity

in the years 2009, 2012, 2015, and 2021. In terms of the suffix "-ity," it demonstrated substantial progress. In 2009, it was ranked fifth in terms of productivity; however, it moved to second and third place in subsequent years, particularly in 2012, 2015, and 2021.

Other suffixes, such as -or, -sion, and -ing, are considered moderately productive in noun formation, although not to a significant extent. The same applies to the suffixes -ness, -ist, -ism, -ence and -ance in all the mentioned years. It is interesting to observe the progression of these suffixes in noun formation, despite a slight decline in the productivity of -ness in the years 2018 and 2012, and low productivity of -ist in 2021. Nonetheless, their productivity remains relatively high compared to other less productive suffixes.

Lastly, there is a group of suffixes that have low productivity, including -ary, -ency, -ship, -ure, -age, -hood, -ee, -y, -ory, -al, -ess, -dom, -th, -ancy, -ant, and -ent. Some suffixes within this group became unproductive in certain years, such as "-ess" with zero productivity in 2009, -ant and -ent with zero productivity in 2012, "-ancy" with zero productivity in 2015, and "-ory," "-ess," and "-dom" with zero productivity in 2021.

The reasons behind the productivity of certain suffixes, particularly "-tion" and "-er," "-ity" and "-ment" stem from their ease of use and versatility in word formation. Productive suffixes like these allow for the creation of a wide array of related words, enhancing their adaptability in the language.

Additionally, productive suffixes often appear in common usage, making them familiar and accessible to speakers. Their prevalence in everyday language contributes to their

productivity, as they can be seamlessly integrated into both formal and informal contexts. This combination of ease, versatility, and familiarity makes productive suffixes effective tools for expanding language and communication compared to less commonly used suffixes.

6) Conclusion

The productivity of NDSs is dynamic and varies throughout time. Numerous suffixes may exhibit significant production during one era but may diminish in efficacy in later years. This study examines the productivity of different suffixes used in noun construction. The results demonstrate that suffixes like "-tion" and "-er" display the greatest output, succeeded closely by "-ment," "-ity," and "-ing." Conversely, suffixes such as "-ory" and "-ess" exhibit markedly diminished productivity levels. The results highlight the significance of the various processes that produce nouns and their contribution to the dynamic evolution of the English language.

To thoroughly comprehend the evolution of the English language and its representation of societal and communication trends, it is essential to possess a comprehensive understanding of the productivity of noun suffixations and the varying usage rates linked to different morphological processes.

References

- ❖ Aronoff, M. (1976). *Word Formation in Generative Grammar*. MIT Press.
- ❖ Baayen, Harald. (1991). *Quantitative Aspects of Morphological Productivity*. In Yearbook of Morphology.
- ❖ Baayen, R. H. (1993). *On Frequency, Transparency, And Productivity*. In Yearbook of Morphology.
- ❖ Bauer, L. (2001). *Morphological Productivity*. Cambridge University Press.
- ❖ Bauer, Laurie .(2005). "*Handbook of Word-Formation*."
- ❖ Bauer, L. (1983), *English Word Formation* .Cambridge: Cambridge University Press.
- ❖ Booij, G. (2010). *Construction Morphology*. Oxford University Press.
- ❖ Bybee, J. (1985). *Morphology: A Study of the Relation Between Meaning and Form*. John Benjamins Publishing.
- ❖ Haspelmath, M. (2002). *Understanding Morphology*. London: Arnold & New York: Oxford University Press.
- ❖ Kytö, M., & van der Wurff, J. (2014). *Nominal suffixes in English: Limitations of hapax-based measurements and a multimodal strategy*.
- ❖ Lieber, R., & Štekauer, P. (2009). *The Oxford Handbook of Compounding*. Oxford University Press.
- ❖ Papoutsis, T. (2020). *Suffixes in Greek and English: Frequency, use, and cognitive aspects*. John Benjamins Publishing Company.

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- ❖ Plag, Ingo.(1999) . *Morphological Productivity: Structural Constraints in English Derivation*, Berlin: Mouton de Gruyter.
- ❖ Plag, I. (2003). *Word-formation in English*. Cambridge University Press.
- ❖ Plag, I. (2014). *Word-formation patterns and productivity: A study of hapax legomena*.
- ❖ Trask, R. L., and Stockwell, P., 2007, *Language and Linguistics: The Key Concepts, 2nd ed.*, Routledge: New York.
- ❖ Trips, C. (2016). *The Morphology and Phonology of Exponence: Theoretical and Typological Aspects of Word Formation*. Oxford University Press.
- ❖ Warren, B. (2017). *A Dictionary of Word Roots and Combining Forms*. Courier Dover Publications.

Web References

- ❖ Fernandez ,J. (2013). Morphological Productivity Measurement: Exploring Qualitative versus Quantitative Approaches
- ❖ https://www.researchgate.net/publication/263529042_Morphological_Productivity_Measurement_Exploring_Qualitative_versus_Quantitative_Approaches
- ❖ Harrison , E.(2017) , Morphological Productivity
- ❖ https://www.academia.edu/32919514/MORPHOLOGICAL_PRODUCTIVITY_docx?ssp=1&setlang=en-XL&safesearch=moderate
- ❖ Idress, A. (2010). Noun Formation in Standard English and Modern Standard Arabic: A Contrastive Study
- ❖ https://www.researchgate.net/publication/47716173_Noun_Formation_in_Standard_English_and_Modern_Standard_Arabic_A_Contrastive_Study
- ❖ Lifang , D. (2010). A Survey of the Measurements of Morphological Productivity
- ❖ https://www.researchgate.net/publication/42386432_A_Survey_of_the_Measurements_of_Morphological_Productivity
- ❖ New York Times , 2009/09/10
- ❖ <https://www.nytimes.com/sitemap/2009/09/10>
- ❖ New York Times , 2012/09/10
- ❖ <https://www.nytimes.com/sitemap/2012/09/10/>
- ❖ New York Times , 2015/09/10
- ❖ [/https://www.nytimes.com/sitemap/2015/09/10](https://www.nytimes.com/sitemap/2015/09/10)
- ❖ New York Times , 2018/09/10
- ❖ <https://www.nytimes.com/sitemap/2018/09/10>
- ❖ New York Times , 2021/09/10
- ❖ <https://www.nytimes.com/sitemap/2021/09/10>