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Quantity and quality of vocabulary knowledge in Greek-speaking university students

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Abstract

This study investigates possible interrelations between quantity and quality of vocabulary knowledge in Greek-speaking university students. Research so far has shown that the difference in the quantity of vocabulary knowledge in adults is evident in low frequent words; while the quality of vocabulary knowledge depends on career orientation and educational level. Nevertheless, it has not been tested, so far, whether there are differences in highly-educated students coming from the same field of education; and if so, which are the parameters that affect their vocabulary knowledge. To this end, the present study tested seventy undergraduate university students of the Department of Greek Philology (aged 20-24 years; M: 21.5 years; S.D.: 0.8; females = 54) that were grouped based on their vocabulary knowledge (size and depth) into two groups (low & high). All participants completed an online test, which was consisted of four parts (correct stressing, synonyms, choosing the most accurate formal definition, producing formal definitions). The results revealed that students with higher vocabulary knowledge scored better in the tasks of stressing and synonyms, while no differences were attested either in the choose of formal definitions or the production of formal definitions. Nevertheless, correlations performed for each group separately exhibited that the production of definitions correlates with stressing and synonyms knowledge, though only in the group with higher vocabulary knowledge, suggesting that this link between different aspects of vocabulary is evident in individuals with higher vocabulary knowledge and that educational level per se is not a reliable indicator.

Keywords: vocabulary knowledge, quality of vocabulary knowledge, quantity of vocabulary knowledge, formal definitions, university students

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1. Introduction

The present study aims to investigate the two components of vocabulary knowledge (i.e., quality and quantity) in university students. The rationale behind the study is that we often detect differences in academic performance of monolingual university students. Although plenty of studies (Li & Kirby, 2015; Luo et al., 2021; Pan et al., 2023) have tested the vocabulary knowledge in the second or foreign language, little we know about vocabulary knowledge in the first language in healthy adults and more specifically in high-educated ones (Dourou et al., 2020), since some studies focus on the low-educated adults (Tran et al., 2020). Another area of interest is the examination of vocabulary knowledge in individuals with neurogenerative diseases (Cuetos et al., 2017; Kavé, 2022). Nevertheless, in order to investigate these deviances, we should first investigate vocabulary knowledge, in terms of both quality and quantity, in young healthy adults with higher educational attainment.

1.1 Vocabulary knowledge (quality and quantity)

A first plausible question is why is vocabulary knowledge important. Vocabulary knowledge has found to correlate and predict the development of morphosyntax in first and second language (Iwaizumi & Webb, 2021, 2023), the reading comprehension in first and second language (Qian,1999; Ouellette, 2006; Perfetti, 2007; Dong et al., 2020) and school and academic performance (Schuth et al., 2017; Dourou et al., 2020). From the above we understand that vocabulary knowledge is of paramount importance to the development of other abilities and skills. But, do we refer to all types of vocabulary and which of them seem to be crucial for the development of the abovementioned abilities and skills? Initially, basic vocabulary plays an important role, but later on more advanced vocabulary, such as academic vocabulary, is needed for the enhancement of more advanced language abilities and skills (Masrai & Milton, 2021).

How do we define vocabulary knowledge? An oversimplified definition can be that vocabulary knowledge is they words we know. It is divided into two components; (a) quantity or breadth and (b) quality or depth. *Quantity* of vocabulary knowledge refers to the size of our vocabulary, in other words how many words do we know (Wesche & Paribakht, 1996; Schmitt, 2014). However, all these words that we know are not necessarily known in depth. Therefore, the quality of vocabulary knowledge indicates how well are these words known (Wesche & Paribakht, 1996; Luo et al., 2021). *Quality* of vocabulary knowledge is depicted by means of synonyms, antonyms, super- and subordinate categories, word associations and words definitions (Schmitt, 2014). Quality of vocabulary knowledge is high when the phonological, orthographic and semantic representations are well-developed and established (Swart et al., 2017). These findings confirm a recent hypothesis (i.e., *Lexical Quality Hypothesis*; Perfetti & Hart, 2001), which similarly suggests that words are represented as a set of phonological, semantic and orthographic components. Quantity of vocabulary knowledge increases as the child grows up and attends formal education; nevertheless, the pace of acquisition and learning diminishes with age.

