A Wealth of Information or Too Much Information? Examining the Effectiveness of Supplementary Corpus Examples in Online Dictionaries

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ABSTRACT

Both quality and quantity matter when lexicographers select examples. It may be true that in the digital era of lexicography, unrestricted storage space in dictionaries is a convenience publishers can afford to have. But at the same time it cannot be denied that dictionary-making requires consistency and precision. A great number of corpus examples, which are carriers of collocational and grammatical information, have been lavishly squeezed into the extra sections of online dictionaries. The aim of the present contribution is to gauge the adeptness of advanced English learners in extracting pertinent lexicographic information from numerous supplementary corpus examples found in online dictionaries, and subsequently applying this acquired knowledge in a language production task. 308 subjects were recruited for the study. The mixed-effects logistic regression model reveals that the students derived the most benefit from the presence of three examples of which two examples held the target structure. The most significant finding is that exposure to as many as twelve or fifteen encoding corpus examples with two examples relevant to the task benefits dictionary users as much as the availability of three encoding corpus examples with one relevant example. The study findings are in line with the previous investigations. The study carries some general pedagogical and lexicographic implications.

Keywords: lexicography; online dictionary; corpus example; language production; second language learner

INTRODUCTION

Language production can be adversely affected when advanced learners use words that have a higher syntactic and collocational potential without prior dictionary consultation (Summers, 1988, pp. 112-116). Being able to produce grammatically correct sentences in the target language is considered to be an unenviable task when students form sentences using words exhibiting various types of syntax and collocation patterns (Chan, 2012, p. 69) in a wide variety of contexts. In these situations, the more skilful and adept dictionary user is likely to consult an English monolingual learners' dictionary. Today, in the era of digital lexicography, lexicographers facilitate language learning by supplying online dictionary entries with a plethora of corpus example sentences (Heuberger, 2020, p. 410) located in different parts of the entry. Normally, examples in dictionaries appear along with their respective grammar patterns of usage which are highlighted in boldface (for an example, see the online version of *Longman Dictionary of Contemporary English* or *Oxford Advanced Learner's Dictionary*). However, lexicographers who try to cater for students' encoding needs also have a tendency to additionally incorporate a good many corpus examples in specific

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sections of the entry, or on a separate page[1] where examples of the headword are provided in sentences (see Appendix A and Appendix B[2]). These examples usually encompass various types of syntax and collocation patterns for words exhibiting more complex properties with respect to their capacity to combine with other words in a sentence, mixed with target and non-target structures. Clearly, the use of corpora in the making of dictionaries is a well-established practice nowadays which plays a pivotal role in the production of dictionaries (Krishnamurthy, 2006, pp. 251-252; Hanks, 2012a, 2012b; Kilgarriff & Kosem, 2012; Heuberger, 2016, 2020; Kosem, 2016; Rundell, 2018; Nelson, 2020). In present-day lexicography, given state-of-the-art technology readily available to researchers, resorting to electronic corpora is the *sine qua non* of compiling a modern dictionary. The reasons for the powerful impact that corpora have on the process of writing dictionaries are manifold, however, one of the most obvious answers would be that users want to have examples in a dictionary (Rundell, 2015, p. 318). But this begs the question of how many examples lexicographers should give them. Herbst (2010, p. 225) contends that using collocations[3] is more challenging for language learners than understanding them. Lew and Radłowska (2010, p. 43) hold the view that collocations can be problematic for higher-level students and their awareness[4] of collocational word combinations should be heightened by their teachers. Chan[5] (2012, p. 69) emphasizes the fact that insufficient productive knowledge of syntactic rules and collocations may negatively influence language production, while Bahns and Eldaw (1993, p. 101) observed that using collocations to produce correct English can be a daunting task for German advanced EFL students. Such findings suggest that students of English are in dire need of the incorporation of supplementary production examples by dictionary-makers in monolingual pedagogical dictionaries. Nevertheless, in light of time constraints in the real world and the importance that learners attach to faster dictionary consultation (Bogaards, 1998, p. 561; Chen, 2010, p. 292; Chan, 2012, p. 87; Knežević et al., 2021, p. 7), they deserve to be provided with the optimum number of examples within a dictionary entry. Moreover, by additionally supplying dictionary entries with multiple corpus examples, lexicographers give dictionary users access to an enormous body of lexicographic data. Frankenberg-Garcia (2020, p. 32) notices that "[o]verburdening dictionary users with too much information could be detrimental", whereas Gouws and Tarp (2017, p. 394) recognize that "in online dictionaries (…) overloading of data can be an inviting trap". To reiterate, having more examples is what dictionary users want and need (Ptasznik: 2022, p. 240), and the author supports the view that this lexicographic practice needs to be continued. Still, it must be admitted that it would perhaps be worthwhile to set the boundaries with higher precision, and establish the threshold of the quantity of additional corpus examples that could be incorporated within a single dictionary entry for words that have a larger syntactic and collocational capacity for combining with other words. Another reasonable question pertaining to the aforementioned issue is how many target structures for a specific grammar and collocation pattern of use should be included when numerous corpus examples that are provided in an entry are a mix of relevant and irrelevant examples? Significantly, such research could be rewarding in the long-term and bring more benefits to users, not to mention the fact that it would be in line with the fundamental principle of lexicographic consistency. Notably, even more proficient students

[1] *In the Collins Online Dictionary, this page is called the Sentences page.*
[2] *To gain access to all of the extra examples (eleven example sentences from Collins dictionaries and thirty-two from the Collins Corpus), please visit: https://www.collinsdictionary.com/sentences/english/recommend.*
[3] *For more on the topic of collocations and production see Laufer and Waldman (2011).*
[4] *Chen (2017: 247) reinforces the view put forward by Lew and Radłowska (2010). For more on building learners' collocational awareness, see Dziemianko (2014).*
[5] *For more about the problems that learners encounter in production see Chan (2010), where the author elaborates on written errors of Hong Kong Cantonese ESL learners.*

