

Collocations of Effective and Efficient in COCA: A Corpus Analysis

Deliana^{*1} & Amanda Fransisca Gultom²

^{1,2}Universitas Sumatera Utara, Medan, Indonesia

*Corresponding Author: deliana@usu.ac.id

ARTICLE INFO

Article history:

Received 16 September 2024

Revised 23 September 2025

Accepted 01 October 2025

Available online 31 October 2025

E-ISSN: [2654-3591](#)

P-ISSN: [2623-1999](#)

How to cite:

Deliana, & Gultom, A. F. (2025). Collocations of effective and efficient in coca: A corpus analysis. *International Journal of Culture and Art Studies*, 9(2), 117-126.

ABSTRACT

This corpus-based study analyses two adjectives often perceived as synonymous, *effective* and *efficient*, by examining their collocations and formality levels in the Corpus of Contemporary American English (COCA). A qualitative content analysis was applied to 400 concordance lines, evenly divided between the two adjectives. The analysis involved selecting content, categorising data, developing coding rules, coding texts, and interpreting results. Collocational structures such as adjective + preposition, adjective + to-infinitive, adjective + that-clause, adverb + adjective, and adjective + noun were identified. The findings show that *effective* frequently collocates with nouns related to outcomes and appears predominantly in formal contexts, especially academic writing. In contrast, *efficient* commonly collocates with nouns related to processes and is used more flexibly across genres, including blogs and magazines. Grammatically, *effective* often combines with the prepositions *in* and *at*, while *efficient* shows greater variety and frequently occurs in to-infinitive and that-clause constructions. The study concludes that *effective* and *efficient* have distinct collocational patterns, grammatical behaviours, and degrees of formality, making them not fully interchangeable in all contexts.

Keywords: *Corpus-based study, Effective, Efficient, Collocation, Degree of formality*



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International.
<http://doi.org/10.32734/ijcas.v9i2.22811>

1. Introduction

Parts of speech are fundamental components of language, classifying words based on their syntactic roles within sentences. These categories include nouns, verbs, adjectives, adverbs, pronouns, conjunctions, prepositions, and interjections, each serving a distinct function in communication (Lyons, 1981). Understanding these categories is crucial for effective communication, as improper usage can lead to confusion and misinterpretation.

Among these, adjectives hold particular significance as they modify nouns by providing details about qualities, attributes, or characteristics. They enhance language precision by specifying properties such as size, color, shape, and condition (Quirk et al., 1985). However, adjectives can sometimes be confusing, particularly when two words appear to have similar meanings but differ in application and usage. A common example of this confusion occurs between *effective* and *efficient*. These words are frequently misinterpreted and used interchangeably by both learners and native speakers. The Indeed Editorial Team (2024) notes that these adjectives often seem synonymous, yet they have distinct meanings. Schwarz (2024) explains that efficiency pertains to achieving results while minimizing resources, whereas effectiveness refers to producing the intended outcome regardless of resource consumption. Burches and Burches (2020) further distinguish efficacy as effectiveness under controlled conditions, effectiveness as success in real-world applications, and efficiency as optimizing resources.

Despite these clarifications, English learners often struggle to differentiate between *effective* and *efficient*, especially in academic or professional settings. Schwarz (2024) provides an example where a policy may be *effective* in achieving its goals but not *efficient* if it consumes excessive resources. Similarly, phrases like *more efficient for taxpayers* suggest optimized resource use, whereas *more effective in reducing inequality* emphasizes achieving intended outcomes. These distinctions highlight how easily these two adjectives can be

confused. Understanding the subtle differences is essential for accurate communication, particularly in areas where the precise usage of these words can affect clarity and outcomes.

Given this ongoing confusion, there has been significant interest in examining the collocational patterns of *effective* and *efficient* to understand their proper usage. Corpus linguistics offers a valuable approach to analyzing language based on real-world data. Using large collections of authentic texts (Biber in Heine & Narrog, 2010), corpus linguistics provides insight into how language is used in various contexts. The corpus-based approach is deductive and examines predefined linguistic categories, while the corpus-driven approach is inductive, allowing patterns to emerge naturally from the data. Both methods reveal how language varies across contexts, which is especially useful for distinguishing subtle differences in meaning and usage, such as those found between *effective* and *efficient*.