In adulthood we acquire and learn more sophisticated words which we encounter throughout our studies or our carrier (Milton, 2010). The outcomes are more complex in quality of vocabulary knowledge. Word definitions depict useful data about word meaning (content) and the proper form of a definition (syntactic structure) (Johnson & Anglin, 1995). Studying the early development of definitional skills, children define the words through their function or they give a description of the words or examples of the word in order to define them (Snow, 1990; Johnson & Anglin, 1995; Hadley et al., 2016). In other words, giving these informal definitions it is clear that they cannot still use decontextualized language. More formal definitions appear by the end of the elementary school (11-12 years old) (Johnson & Anglin, 1995; Friedmann et al., 2011). The equivalent development of meaning and form is a grinding process (Snow et al., 1989; Caramelli et al., 2006; Dosi &

Gavriilidou, 2020). Definitional skills are still developing in adulthood. Even high-educated adults cannot define words in a formal way (Dourou et al., 2020).

In the study of Dourou and colleagues, results have shown that the more reliable predictor for the quality of vocabulary knowledge is the carrier orientation. Thus, only medical students used more formal definitions than students of the Department of Greek Philology. The authors explained the finding suggesting that medical students are exposed to formal definitions more often than the students of the Department of Greek Philology. Nevertheless, we should also mention that the former students had higher academic scores in order to enter to the Medical School compared to the latter group of students. Therefore, even within the group of high-educated students, differences in knowledge and academic performance matter.

Presenting the two components of vocabulary knowledge separately, a reasonable question that follows is whether are both components of vocabulary knowledge related to the development of language abilities and skills and are these two components correlated or do they work independently? The findings of previous studies are controversial. Some studies suggest that quantity and quality are not, necessarily, linked (McGregor et al., 2013); meaning that knowing a word does not implies knowing it in depth. Other studies have suggested that quantity and quality are linked and they become independent with age (Qian, 1999, 2002; Vermeer, 2001; Li & Kirby, 2015). The findings of Dosi and Gavriilidou (2020) also verify the previous suggestion, since link between quantity and quality of vocabulary knowledge was detected in the typically developing monolingual children of their study (mean age: 8.4 years old). Findings are different in the studies on second language learning. Studying adult second language learners Nurweni and Read (1999) have found that quantity and quality of vocabulary knowledge correlate in advanced learners compared to low proficient learners, in whom these components are distinct. Thus, language exposure and proficiency affect this connection. Little we know about this possible link in adults' first language.

1.2 The role of word type and word frequency

The type of the word has an impact on the acquisition of both quantity and quality of vocabulary knowledge (Hadley et al., 2016). Hence, nouns are learned earlier than verbs and adjectives, which are cognitively more demanding in acquisition (Benedict, 1979). There is no consensus regarding verbs and adjectives; thus, some studies suggest that verbs are acquired earlier than adjectives (Hadley et al., 2016); while other studies claim the opposite finding (Gavriilidou, 2015). The characteristic of abstractness is also important in word learning; abstract nouns are learned later than concrete nouns (Maguire et al., 2006), due to their conceptual complexity. Another important characteristic is compoundness. Studies agree that compound words are more demanding in acquisition than simple ones (Dourou, 2019; Dosi et al., 2021).

The role of word frequency is also central for word learning (Gollan et al., 2008; Miozzo, 2008); thus, less frequent words are acquired later. In addition, the frequency of exposure to words in an important factor. Webb (2007) suggests that 7 times of exposure to the word seem to be the threshold for successful acquisition of the word. According to Wolter (2001) word frequency is a reliable index of vocabulary knowledge. Moreover, the context, in which a word is encountered, is also important for word learning. In a later study of Webb (2008), the findings revealed that the quality of the context rather than the number of encounters with words affect more word learning. By quality of context it is meant whether a word meaning is clearly presented.

From the above we deduce that vocabulary knowledge is a complex process with different parameters affecting its enhancement. Therefore, we have still many things to investigate in order to understand the psychology of language and how it works.