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can be overwhelmed during a production task by the complexity of the valence and argument structure of the lexical item in a setting swamped with a multitude of examples. Last but not least, the issue of presentation space (Lew in press; L'Homme & Cormier, 2014, p. 333; Fuertes-Olivera, 2016; Ferrett & Dollinger, 2021, p. 68) in online dictionaries remains relevant in the present context as dictionary users care about the amount of lexicographic information that is displayed to them on screen. On balance, in light of the significant role that dictionary users attribute to dictionaries as essential learning tools, lexicographers and metalexicographers are expected to push the boundaries of research by further exploring students' needs and preferences regarding the consultation of example sentences in dictionaries.

LITERATURE REVIEW

There are empirical studies in the area of dictionary-user research that have paved the way for researchers to further explore the topic of the usefulness of examples. Summers (1988, pp. 120-123), who investigated the impact of definitions and examples in dictionary use on language production and comprehension, observed that students seem to benefit most from exposure to a combination of examples and definitions when engaging in language production tasks. In spite of circumstantial evidence pointing to the fact that bare examples could have a more positive effect on production than comprehension, statistically significant differences were not reported in any of the three experiments. Laufer (1993, pp. 136-138) found that the incorporation of definitions plus examples into entries appears to be a more effective strategy for the comprehension and production of new words than supplying entries with definitions or examples only. In other experiments, there was no statistically significant effect of the usefulness of examples on language production (Nesi, 1996, pp. 203-205) or comprehension (Al-Ajmi, 2008, pp. 21-22). Importantly, Nesi tries to account for this phenomenon by concluding that learners need better examples in dictionaries. Chan's research (2012, pp. 85-86) highlights the importance of examples in monolingual dictionaries for advanced learners with respect to grammaticality judgement of English sentences, and reinforces the findings from previous studies (Bogaards & van der Kloot, 2002, pp. 755-756; Dziemianko, 2006) that language learners are keen to use examples. Chan concludes that examples hold an advantage over explicitly presented grammatical information in the identification of correct word usage, and infers, in accordance with Nesi's remark (1996, pp. 203-205), that only examples of the highest quality, meticulously selected by lexicographers, are needed in dictionaries.

Quite predictably, the fact that we live in the age of digital lexicography and in the light of the rapid development of digital-only resources (Rundell, 2014, pp. 1-4), different types of language learning and lexicographic technologies that enable the selection of good dictionary examples, such as the GDEX tool (see Kilgarriff et al., 2008), have commanded lexicographers' attention (Kosem et al., 2019, pp. 119-122). According to Krishnamurthy (2006, p. 252), "[t]he abundance of corpus examples (…) presents lexicographers with new problems: selecting appropriate examples and deciding their exact extent". It follows that dictionary compilers must give priority to high-quality examples, i.e. those that are natural, typical, informative and intelligible (Fox 1987; Atkins & Rundell, 2008, pp. 458-461). Being selective in choosing examples is essential because these conveyors of syntactic and collocational information hone learners' linguistic skills, boost language reception and production, and are often perceived by foreign language learners as their primary source of collocational and colligational information. In the past years, however, there has been a growing trend in the lexicographic society, embraced

by publishing houses, towards the automation (Rundell, 2012b; Dziemianko, 2019, p. 5) of the process of dictionary compilation, which has resulted in the exploitation of corpus data and incorporation of a multitudinous number of corpus examples in monolingual dictionaries for learners of English.

In the business of professional dictionary-making, both quality and quantity matter. Learners have communicated their message to metalexicographers that they desire to be given more examples in dictionaries (Farina, 2019, pp. 469-470). The question remains what the optimum number of examples is in dictionaries, as dictionary-making requires consistency and precision. Vrbinc A. and Vrbinc M. (2016, p. 298) shrewdly point out that more complex lexical items from a semantic and grammatical point of view will usually need more examples than those exhibiting more simple semantic and syntactic properties. Liu (2017, pp. 289-292), however, acknowledges that nowadays lexicographers are in possession of the tools to follow a more liberal policy and freely increase the number and variety of examples in e-dictionaries, but at the same time forewarns of the dangers of this practice by suggesting that only when lexicographers deem it necessary should more examples be made available to the average dictionary user. Nesi (1996, p. 204) pushes for sensible steps to be taken in practical lexicography, by arguing that dictionary-makers of pedagogical dictionaries "must also make decisions regarding the quantity of examples provided for any given word". The overriding importance of digital-only resources and unlimited space in the digital formats of dictionaries (Svensén, 2009, p. 284; Felbaum, 2014, pp. 378-379; Rundell, 2014, pp. 1-2) means that there is now room for more examples in online dictionaries. But does this mean that countless examples can be squeezed into a dictionary entry? Atkins and Rundell (2008, p. 23, see also De Schryver, 2003, p. 163; Rundell, 2012a, p. 73) caution against following such an approach by stressing that the process of using lexical data in dictionaries "calls for smart information management and sensitive design, if users are not going to suffer from a debilitating case of information overload". Furthermore, as previously mentioned, Frankenberg-Garcia (2020) and Gouws and Tarp (2017) contemplate that entries packed with lexicographic data could be a potential problem.