However, while corpus-based research has explored collocations broadly, there is limited research specifically focusing on the collocational tendencies of *effective* and *efficient* in various genres, particularly in terms of their grammatical and lexical collocations. Studies by Schwarz (2024) and Burches and Burches (2020) have addressed the general definitions of these adjectives but have not explored how they function in everyday language. This gap in the research motivates the current study, which seeks to investigate the collocational patterns of *effective* and *efficient* using the Corpus of Contemporary American English (COCA). COCA, developed by Mark Davies (2008), is a large-scale corpus containing over one billion words from diverse sources, including spoken language, fiction, academic texts, and blogs. By examining 400 concordance lines—200 for each adjective—this study aims to uncover common lexical and grammatical collocations that can shed light on the differences between these two adjectives.

The objectives of this research are twofold: first, to identify the typical collocational patterns of *effective* and *efficient* in a variety of genres, and second, to explore the degree of formality associated with these adjectives. This study will focus on grammatical and lexical collocations, using the framework of Benson, Benson, and Ilson (1996), which categorizes collocations into adjective + noun, adjective + preposition, adjective + to-infinitive, and other structures. By systematically analyzing these patterns, the study seeks to contribute to the understanding of how *effective* and *efficient* are used across different contexts. Furthermore, it aims to provide insights that will help non-native English speakers differentiate between these adjectives and use them correctly, enhancing communication clarity.

In examining the degree of formality, this study considers how language use varies across formal and informal contexts. Formal language typically follows standard rules and uses complex vocabulary and syntax. It is often seen in professional, academic, or official contexts, such as business correspondence or academic writing (Barowski, 2021). In contrast, informal language is characterized by casual expressions, slang, and a more spontaneous structure, commonly used in personal conversations, text messages, or informal writing (Crystal, 2008). Ultimately, this research will demonstrate how corpus-based analysis can resolve common misunderstandings in language use and clarify the proper usage of frequently confused adjectives.

Additionally, previous studies have offered valuable insights into the analysis of collocations and the usage of near-synonyms. Fathi (2023) examines the adverbs *nevertheless* and *nonetheless* in academic texts. There was a tendency for both adverbs to be predominantly used in formal contexts, contributing to an understanding of the nuanced differences in their usage. Anggita (2023) explores the collocation of the verb *explored*, which is most frequent with nouns and adverbs, with significant variations between academic texts and magazines. These studies underscore the value of corpus-based analysis in identifying near-synonyms.

2. Method

This study employs a qualitative content analysis approach to examine the adjectives *effective* and *efficient* in various contexts, focusing on their collocations and degree of formality. The data were taken randomly, each of 200 concordance lines for *efficient* and 200 concordance lines for *effective*. The source of data was the Corpus of Contemporary American English (COCA), a large, publicly accessible corpus with over one billion words from a wide range of genres, including academic texts, spoken language, fiction, news, and blogs. The selection of concordance lines emphasized different grammatical structures such as adjective + preposition, adjective + to-infinitive, adjective + that-clause, adverb + adjective, and adjective + noun. The degree of formality was categorized based on the genre, distinguishing between formal genres like academic writing and informal genres like spoken language, TV/movies, and blogs.

Formality refers to words which may have similar meaning but cannot be used in all situations. For example, the word *tell* is used in informal contexts while the word *inform* is used in formal contexts. The similarities and differences in degree of formality are determined by its appearance in each genre of the text.

The analysis followed a structured content analysis process as outlined by Luo (2022), involving the selection of content from varied genres, defining units and categories for collocations, and manually coding

the data based on grammatical structures and formality levels. The study did not use statistical models but instead relied on qualitative methods to interpret the patterns of usage of *effective* and *efficient*. Each concordance line was analyzed to identify common collocational patterns and assess the degree of formality in different genres. This process enabled a comprehensive understanding of the contextual nuances of the two adjectives, offering insights into their usage across both formal and informal settings. Data analysis was performed using basic text processing tools, with no specialized software employed for content analysis.