2. The present study

2.1 Aims & research questions and hypotheses

The present study aimed to investigate the two components of vocabulary knowledge (i.e., quality and quantity) and to examine whether they interrelate in Greek-speaking university students. The rational of this study was based on a previous one of Dourou et al. (2020), in which it was found that medical students gave more formal definitions that the students of the Department of Greek Philology. As mentioned above, it can be an issue of carrier orientation but also an issue of more advanced education, since in order for a student to achieve a medical school, they must have better grades and academic performance. Hence, the motivation of the present research was to detect differences in some components of vocabulary knowledge that may affect other aspects of vocabulary knowledge. In other words, this study focuses only on university students of the Department of Greek Philology and investigates differences in their vocabulary knowledge considering both the quantity and the quality of this knowledge; exploring whether the differences in performance found in the study of Dourou et al. (2020) were subjected to other factors that were not considered. For the above reasons, two interrelated research questions were formed:

- Do quality and quantity of vocabulary knowledge differ in young monolingual students with different levels of vocabulary knowledge?
- And if so, are quality and quantity linked in these students with different levels of vocabulary knowledge?

Continuing the reasoning of previous studies, we hypothesized that (1) differences will be observed between students with higher and lower vocabulary knowledge and (2) quantity and quality of vocabulary knowledge will be linked in participants with higher vocabulary knowledge.

2.2 Participants

The study sample consisted of seventy Greek-speaking university students (20-24 years old; mean age: 21.5; S.D.:0.8; females = 54) studying Greek Philology at the Democritus University of Thrace (Greece). Participation was voluntary. Participants confirmed their willingness to participate by means of a written consent form.

2.3 Material

The tasks were administered during the global coronavirus pandemic; thus, they were administered online via Google forms. It consisted of four tests: (a) a stressing test, (b) a synonyms test, (c) a test of choosing the formal definition and (d) a test of producing the formal definition.

- The stressing test included 50 low frequent literary words, which participants had to stress accurately. The test examined the quantity of vocabulary knowledge.
- The synonyms test consisted of 40 low frequent literary words. Participants have to produce the synonym of the word. The present test investigated the quality of vocabulary knowledge.
- The test of choosing the formal definition included 16 words. The words under definition was from the definition task of Dourou (2019). Four different choices were given (two informal definitions, i.e., an example and a synonym, respectively; a partial Aristotelian definition; and a formal/Aristotelian definition) and the participants had to indicate the formal definition.
- The test of producing the formal definition included 16 similar words (8 simple and compound, concrete and abstract nouns, *4 simple and compound verbs and 4 simple and compound adjectives) to*

the former task were given and participants had to type their definition.

All items were pseudorandomized in each test. Participants were instructed not to search words or definitions.

The rationale behind the choice of the two sub-tests to be consisted of low frequent words, while the other tasks included definitions of high frequent words, was that the stressing and the synonyms test were used for grouping the participants in terms of their vocabulary knowledge. As Wolter (2001) suggests word frequency is a reliable indicator of vocabulary knowledge. We did not follow the same practice in the definition task, since it was a task priory administered in children and adults (Dourou, 2019) and we would like to obtain methodologically similar and comparable results.

2.4 Scoring of data and reliability

Two evaluators assessed the responses using the blind making method. For the last test, as an agreement was calculated the number of answers coded identically divided by the total number of definitions, both for content and for form. The inter-judge agreement for content was 89.5% and for form was 90%. To further check the reliability of the task, a Cronbach's Alpha coefficient was calculated. The result for the overall task was .084 suggesting a high degree of internal consistency.

2.5 Data analyses

Independent samples t-tests were performed to the four tests. Participants were divided into two groups; participants with high vocabulary knowledge (N=34) and participants with low vocabulary knowledge (N=36). Vocabulary knowledge was calculated by the addition of stressing and synonyms tests and their sum was divided by two in order to get an index of both quantity and quality of vocabulary knowledge. As mentioned above, the fact that the stressing and the synonyms test included low frequency words is a good indicator for grouping the participants by means of their scores in these two tasks (Wolter, 2001). The results will be presented in percentages. In addition, correlations were performed for each group separately, including the four tests as variables (stressing test, synonyms test, test of choosing the formal definition and test of producing the formal definition).

3. Results

The two groups differ in stressing and synonym tests. The group with the higher vocabulary knowledge outperformed the group with the lower vocabulary knowledge (stressing test: t (68) = 7.780, $p < .001$; synonyms test: t (68) = 10.336, $p < .001$), as Figure 1 shows. Interestingly, the differences are more evident in the task that depicts quality of vocabulary knowledge, i.e., the synonyms task (80% vs. 54.1%).