Frankenberg-Garcia (2012, 2014) found that three corpus examples are more helpful to learners of English (B1-B2 in CEFR) than a single corpus example in language production[6]. In her third study (2015), Frankenberg-Garcia incorporated four examples into the research design, however, there was no evidence pointing to the fact that four corpus examples hold an advantage over three corpus examples. Ptasznik (2023) set out to explore the impact of multiple corpus examples on production in an experimental dictionary setting where example sentences represented a range of grammatical and collocational patterns, and found that eight corpus examples of which two examples hold the target structure can be equally beneficial to English majors as three corpus examples with one example relevant[7] to the task. This finding implies that

[6] *In the context of Frankenberg-Garcia's studies, "multiple corpus examples" are to be understood as "three corpus examples", although in her third study (2015) experimental conditions with two, three and four examples were used.*

[7] *To give a simple example (in order to make a distinction between a "relevant" and "irrelevant" example), the verb "suggest" is commonly followed by either a noun phrase, that-clause, gerund or wh-question word (see https://dictionary.cambridge.org/grammar/british-grammar/suggest). In the sentence "I suggest that you go home", the verb "suggest" is used with a that-clause. This sentence illustrates only one possible grammatical pattern of usage for the verb "suggest", as the verb "suggest" can also be used in a sentence with a noun phrase ("suggest a good restaurant"). In order to correctly translate the Polish sentence "Sugeruję, abyś poszedł do domu" into English using the word "suggest", one would need to use "suggest" with a that-clause" (or perhaps, assuming that it could be inferred from context who it is that we are speaking to: suggest + -ing form of the verb). Taking everything into account, the sentence "I suggest that you hurry up with your homework" could be treated as a relevant example (sentence) given the context above, as such a sentence illustrates a specific syntax pattern of usage (suggest + that-clause) required for the task at hand, whereas the sentence "She suggested a good restaurant" (suggest + noun phrase) would be an irrelevant example. To better understand the difference between "relevant" and "irrelevant" examples, see Appendix A, where the verb "recommend" is used in a range of lexicogrammatical patterns of usage (for example, recommend (that), recommend doing something, recommend something to somebody, etc.).*

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upper-intermediate and advanced-level students are adept at obtaining relevant information from exposure to eight encoding corpus examples in a production-based task, which in turn suggests that exposing students to eight examples in an entry is not tantamount to overburdening them with an abundance of lexicographic information.

But what happens when learners strive to extract pertinent lexicographic information from dictionaries when they are exposed to an environment overloaded with more than ten encoding corpus examples? One reason why more examples are added to dictionary entries is because certain words in the English language have a higher syntactic and collocational potential than other words. Meanwhile to illustrate various types of verb complementation patterns and enhance production, the lexicographer selects from appropriate corpora more than one example for each separate collocation and colligation pattern of usage. All things considered, lexicographers try to make dictionaries more user-friendly by incorporating as many example sentences as necessary in dictionaries for words with complex lexicosyntactic properties, be it even more than ten examples (see Appendix A), to illustrate word usage as transparently as possible with the aim of satisfying dictionary users' productive needs. In other words, giving learners more examples for lexical items with a more complex valence and argument structure is an essential lexicographic practice.

For the sake of clarity, dictionary users need more examples. The questions however pertaining to the context of the author's current research are the following: What specifically does giving learners *more examples* mean? How can *too many examples* be understood?

AIM OF THE STUDY

The aim of the paper is to gauge students' effectiveness using lexicographic information from multiple supplementary corpus examples in the extra sections of online dictionary entries. The author will attempt to answer the following research questions:

1. Does exposure to three example sentences (with either one or two relevant examples) contribute to significantly higher TRANSLATION ACCURACY compared to twelve example sentences (with either one or two relevant examples)?
2. Does exposure to three example sentences (with either one or two relevant examples) contribute to significantly higher TRANSLATION ACCURACY compared to fifteen example sentences (with either one or two relevant examples)?
3. Does exposure to twelve example sentences (with either one or two relevant examples) contribute to significantly higher TRANSLATION ACCURACY compared to fifteen example sentences (with either one or two relevant examples)?

METHOD

SUBJECTS

A sample of 308 subjects took part in the study. The participants were advanced learners of English (C1 in CEFR). They were English majors attending a Polish university, males and females. All of them were native speakers of Polish, aged between 19 and 24. Before the students were allowed to take the translation test, they first had to give their consent to participate in the experiment.

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EXPERIMENTAL DESIGN

Only verbs (35) were incorporated into the experimental design of the study, which means that a homogeneous sample of test items was used. All of the items in the study were selected from the Longman Communication 9000, based on the Longman Corpus Network and Longman Learner's Corpus. To meet the aims of the study, as well as avoid any comprehension problems on the part of the subjects, frequently used words exhibiting a higher syntactic and collocational potential were chosen for the experiment. More challenging target collocation and colligation patterns of use were selected, with a view to engaging the subjects in the consultation of the examples provided for specific experimental conditions. To be able to assess the students' ability to translate sentences from Polish into English through the use of the target syntax and collocation patterns of use selected for the purpose of the experiment, the participants were asked to translate the sentences by using the words made available to them in the space above the example sentences.