3. Result and Discussion

3.1. Result

3.1.1. Degree of Formality: A Comparative Analysis of *Effective* and *Efficient* in COCA

The degree of formality of the adjectives *effective* and *efficient* can be determined by analyzing their distribution across various text genres in the Corpus of Contemporary American English (COCA). To explore their usage patterns, 400 concordance lines for each adjective were randomly collected. The findings reveal interesting contrasts in their prevalence across formal and informal contexts.

3.1.1.1. The Formal Dominance of *Effective*

The adjective *effective* is predominantly found in academic writing, accounting for 37.5% of its occurrences. This strong presence highlights its association with formal discourse, where precision and evaluation of success play a crucial role. The term also appears in semi-formal settings, such as magazines (15.5%) and web texts (15.5%), where professional discussions often require an assessment of outcomes.

Interestingly, *effective* maintains a moderate presence in blogs (15.0%), suggesting some degree of adaptability in less rigid contexts. However, its limited occurrence in fiction (2.0%) and TV and movies (1.5%) further emphasizes its preference for structured, analytical writing over narrative or conversational forms.

Table 1. The Distribution of Adjective *Effective* in COCA

Genre	Frequency	Percentage (%)
Academic Writing	75	37.5%
Magazine	31	15.5%
News	13	6.5%
TV and Movies	3	1.5%
Web	31	15.5%
Blog	30	15.0%
Spoken	13	6.5%
Fiction	4	2.0%

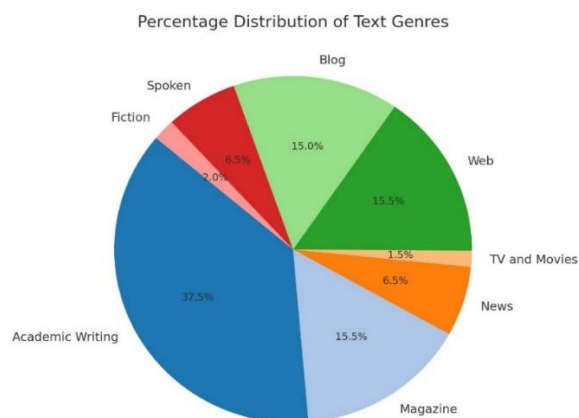


Figure 1. The Distribution of Adjective *Effective* in COCA

3.1.1.2. The Versatility of *Efficient*

In contrast, *efficient* demonstrates a more balanced distribution across both formal and informal contexts. While it appears in academic writing (20.5%), it is also highly prevalent in blogs (21.5%) and magazines (19.0%), indicating its frequent use in discussions that extend beyond strictly professional domains. This suggests that *efficient* is more adaptable and commonly used in conversations about practicality and resource

management, whether in formal reports or everyday discussions.

Notably, *efficient* appears more frequently in spoken language (8.5%) and news articles (10.0%) than *effective*, reinforcing its accessibility in a wider range of discourse. Although its presence in fiction (2.5%) and TV and movies (3.0%) remains relatively low, *efficient* still exhibits a broader applicability compared to its counterpart.