No differences were found either in the task that participants had to choose the formal definition (t (68) = 1.452, $p = .151$) or the task that they had to produce formal definitions (for content: t (68) = .434, $p = .666$; for form: t (68) = .387, $p = .700$). In the test of choosing the formal definition both groups scored below the chance level (high: 49%; low: 44%). The finding suggests that they cannot successfully recognize the characteristics of a formal definition and that is the reason why they could not produce formal definitions in the production task (content: high: 63.5%; low: 62.1%; form: high: 63.5%; low: 62.3%). More challenging were the definitions of verbs and adjectives and less demanding were the definitions of nouns. More specifically, simple and concrete nouns were defined in a more formal way. Compoundness and abstractness were found to be demanding variables even for these age groups, i.e., for young adults.

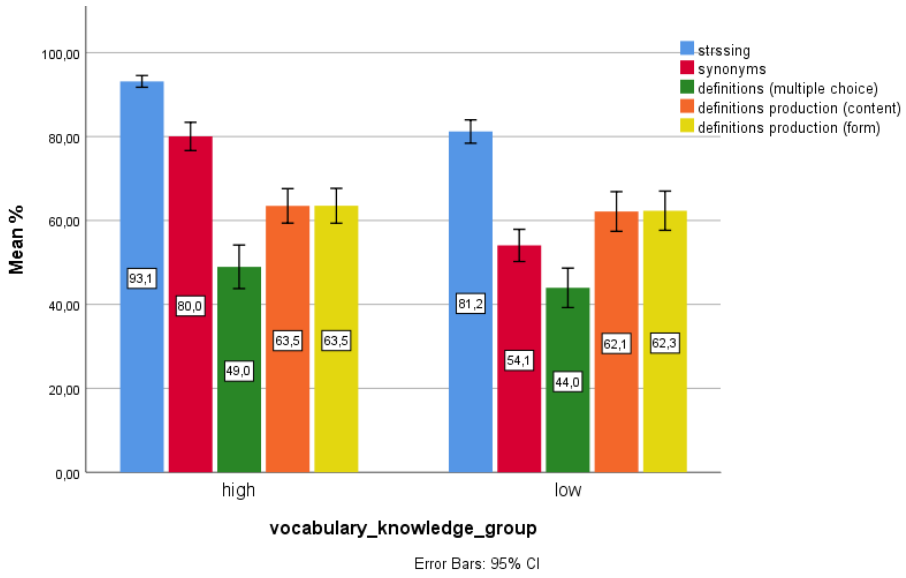

Figure 1. Groups' performance on tasks

Correlations performed for each group separately exhibited that the production of definitions correlates with stressing and synonyms knowledge, though only in the group with higher vocabulary knowledge, as Table 1 indicates.

Table 1

Correlations between quantity and quality of vocabulary knowledge

		stressing	synonyms	definitions (multiple choice)	definitions (production)
high	stressing		r (34) = .089, p = .611	r (34) = .212, p = .222	r (34) = .398, p = .018
	synonyms	r (34) = .089, p = .611		r (34) = .015, p = .931	r (34) = .704, p < .001
	definitions (multiple choice)	r (34) = .212, p = .222	r (34) = .015, p = .931		r (34) = .143, p = .412
	definitions production	r (34) = .398, p = .018	r (34) = .704, p < .001	r (34) = .143, p = .412	
low	stressing		r (36) = .077, p = .660	r (36) = .056, p = .751	r (36) = .268, p = .119
	synonyms	r (36) = .077, p = .660		r (36) = .219, p = .207	r (36) = .308, p = .072
	definitions (multiple choice)	r (36) = .056, p = .751	r (36) = .219, p = .207		r (36) = .080, p = .646
	definitions production	r (36) = .268, p = .119	r (36) = .308, p = .072	r (36) = .080, p = .646	

4. Discussion

This study investigated the two different components of vocabulary knowledge (quantity and quality) and examined whether they are interconnected in Greek-speaking university students of the Department of Greek Philology. The motivation of the present study was based on the study of Dourou and colleagues (2020), which concluded that differences were observed in the production of formal definitions even in high-educated students; suggesting that carrier orientation affects this performance. The present study focused only on university students of the Department of Greek Philology and tried to explain differences in their vocabulary knowledge considering both the quantity and the quality of this knowledge; indicating that the differences found in the former study are related to other parameters that were not taken into account.