In the experiment, seven test versions were used. Within each test version, to minimize any item-order effects, items were sequenced according to the random locations assigned by the Random Integer Generator (https://random.org/integer-sets/; item order by test version is available as supplementary material to this article). A within-subjects design was applied, with six experimental conditions and the control condition. Target syntax and collocation patterns of use were assigned random locations to each test item. All of the subjects were exposed to three, twelve and fifteen encoding examples, assisted by either one or two relevant examples that held the target structure, as well as the condition without examples, with five test items being assigned to each experimental condition and the control condition for each test version (the assignment of conditions to test items was rotated across seven test versions). The remaining example sentences represented a range of lexicogrammatical patterns of use, which allowed for exposure to a trickier dictionary use environment. As three examples were used in the research design of previous experiments (see Frankenberg-Garcia, 2012, 2014, 2015; Ptasznik, 2023), an experimental condition with fewer (three) examples was included in the present study. Given the lexicographic practice in online dictionaries to incorporate more than ten corpus examples in extra sections of dictionary entries for verbs exhibiting a higher syntactic and collocational potential (unlike standard examples, which are manually vetted, these extra examples are pulled automatically from a corpus, which is why many of them exhibit different types of lexicogrammatical patterns), the three-examples condition was tested empirically against experimental conditions packed with more lexicographic data, formed out of twelve and fifteen examples (for example, it appears that the policy is to include fifteen additional[8] corpus example sentences at the end of entries in the *Cambridge Dictionary*). The examples that appeared in the three-examples conditions were also used in the remaining experimental conditions, while the examples from the twelve-examples conditions were included in the conditions with fifteen examples. A sixteenth example sentence was prepared by the experimenter for each test item appearing with a single target syntax and collocation pattern of use, as the example sentence containing the second target structure had to be removed. The examples were carefully selected (all examples are available as supplementary material to this article) by the experimenter from different online sources: *Cambridge Dictionary Online, Collins Online Dictionary, Longman Dictionary of Contemporary English, Macmillan English Dictionary Online, Merriam Webster's Learner's Dictionary, Oxford Advanced Learner's Dictionary*. Additionally, other dictionaries and parallel corpus query tools were used in the

[8] *For selected entries, dictionary users have the possibility to gain access to more than fifteen corpus examples by clicking on See all examples of…"; however, these examples are presented on a different page.*

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experiment for the preparation of the Polish and English target sentences: *Bab.la, Diki: Słownik Angielskiego Online, Ling.pl, Linguee.pl, PONS, Reverso Context, Słownik Języka Polskiego (PWN), Wielki Słownik Języka Polskiego, WordReference*. To meet the aims of the study and avoid any comprehension problems, the examples and target sentences were sporadically modified by the researcher (the Polish and English target sentences, along with their target syntax and collocation patterns of use, are available as supplementary material to this article).

PROCEDURE

The experiment was conducted in a computer lab, equipped with twenty-four desktop computers. In total, there were thirteen experimental sessions. In each session, twenty-four students participated in the study, with the exception of the last session, where there were twenty subjects. Each participant was provided with a 35-page Microsoft Word document on the hard drive of the computer. A brief 5-10 minute instruction period preceded the experiment. The subjects were instructed by the experimenter to translate thirty-five sentences from Polish into English (sample tasks are available as supplementary material to this article). This instruction was also provided at the top of each page of the document. It was explained to the participants that they would be working with and without example sentences, and were specifically asked to use the examples for their translations, whenever they were made available to them. Also, the students were provided with specific target words for each separate translation, and were requested to translate the sentences by using every single target word given. It was made clear by the researcher that the students are not allowed to browse the Internet for information, use their smartphones, paper dictionaries or communicate with other students in the room. Taking into account the fact that classes at Polish universities require one hour and thirty minutes, the subjects were given a time limit of one hour and fifteen minutes for the completion of the whole test. They were asked to take their time, thoroughly examine the example sentences before deciding on their final answers, as well as avoid leaving a blank space for their translations and attempt to provide a translation equivalent regardless of the level of difficulty of the task at hand. The procedures were directly overseen by the experimenter. At the end of the experiment, the participants were reminded not to sign the Word document (they were also asked not to do this during the instruction period).

TEST SCORING

A score of 1 or 0 was assigned to test items for each correct and incorrect translation respectively. The subjects' performance was evaluated on their ability to correctly use the target syntax and collocation patterns of use provided to them in the example sentences (the subjects were supposed to extract this information from the example sentences). Errors pertaining to other grammar issues and not corresponding in any way to the students' ability to use the target structures incorporated into the examples, such as incorrect usage of tenses, conditional sentences, articles, prepositions, modal verbs, defining and non-defining relative clauses, or, for example, the causative *have*, were disregarded by the researcher, provided that these were minor mistakes that did not decrease the comprehensibility of the target sentences. Scores for test items were given by the experimenter.

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DATA ANALYSIS

Given the advantages of the application of mixed-effects logistic regression models in dictionary-user research (for example, incorporation of random effects, which allows to control for the variability between the subjects and test items, or robustness of such statistical analyses), two mixed-effects logistic regression models were fitted in the present study. For building the mixed-effects models, the package *lme4* (Bates et al., 2015) for R (Baayen, 2008) was used. The statistical computations were done in package R version 4.0.2 (R Core Team, 2020). One fixed-effects parameter and two random effects were incorporated into the statistical model. EXAMPLES CONDITION was defined as the fixed effect, whereas ITEM and SUBJECT were entered in the model as the random effects. TRANSLATION ACCURACY was the outcome variable (a description of the selection of the mixed effects logistic regression model is available as supplementary material to this article).

RESULTS

The mean results for TRANSLATION ACCURACY have been collated in Table 1 (the mean scores expressed in percentage terms for individual test items by experimental and control condition are available as supplementary material to this article).

TABLE 1. Mean results for TRANSLATION ACCURACY with standard deviations and 95% confidence intervals

Condition	Mean	Standard deviation	95% CI
Control	46.69	26.14	43.76—49.62
Three examples (1 relevant example)	65.71	26.30	62.77—68.66
Three examples (2 relevant examples)	69.22	26.39	66.26—72.18
Twelve examples (1 relevant example)	59.87	27.01	56.84—62.90
Twelve examples (2 relevant examples)	62.47	27.85	59.34—65.59
Fifteen examples (1 relevant example)	59.42	25.54	56.55—62.28
Fifteen examples (2 relevant examples)	63.77	27.04	60.73—66.80

Figure 1 shows a violin plot (with horizontally-oriented density curves) which presents the distribution of mean TRANSLATION ACCURACY across the six experimental conditions and control condition (violin plots visualize the distribution of data points, showing both the probability density and the range of the data). The elongated shapes suggest that the distribution is rather wide.