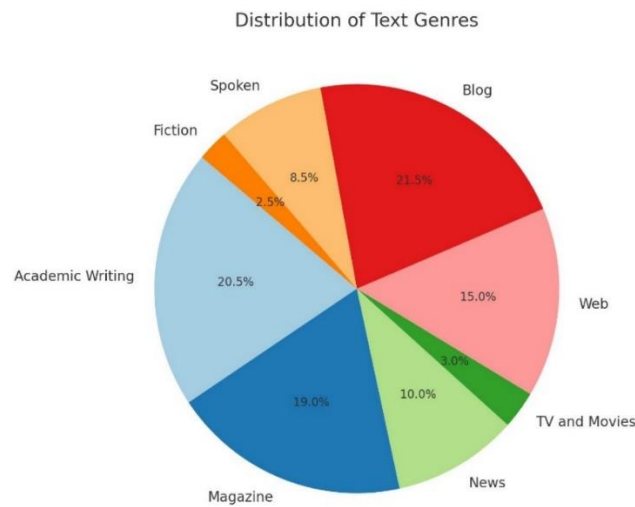


Figure 2. The Distribution of Adjective *Efficient* in COCA

3.2. Discussion

This section presents the results and discussion of the analysis of the adjectives *effective* and *efficient*, focusing on their collocational patterns based on Benson and Ilson's (1986) theory and their levels of formality using data from the Corpus of Contemporary American English (COCA). The analysis is divided into two main aspects: grammatical and lexical collocations, and the degree of formality across various genres. Examples and tables taken directly from the corpus data are provided to illustrate key patterns and support the interpretation of findings. The discussion highlights how these patterns reflect different contextual uses of the two adjectives and explores their implications for understanding subtle distinctions in meaning and formality.

3.2.1. Collocational Patterns of *Effective* and *Efficient*

The collocations of *effective* and *efficient* can be categorized into two types, grammatical and lexical. Grammatical collocations can be further divided into three types, as outlined below.

3.2.1.1. Grammatical Collocations

Grammatical collocations involve structural combinations of words, such as adjective + preposition, adjective + to-infinitive, and adjective + that-clause.

3.2.1.1.1. Adjective + Preposition

The adjectives *effective* and *efficient* frequently co-occur with specific prepositions, reflecting their distinct focuses on outcomes and processes. Based on data from COCA, the collocations of these adjectives with prepositions are shown in the table below:

Table 2. Collocations of *Effective* and *Efficient* with Preposition

No	Preposition	Frequency (<i>Effective</i>)	Frequency (<i>Efficient</i>)
1	In	11	5
2	At	8	1
3	For	1	2
4	To	1	-
5	With	1	2
6	Against	1	-
7	From	1	-
8	On	1	2
9	By	-	1

Examples of *Effective* with Prepositions:

1. Some say Egypt could be more **effective in** reining in its own citizens.
2. That would be both surprising and **effective in** raising inflation expectations.
3. *Economically shaped editorial policies of major news media organizations are quite **effective at** stifling them.*
4. *Damp soil is even more **effective at** holding heat, as water retains heat better than air.*
5. *Clearly outperformed insecticides and is proving to be very economical and **effective at** preventing the insect's spread.*

Examples of *Efficient* with Prepositions:

1. There are attempts at getting more labor-**efficient in** medicine.
2. These resistant proteases are just as **efficient in** helping HIV replicate *the drug-sensitive versions*.
3. *it allows the Thunder to be more **efficient with** their time.*
4. *Companies should be pairing up and standardizing systems to make this easy and **efficient with** little cross-training needed.*
5. *The question to me is can we make this system less expensive and more **efficient for** the taxpayer.*
6. *So it's far more **efficient for** the business to not pay out salaries to avoid the tax you'll be paying away to the government.*
7. *Emphasizing the fact that some simulations can be more **efficient on** CUDA than traditional CPUs.*
8. *No matter what your level, smooth strokes are more **efficient on** long rides.*

Effective most commonly pairs with *in* (11 occurrences) and *at* (8 occurrences), reflecting success in achieving goals. For example, “*effective in raising inflation expectations*” means successfully influencing expectations, while “*effective at holding heat*” highlights the ability to retain warmth. These patterns confirm that *effective* relates to measurable success.

In contrast, *efficient* appears with a wider range of prepositions, including *in*, *with*, *on*, and *for*. The preposition *in* (5 occurrences) relates to process efficiency, as in “*efficient in helping HIV replicate*.” *With* (2 occurrences) emphasises resource management, such as “*efficient with their time*.” *On* (2 occurrences) focuses on performance in specific situations, like “*efficient on long rides*,” while *for* (2 occurrences) suggests cost-effectiveness, as in “*more efficient for the taxpayer*.”

Although both adjectives share some prepositions, their usage differs significantly. *Effective in* highlighting achieving results “*effective in contributing to students' environmental literacy*”, whereas *efficient in* focusing on streamlining processes “*getting more labor efficient in medicine*”. This distinction reinforces that *effective* is about outcomes, while *efficient* is about optimisation.