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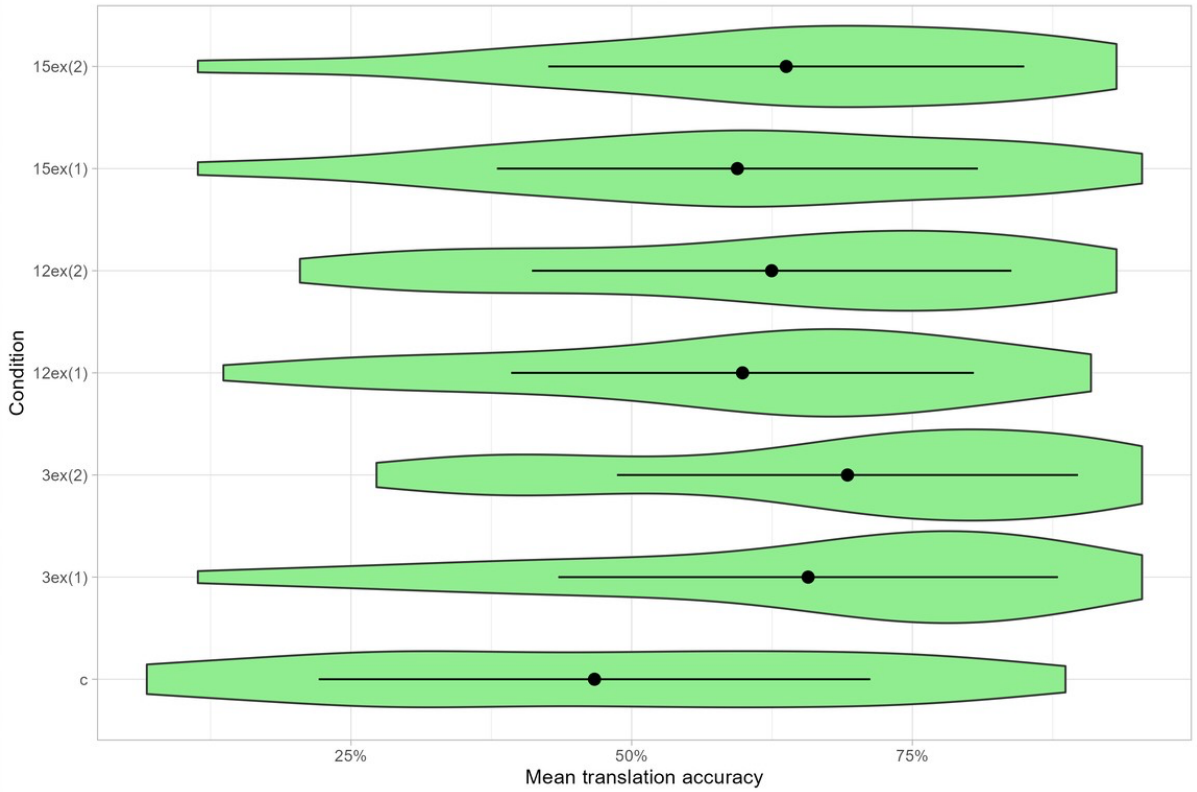

FIGURE 1. Violin plot of mean TRANSLATION ACCURACY by EXAMPLES CONDITION (central dots and horizontal bars represent the means ± one standard deviation)

The variance of the SUBJECT random effect, corresponding to the subjects taking part in the experiment, was equal to 0.947, whereas the ITEM random effect had a slightly higher value. Its variance was equal to 1.125. Residual variance amounted to 0.927.

Table 2 provides the variance and standard deviation measures for random effects.

TABLE 2. Variance and standard deviation for random effects

Groups	Variance	Standard deviation
Subject	0.947	0.973
Item	1.125	1.061

The results indicate that the subjects benefited the most from exposure to three examples. The chances of correct translation were on average 2.958 times higher than in the control condition when the students were given three examples with one example relevant to the task, and 3.630 times higher when they had three examples with two relevant examples. In the twelve-examples condition, the subjects had a 2.113 times higher chance of being more successful than in the control condition when they were assisted by one relevant example that held the target syntax and collocation pattern of use, while those who had access to twelve examples of which two were relevant had a 2.486 times higher chance of giving the correct answer. The students who were exposed to the experimental condition with fifteen examples containing one relevant example had a 2.045 times higher chance of correctly translating the sentences than the students who worked without examples, while for the students provided with fifteen examples of which two represented

the target structure the chances of correct translation from Polish into English were on average 2.604 times higher. The differences between the abovementioned conditions reached statistical significance ($p < 0.001 < \alpha = 0.05$).

Table 3 gives figures for the logistic regression model. The p-values in Table 3 refer to differences against the control condition.