3.2.1.1.2. Adjective + To-Infinitive

The collocations of *effective* and *efficient* with to-infinitives reveal significant differences in frequency and variety. While *efficient* frequently pairs with a wide range of to-infinitives, *effective* demonstrates minimal use of this structure. The table presents the collocations of *efficient* with to-infinitives:

Table 3. Collocations of *Efficient* with To-Infinitives

No	To-Infinitive	Frequency
1	to transport	1
2	to store	1
3	to pay	1
4	to perform	1
5	to have	1
6	to send	1
7	to demonstrate	1

Examples of *Efficient* with To-Infinitive:

1. *The bags pack more densely than the same quantity of board cartons and are consequently more **efficient to transport**.*
2. The bag is also more **efficient to store** in-restaurant.
3. *Me and my CFO have decided it's more **efficient to pay** the "penalty" or "tax" or whatever it is called.*
4. It is more **efficient to perform** this level of simulation very close to the hardware.
5. *They've begun to learn it's more **efficient to have** some basic information ready all the time.*

6. And since it is more **efficient to send** large tuna down the assembly lines in U.S.
 7. that Eve can be sufficiently productive and **efficient to compensate** all of the losers.

Example of Effective with To-Infinitive:

Lehrer concluded by suggesting that if society wants to change behavior, it's much more **effective to raise** its cost through taxes.

The use of *effective* and *efficient* with to-infinitives highlights their distinct meanings. *Efficient* frequently pairs with to-infinitives, emphasizing process optimization and practicality, while *effective* rarely does, as it focuses on achieving results rather than improving operations. *Efficient* commonly appears with to-infinitives in contexts related to logistics, cost-effectiveness, and streamlined execution. Examples like “*efficient to transport*” and “*efficient to store*” highlight practical benefits, while “*efficient to perform*” refers to smoother and faster execution. These patterns show that *efficient* is often linked to optimizing processes.

In contrast, *effective* rarely occurs with to-infinitives. The only recorded example, “*effective to raise its cost through taxes*,” emphasizes achieving a specific goal—using taxation to influence costs. This limited usage suggests that *effective* is more result-oriented, making it less adaptable in procedural contexts compared to *efficient*. This distinction reinforces that *efficient* relates to practicality and optimization, while *effective* is about achieving desired outcomes.

3.2.1.1.3. Adjective + That-Clause

The analysis of that-clauses as collocations with *effective* and *efficient* shows that this pattern is uniquely associated with *efficient*. In the COCA corpus, there is no recorded instance of *effective* appearing with a that-clause. However, *efficient* occurs in the following example:

The technology is so efficient that the DNA from a single cell can be amplified without difficulty. The use of *efficient* with that-clauses highlights its strong connection to technical and scientific contexts, where it describes procedural optimization and system efficiency. This pattern reinforces how *efficient* is often used to measure the effectiveness of processes or technologies in achieving streamlined outcomes.

In contrast, *effective* does not appear with that-clauses in the analyzed COCA data. This absence suggests a distinct collocation tendency—*efficient* is more common in contexts requiring precision and process improvement. However, this finding may also reflect data limitations rather than a strict grammatical rule, as *effective* that-clauses may still be possible but less conventional. This distinction further supports the idea that *efficient* relates to optimization, while *effective* focuses on results.

3.2.1.2. Lexical Collocations

Lexical collocations involve combinations of adjectives with nouns or adverbs. These pairings reveal additional nuances in the meanings and contextual usage of *effective* and *efficient*.

3.2.1.2.1. Adjective + Noun

The collocations of *effective* and *efficient* with nouns in the COCA corpus highlight their distinct tendencies in usage. *Effective* often pairs with nouns that emphasize results or impact, while *efficient* is commonly found with nouns related to processes and optimization. These differences align with their meanings—*effective* focuses on success in achieving an outcome, whereas *efficient* emphasizes resourcefulness and performance.

Table 4. Collocations of *Effective* and *Efficient* with Nouns

No	Noun (<i>Effective</i>)	Frequency	Noun (<i>Efficient</i>)	Frequency
1	Date	6	Way	8
2	Way	5	Use	7
3	Means	4	Government	4
4	Responses	3	Ways	4
5	Teaching	3	Solutions	3
6	Tool	2	Defense	2
7	Treatment	2	Managers	2
8	Interventions	2	Production	2
9	Lessons	2	Search	2
10	Sample	2	Vehicle	2
11	Tax	2	Biodiesel	1
12	Use	1	Methodology	1

13	Defense	1	Generators	1
14	Ways	1	Resources	1
15	Strategies	1	-	-

Examples of Shared Collocations: Effective and efficient share collocations with certain nouns, such as way and use. These shared patterns highlight their complementary roles, though their meanings remain distinct.

1. He had a very effective way of disarming some of the questions.
2. The most efficient way for cells to harvest energy stored in food is through cellular respiration.
3. The effective use of technology in the classroom is not an end in itself but a tool to understand and create music.
4. Otherwise, there's no way to determine the most efficient use of resources, how to minimize costs, and maximize benefits.

Examples of Highest Collocations: The most frequent collocation for effective is date (6 occurrences), which often relates to contexts involving time or deadlines:

1. August 5, 2008, was the effective date of registration.
2. In 2015 approximately 845,000 bankruptcy cases were filed, down from a high of nearly 1.8 million in 2005 in advance of the effective date of the 2005 amendments.

For efficient, way is the highest collocation (8 occurrences), reflecting its focus on optimizing processes:

1. Metals radiate heat away better than hydrogen can, providing a more efficient **way** for compressed gas to cool and form stars.
2. Distributed generation as a more efficient way to deliver electricity to remote villages.

Examples of Second-Highest Collocations: The second-most frequent collocation for effective is way (5 occurrences), often describing impactful strategies or methods:

1. The ambassador and the staff had to return to the embassy, they had an effective way to communicate.
2. Sometimes, violence against herself seems the most effective way for her to take control of her own body.

For efficiency, use ranks second (7 occurrences), emphasizing practicality and resource optimization:

1. Mongolian herders have developed a sophisticated system of animal husbandry that enables them to make efficient use of the diverse landscapes of Central Asia and the heterogeneous resources within them.
2. The efficient use of the land bridge will reduce transit times significantly.

Examples of Third-Highest Collocations: For effective, the third-most frequent collocation is means (4 occurrences), often describing methods or approaches that achieve a desired outcome:

1. Lens calls for training welfare workers on the most effective means of working with clients in a professionally competent and ethical manner.
2. that faculty book clubs were an extremely effective means of literacy staff development

For efficiency, the third-most frequent collocation is solutions (4 occurrences), often referring to approaches or strategies that optimize resource use effectively:

1. To investigate **efficient solutions** to comprehensively interpret the GSR profiles in a dating perspective
2. There is a strong concern regarding the lack of **efficient solutions** addressing the situation of Roma women and children.

The collocations of *effective* and *efficient* with nouns highlight their different focuses. *Effective* pairs with nouns emphasizing results, such as *date* (6 occurrences), *way* (5 occurrences), and *means* (4 occurrences). For example, *effective date* refers to when a policy starts, as in “In advance of the effective date of the 2005 amendments.” *Effective way* describes successful methods, as in “They had an effective way to communicate.” Similarly, *effective means* refers to successful approaches, as in “training welfare workers on the most effective means of working with clients.”

Efficient, on the other hand, collocates with nouns related to process optimization, such as *way* (8 occurrences), *use* (7 occurrences), and *solutions* (4 occurrences). *Efficient way* refers to streamlined methods, as in “recommends distributed generation as a more efficient way to deliver electricity to remote villages.” *Efficient use* highlights resource management, as in “The efficient use of the land bridge will reduce transit times significantly.” *Efficient solutions* focus on practical problem-solving, as seen in “the lack of efficient solutions addressing the situation of Roma women and children.”

While both adjectives share collocations like *way* and *use*, their meanings differ. *Effective way* describes a method that achieves a goal, as in “he had a very effective way of disarming some of the questions.” *Efficient*

way focuses on minimizing effort, as in “The most efficient way for cells to harvest energy stored in food is through cellular respiration.” Similarly, *effective use* means meaningful application, as in “the effective use of technology in the classroom, not as an end in itself but as a tool.” Meanwhile, *efficient use* emphasizes resourcefulness, as in “the most efficient use of resources, how to minimize costs and maximize benefits.” These examples show that effective relates to results, while efficient emphasizes optimization.