TABLE 3. Logistic regression model

	Odds ratio	2.5%	97.5%	p-value
(Intercept)	0.826	0.557	1.225	0.331
Three examples (1 relevant example)	2.958	2.492	3.517	< 0.001
Three examples (2 relevant examples)	3.630	3.050	4.325	< 0.001
Twelve examples (1 relevant example)	2.113	1.785	2.504	< 0.001
Twelve examples (2 relevant examples)	2.486	2.097	2.951	< 0.001
Fifteen examples (1 relevant example)	2.045	1.729	2.422	< 0.001
Fifteen examples (2 relevant examples)	2.604	2.197	3.090	< 0.001

Statistically significant differences were also reported between the three-examples condition with two examples relevant to the task and each of the experimental conditions in which students were provided with twelve and fifteen examples ($p < 0.001$). Having an additional relevant example in the three-examples condition did not significantly help the students improve their scores ($p = 0.258$). This suggests that advanced-level students may not need two examples that hold the target structure when they are exposed to three examples, as having one such example should suffice. Notably, the results for the subjects assisted by three examples with one example relevant to the task significantly exceeded those in the twelve (odds ratio = 1.399, $p < 0.001$) and fifteen-examples (odds ratio = 1.446, $p < 0.001$) conditions with a single relevant example, however, the differences between the three-examples condition with one relevant example to the task and twelve (odds ratio = 1.189, $p > 0.05$) and fifteen-examples (odds ratio = 1.135, $p > 0.05$) conditions with two relevant examples were far from reaching statistical significance. These findings seem to lend support to the idea that advanced students of English achieve comparable results in a production task when assisted by three, twelve and fifteen corpus examples, in an environment of relevant and irrelevant examples, as long as they are given at least two relevant examples that hold the target structure when extracting information from twelve and fifteen corpus examples. By the same token, the data reveal that exposing students to as many as twelve or fifteen corpus examples of which one example holds the target syntax and collocation pattern of use may be less beneficial with respect to language production.

DISCUSSION AND CONCLUSIONS

Exposure to three encoding corpus examples with two examples representing the target structure created the most favorable condition for using lexicographic information from corpus examples (Research question 1 and 2). Adding an extra relevant example in the three-examples condition boosted the students' overall scores, but did not significantly improve the TRANSLATION ACCURACY of the students from a statistical point of view. Given the findings that exposure to three corpus examples can be helpful in production, these inferences are in line with the previous investigations. When advanced-level students are exposed to three examples, regardless of whether they have one (Ptasznik, 2023), two or three (Frankenberg-Garcia, 2012, 2014) relevant examples at their disposal, it appears that they are able to execute difficult language production

tasks. The provision of three examples seems to be enough when there is no need to present English learners with *more* lexicographic data.

Most importantly, the findings suggest that the incorporation of a fairly large number of supplementary corpus examples in online dictionaries can benefit students. The most practical research finding of this study is that advanced learners of English exhibit proficient dictionary skills, enabling them to effectively utilize lexicographic information from an environment overloaded with twelve and fifteen encoding corpus examples. This success is contingent upon being presented with a minimum of two examples illustrating the target structure. By contrast, the evidence points to the fact that supplying dictionary users with either twelve or fifteen examples with only a single example relevant to the task may be less beneficial in language production (Research question 1 and 2). Overall, it appears then that twelve and fifteen examples are not *too many*, on the condition that the extra sections of dictionary entries are equipped with enough lexicographic data for pertinent information to be extracted. Thus twelve and fifteen encoding corpus examples could be the optimum number of *more examples* in an entry, as long as two relevant examples are included to illustrate distinct target collocation and colligation patterns of usage, and the complexity of the valence and argument structure of the lexical item in question necessitates and allows for the use of such a number of examples. These findings are of direct relevance to lexicographic practice, since this variable can be manipulated and controlled by lexicographers: they can decide on the number of syntax and collocation patterns of use to be incorporated into the examples in the extra sections of entries. The findings reveal that students need only *two* relevant examples that hold the target structure. Given issues of presentation space (Lew in press; L'Homme & Cormier, 2014, p. 333; Fuertes-Olivera, 2016; Ferrett & Dollinger, 2021, p. 68), this seems to be a viable lexicographic strategy in the context of online dictionaries. From a different perspective, the findings lend weight to the argument that dictionary users do not need to be given as many as *three* relevant examples with the target structure for verbs with a higher syntactic and collocational potential when working with twelve or fifteen examples. Using *two* relevant examples with the target structure in the experimental conditions with twelve and fifteen examples proved equally beneficial as incorporating *one* example relevant to the task into the three-examples condition. To be able to display more lexicographic content at a given time to the dictionary user, additional space could be allocated otherwise.

The present findings are also in consonance with the findings of Ptasznik (2023), who found that eight encoding corpus examples with two examples relevant to the task are equally helpful to dictionary users as three examples of which one holds the target structure. All things considered, these findings demonstrate that dictionary users need *two* relevant examples when they are exposed to *more* examples in an entry – that is, eight, twelve and fifteen examples. That said, it could be worthwhile to see how *more* than fifteen corpus examples in an entry with *more* than two relevant examples influence language production. It may be argued that increasing the number of examples and (especially) examples relevant to the task within the extra sections of entries would improve language production and help guarantee even higher TRANSLATION ACCURACY compared with the scores received by the students in the current experiment. Despite bringing a tangible benefit to dictionary users, adopting such a strategy most likely comes at the cost of the loss of consultation time. On the contrary to what has been said above, the prolonging of entry consultation time could perhaps in turn negatively influence the students' level of motivation, and as a result reduce TRANSLATION ACCURACY.

The students achieved comparable results when being supplied with twelve and fifteen examples (Research question 3) in the present study (see Table 1). There were no statistically

significant differences between the conditions, although the difference between both fifteen-examples conditions would have almost reached statistical significance ($p = 0.081$) at the 8% level of significance. It can be inferred from this observation that the number of examples in an entry matters. Having to navigate through *more* examples in a dictionary entry tends to slightly pose a greater challeng for the average dictionary user. When *more* lexicographic data are provided, *more* information needs to be processed. Likewise, it seems rather obvious that consultation time increases. With *more* examples in a dictionary entry, and *fewer* examples relevant to the task, learners appear to lose some degree of interest in the task and may at some point abandon their attempt to continue using the examples made available to them. This is why more attention must be paid by lexicographers to the number of different target syntax and collocation patterns of use included within specific example sentences in sections of entries with fifteen or more corpus examples.