3.2.1.2.2. Adverb + Adjective

The collocations of *effective* and *efficient* with adverbs from COCA highlight their distinct usage patterns. Adverbs intensify the meanings of these adjectives, emphasizing either the degree of success (*effective*) or the optimization of functionality (*efficient*). The table below presents the most frequent adverbs collocating with each adjective.

Table 5. Collocations of *Effective* and *Efficient* with Adverbs

No	Adverb (<i>Effective</i>)	Frequency	Adverb (<i>Efficient</i>)	Frequency
1	Very	6	Highly	3
2	Fairly	3	So	3
3	Highly	2	Very	2
4	How	2	Economically	2
5	Not	2	Ridiculously	1
6	Darn	1	Informationally	1
7	Extremely	1	Incredibly	1
8	Quite	1	Fairly	1
9	Surprisingly	1	Quite	1
10	Especially	1	Ruthlessly	1
11	Politically	1	Extremely	1
12	Generally	1	Particularly	1
13	Still	1	Uniquely	1
14	Optimally	1	Both	1
15	Truly	1	Relatively	1
16	So	1	Marvelously	1

The table above shows the frequency of collocation adjective efficient and effective.

For *effective*, the most frequent adverbs include *very*, *fairly*, and *highly*, which emphasize its degree of success or impact. Examples include:

1. It seems to me that those passages in her post do a **very effective** job of helping us understand the psychological state she was suffering under.
2. Typically, for the deleted vignettes, their responses were rated as either effective or ineffective, with no representation of **fairly effective** responses.
3. Soft law is a pervasive phenomenon that is **highly effective** as a means of regulation in Australia.

For *efficient*, common adverbs include *highly*, *so*, and *economically*, which highlight practicality and functionality. Examples include:

1. The simple but **highly efficient** generators are hand-cranked and store the resulting mechanical energy.
2. The technology is **so efficient** that the DNA from a single cell can be amplified without difficulty.
3. It sounds good because, obviously, it's much simpler, and it may be much more **economically efficient** in the long run.

The collocations of *effective* with adverbs highlight different levels of success. The most frequent, *very* (6 occurrences), reinforces strong effectiveness, as in “those passages in her post do a very effective job of helping us understand.” *Fairly* (3 occurrences) suggests moderate success, as in “their responses were rated as either effective or ineffective, with no representation of fairly effective responses.” *Highly* (2 occurrences) emphasizes strong effectiveness, as in “Soft law is a pervasive phenomenon which is highly effective as a means of regulation in Australia.” These patterns show that *effective* is often modified by adverbs indicating degrees of success.

The collocations of *efficient* with adverbs emphasize practicality and optimization. *Highly* (3 occurrences) highlights strong performance, as in “the simple but highly efficient generators are hand-cranked.” *So* (3 occurrences) indicates a high level of optimization, as in “the technology is so efficient that the DNA from a single cell can be amplified.” *Economically* (2 occurrences) underscores cost-effectiveness, as in “it may be much more economically efficient in the long run.” These patterns show that while *effective* relates to achieving goals, *efficient* focuses on smooth and resourceful performance. These study's findings align with Fatih (2023),

who observed a notable co-occurrence pattern between the adverbs "nevertheless" and "nonetheless" and adjectives, with 7 out of 13 instances exhibiting an adverb-adjective collocation. In this study, the adjectives "efficient" and "effective" were found to collocate with all adverbs across various collocation types. Furthermore, the level of formality in the usage of the adverbs "nevertheless" and "nonetheless" was highest in academic texts and magazines, whereas in other genres, the level of formality was consistent. The formality level of the adjectives "efficient" and "effective" was distinguished by their occurrence in different text genres, with "effective" being more frequently used in formal genres such as academic texts, while "efficient" was used in both formal and informal genres, including magazines, fiction, and others.

4. Conclusion

This study set out to clarify the distinct uses of the adjectives *effective* and *efficient*, which are often mistakenly regarded as interchangeable. By analyzing their collocational patterns and degrees of formality in the Corpus of Contemporary American English (COCA), the research provides empirical evidence that these adjectives serve different communicative purposes. The findings confirm that *effective* is predominantly associated with outcomes and impact, whereas *efficient* is more closely tied to process optimization and resource management. Furthermore, this study advances the field by highlighting the importance of nuanced word choice in English usage—especially for non-native speakers and learners of academic or professional English. It offers a clearer understanding of how context, collocation, and formality shape the meaning and appropriateness of these commonly confused adjectives.

This study contributes to the field of applied linguistics as it utilizes corpus linguistics to help researchers understand language in real-world contexts, specifically in terms of word collocations and their usage. Additionally, this study also benefits the field of lexicography, as corpus linguistics enables lexicographers to gain insights into how words are used in specific contexts.

Future research could expand on this work by investigating semantic prosody and pragmatic functions of *effective* and *efficient* in spoken versus written discourse. Comparative studies involving other corpora, such as British English or learner corpora, would also help determine whether these patterns are consistent across varieties of English and levels of language proficiency.

References

- Anggita. (2023). *English collocations of the verb "explored" on the Corpus of Contemporary American English (COCA): A corpus-based analysis* [Thesis]. Universitas Sumatera Utara.
- Baker, P., & Egbert, J. (Eds.). (2016). *Triangulating methodological approaches in corpus-linguistic research*. Routledge.
- Barowski, S. (2021). *Formal vs. informal language: Definition and examples*. Cambridge University Press.
- Benson, M., Benson, E., & Ilson, R. (1986). *The BBI combinatory dictionary of English: A guide to word combinations*. John Benjamins.
- Biber, D. (2010). Corpus-based investigations of language use. In B. Heine & H. Narrog (Eds.), *The Oxford handbook of linguistic analysis* (pp. 159–182). Oxford University Press.
- Biber, D., Reppen, R., & Friginal, E. (2010). Research in corpus linguistics. In R. B. Kaplan (Ed.), *The Oxford handbook of applied linguistics* (2nd ed., pp. 548–570). Oxford University Press.
- Brezina, V., McEnery, T., & Wattam, S. (2015). Collocations in context: A new perspective on collocation networks. *International Journal of Corpus Linguistics*, 20(2), 139–173. <https://doi.org/10.1075/ijcl.20.2.01bre>
- Burches, E., & Burches, M. (2020). Efficacy, effectiveness, and efficiency in health care: The need for an agreement to clarify its meaning. *Journal of Public Health*, 42(3), 341–345.
- Davies, M. (2008). *The Corpus of Contemporary American English (COCA)*. <https://www.english-corpora.org/coca/>
- Fathi, M. (2023). *Adverbs nevertheless and nonetheless in Corpus of Contemporary American English (COCA): A corpus-based analysis*. Universitas Sumatera Utara.
- Luo, X. (2022). Content analysis: A systematic approach to textual data. *Journal of Qualitative Research Methods*, 14(1), 27–45.
- Lyons, J. (1981). *Language, meaning and context*. Cambridge University Press.
- Mansour, D. M. (2017). Using COCA to foster students' use of English collocations in academic writing. In *3rd International Conference on Higher Education Advances (HEAd'17)*. <https://doi.org/10.4995/HEAd17.2017.5301>
- McEnery, T., & Hardie, A. (2012). *Corpus linguistics: Method, theory and practice*. Cambridge University Press.

- Moon, R. (1998). *Fixed expressions and idioms: A corpus-based approach*. Oxford University Press.
- Quirk, R., Greenbaum, S., Leech, G., & Svartvik, J. (1985). *A comprehensive grammar of the English language*. Longman.
- Schwarz, L. (2024). Efficiency vs. effectiveness: What's the difference? *Business Insights Journal*, 12(1), 78–95.
- Veloso, I. (2023). Corpus of Contemporary American English (COCA) tutorial. In L. Goulart & I. Veloso (Eds.), *Corpora in English language teaching: Classroom activities for teachers new to corpus linguistics*. Montclair State University.
- Wang, J. T., & Good, R. (2007). The repetition of collocations in EFL textbooks: A corpus study. *Online Submission*, 1–13.