Even advanced learners encounter problems with production when confronted with complex collocational and grammatical challenges. In the current study, the subjects found it difficult to correctly use the following target syntax and collocation patterns of usage, despite being provided with examples: *force somebody into exile, rise (up) in revolt, recommend that somebody (should) do something, to be hurried (Act) through Parliament, cast somebody as something, approve of something, appeal to somebody, send somebody into fits of laughter, suggest that somebody (should) do something, pour in*. For all these test items, TRANSLATION ACCURACY was lower than 50%. From a statistical point of view, only in selected cases did examples seem to significantly help the students. Overall, the findings invite some general conclusions. It seems that students do not always decide to consult examples sentences in dictionaries even when the task at hand demands them to. On the one hand, advanced learners of English are risk-takers. They tend to rely on their own skills and fall back on their own knowledge of verb complementation patterns and collocations, which is not at all surprising, given their extensive experience and constant exposure to the target language. However, resorting to one's own abilities all too often may come at a price when handling an onerous language production task. Even more advanced students will not always manage to efficiently execute the task at hand. Given the complexity of the valence and argument structure of certain verbs, certain tasks will require dictionary consultation in language production. On the other hand, acquiring knowledge of particular verb complementation patterns in the target language can be simply more problematic. For example, producing sentences with verbs such as *suggest* and *recommend* (see Ptasznik, 2023, pp. 44-46) has always posed a formidable challenge to Polish learners of English (regardless of their English proficiency level), given the necessity to understand the use of the present subjunctive mood in the English language. Moreover, using verbs with the right prepositions (for more on the problems that learners of English encounter see Swan & Smith, 2001) can also be tricky. To meet the aims of the present study, the subjects had to deal with more complex test items, purposefully selected by the experimenter. It could be concluded that in certain cases providing accurate translations for verbs exhibiting sophisticated syntax and collocation patterns of usage must have been particularly burdensome for some of the students. On balance, it is the job of the lexicographer to devise a workable solution for such problems. Also, dictionary users need to be made more aware of the significance of examples in dictionaries by their teachers. Emphasizing the importance of dictionary classes in the development of learners of English could be given more priority in the Polish educational system.

The study is not free from limitations. As stated above, the subjects, who were instructed to translate sentences from their native language into the target language, took part in an

experiment which was strictly designed as a productive task. The students were asked to peruse the examples and attempt to correctly translate the Polish sentences by using the target syntax and collocation structures obtained from the examples. Receptive examples were not selected by the experimenter for the current study. Given the frequent grammatical problems that advanced-level students encounter when producing English sentences by using verbs exhibiting more complex syntactic properties, as well as problems related to incorrect usage of collocations, the aim was to create a more straightforward experimental design with a particular focus on students' productive skills. Having said that, however, it could be argued that higher-level students usually consult corpus examples from extra sections of online monolingual learners' dictionaries to develop their production skills. Further research is needed to explore the dictionary habits and preferences of advanced-level students, particularly regarding their motivations for which they resort to consultation of supplementary corpus examples in dictionaries.

In the study, only experimental conditions with three, twelve and fifteen examples were employed. In future studies, the author would like to propose the application of experimental conditions with a minimum of fifteen corpus examples. To illustrate, in the online version of the *Longman Dictionary of Contemporary English* in the extra sections of both entries, the verbs *recommend*[9] and *suggest* include extensive sections with as many as twenty-one and twenty-six corpus examples, respectively. In the *Collins Online Dictionary*, there are eleven example sentences for *recommend* from Collins Dictionaries and an additional thirty-two from the Collins Corpus, which means that users have access to as many as forty-three extra examples on the *Sentences* page[10], whereas in the online version of the *Cambridge Dictionary*, exactly fifteen additional corpus examples from the Cambridge English Corpus have been added to verb entries for *suggest, recommend*, *demand* and other headwords. Moreover, all these examples, which lack grammatical guidance (grammar patterns) on usage, demonstrate a diverse array of different syntactic and collocational patterns of use for verbs considered very challenging by learners of English in terms of production. The aim of the research would be to investigate the impact of incorporating over fifteen corpus examples (with more than two relevant examples representing the target structure) within an environment featuring both relevant and irrelevant examples on language production. Consequently, the effectiveness of the lexicographic strategy to squeeze a bunch (more than twenty) of corpus examples into dictionary entries could be contrasted with the efficacy of the paradigm incorporating fifteen corpus examples, applied in the *Cambridge Dictionary*, as well as in the present study. Such an experiment may help identify the more effective presentation mode of corpus examples adopted in online dictionaries.

The present contribution was an empirical endeavor to further explore the topic of the usefulness of examples in dictionaries, and a determined attempt to examine how exposure to *more* corpus examples affects language production. The study sheds more light on advanced English learners' ability to use lexicographic data from multiple supplementary corpus examples located within the extra sections of monolingual dictionary entries. The current investigation has returned positive results. The findings indicate that advanced-level students show competence in utilizing dictionaries. By and large, when students decide to consult examples, they are adept at bringing back pertinent lexicographic information from multiple encoding corpus examples and applying newly-acquired knowledge in practical contexts.

Given their special status in the context of English monolingual learners' dictionaries, examples demand more attention on the part of lexicographers. In today's world, the advantage

[9] *The verb demand has twenty corpus examples in the extra section.*
[10] *The verb suggest has forty-eight example sentences altogether on the Sentences page.*

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that digital dictionaries hold over their printed counterparts is indisputable. Online dictionaries remain unrivaled for unrestricted storage space, customization, multimedia functions and accessibility of data, among other advantages. Vast technological opportunities in the digital age of lexicography have allowed for the incorporation of an unlimited amount of lexicographic data in online dictionary entries. Notwithstanding the numerous benefits of the monopoly of digital dictionaries on the dictionary-making practice, this phenomenon could also create potential problems. More control is needed over the lexicographic content that is presented to dictionary users, particularly with the inclusion of a plethora of additional corpus examples. This calls for further research.

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SUPPLEMENTARY FILES

Available from the author at reasonable request.

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APPENDIX A

Supplementary corpus examples for the verb entry *recommend* in the *Longman Dictionary of Contemporary English* (twenty-one example sentences exhibiting various syntax and collocation patterns of use for *recommend*)

Examples from the Corpus

recommend

- The hotel's restaurant comes highly **recommended**.
- The prosecutor **recommended** a 15-year sentence.
- Can you **recommend** a good hotel near here?
- They would interview applicants and they would **recommend** a man to him.
- The report **recommends** a number of changes in the existing law.
- Ask friends to **recommend** babysitters. That's the safest way.
- I would always **recommend** buying a good quality bicycle rather than a cheap one.
- The first applicant was **recommended** by a friend of the boss.
- The **recommended** dosage for children is 20 milligrams.
- Who would you **recommend** for this job, Stuart?
- I didn't **recommend** it because I had seen what it had done to sensitive artists like Scott Walker.
- Corfu was wonderful - I'd **recommend** it to anyone.
- And all over the nation, older women are getting far fewer than the **recommended** number of mammography exams.
- McGehee advocates the creation of an independent Office of Ethics Counsel to interpret the rules, investigate complaints and **recommend** sanctions.
- The Forsyth Report **recommended** stricter supervision of the trade in live animals.
- Doctors **recommend** that all children be immunized against polio and tuberculosis.
- For a number of reasons, therefore, planners may **recommend** that growth should be channelled into selected settlements.
- The directors are **recommending** that shareholders accept Baldwin's offer.
- I strongly **recommend** that you get your brakes checked before you go on a long drive.
- Ask your tour guide to **recommend** the best places to eat.
- In summary, it is difficult for this writer to **recommend** this book.

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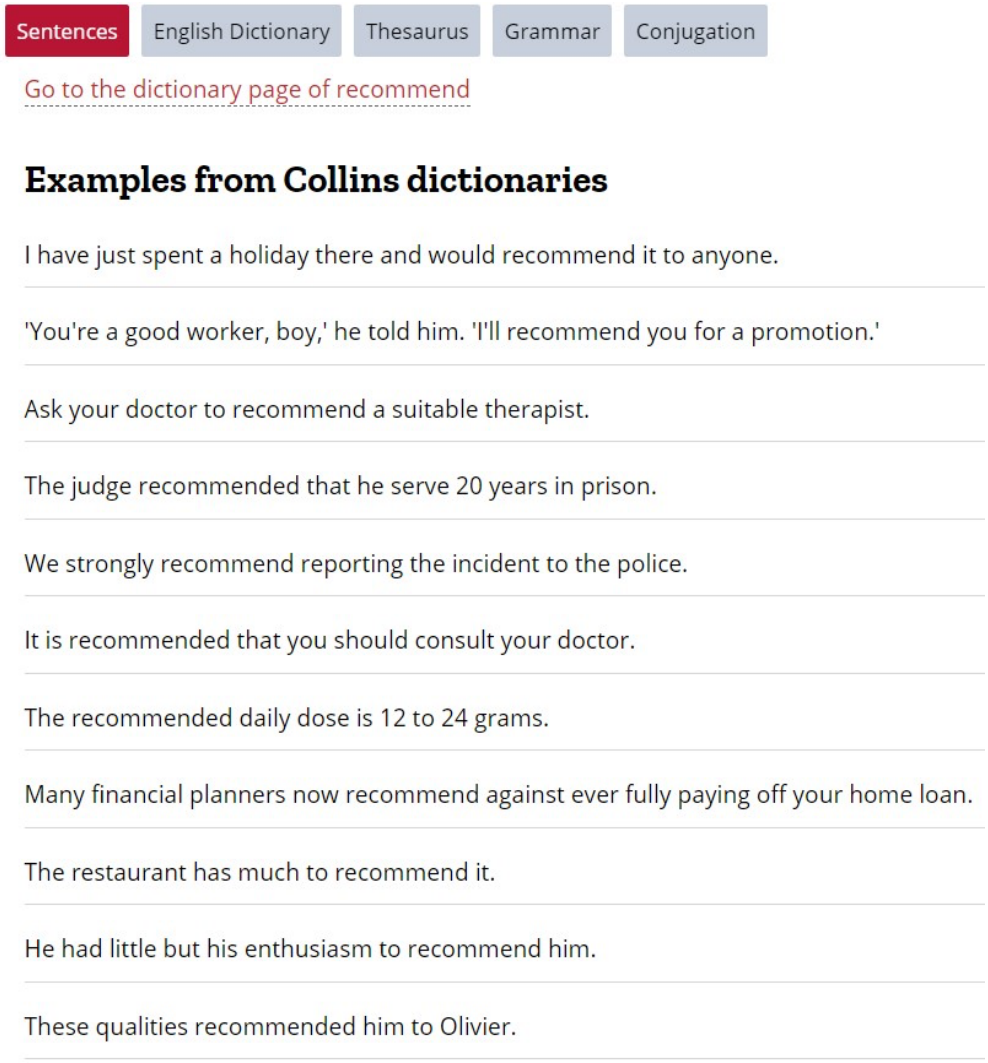
APPENDIX B

Supplementary corpus examples for the verb entry *recommend* in the *Collins Online Dictionary* (eleven example sentences exhibiting various syntax and collocation patterns of use for *recommend*)



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