Summarizing the outcomes of the present study, students with higher vocabulary knowledge scored higher in the tasks of stressing and synonyms, while they two groups performed similarly in both definition tasks. The correlations performed for each group separately revealed that the production of definitions correlates with stressing and synonyms tasks, though only in the group with higher vocabulary knowledge.

Answering to the research questions set, the first hypothesis was partially confirmed, since students with higher vocabulary knowledge outperformed the students with lower vocabulary knowledge in both quantity of vocabulary knowledge (i.e., in the stressing task) and quality of the vocabulary knowledge (i.e., in the synonyms tasks) (Nurweni & Read, 1999). It was interesting the finding that greater differences exhibited in the synonyms task, i.e., the task that tested the quality of vocabulary knowledge, suggesting that quality of vocabulary knowledge is more demanding (Perfetti & Hart, 2001; Swart et al., 2017; Luo et al., 2021). Differences between the groups also confirm that word frequency is a reliable index of vocabulary knowledge (Wolter, 2001). Our hypothesis was not confirmed in the definition task, either in the task of the recognition of the formal definition or in the task of production of the formal definition. This finding seems to verify the suggestions of the previous study of Dourou et al. (2020) that claimed that it can be an issue of carrier orientation and educational practice. Definitions of verbs and adjectives found to be more demanding for both groups (Maguire et al., 2006; Gavriilidou, 2015; Hadley et al., 2016). Similarly, definitions of compound and abstract words were more challenging for both groups (Dourou, 2019; Dosi et al., 2021). The outcomes of the definition tasks show that the choice and use of formal definitions fuddle university students, who are probably not aware of the proper content and form of a formal definition.

The second hypothesis was fully confirmed, since correlations between quantity and quality of vocabulary knowledge were found only in the group with higher vocabulary knowledge (Nurweni & Read, 1999). The finding contrasts with other previous studies (Qian, 1999, 2002; Vermeer, 2001; Li & Kirby, 2015) that claimed that these two components become autonomous with age. An explanation could be that in this study the word frequency (i.e., low frequent words) was taken into account. Delving into the correlations found the production of definitions (quality of vocabulary knowledge) correlated with stressing and synonyms tasks (quantity and quality of vocabulary knowledge). This finding further confirms the ones of previous studies and reveals that not only quantity and quality of vocabulary knowledge are linked but also different aspects of quality of vocabulary knowledge are interrelated, albeit only in individuals with higher lexical knowledge. This outcome further indicates that educational level per se is not a reliable indicator, since both groups were high-educated.

5. Conclusion, educational implications, limitations and further research

The present study has shown that quantity and quality of vocabulary knowledge is correlated in first language, but only in adults with higher vocabulary knowledge. These outcomes are important, because the vocabulary knowledge is a language component that is rather under-researched in adult speakers' first language, but we should not forget that it still develops in a slower pace, though. These findings further prove that we can work on vocabulary knowledge in our first language and see the benefits of such an enhancement.

We can extend your findings and add some practical implications for learners, teachers and school administrators. More specifically, teachers have to work on vocabulary knowledge and school administrators have to promote the enhancement of vocabulary knowledge. However, the focus has to be on both components of vocabulary knowledge, and not just on the quantity, i.e., on the breadth. Words have to be taught in depth, increasing the quality of the vocabulary knowledge. On the part of the learners, they have to put emphasis on learning both aspects of vocabulary knowledge working on words in context, synonyms, antonyms, superordinate and subordinate categories and word definitions. Once learners get older the difficulty has to be increased and it is important to be presented more low frequent words. All individuals involved in the teaching and learning process have to realize the importance of vocabulary knowledge to school and academic success.

Future research can investigate whether this advantage in the first language is linked with reading

comprehension or academic performance and with vocabulary knowledge in second language. Moreover, these outcomes can be compared to those of monolingual individuals with neurogenerative diseases (such as dementia). A limitation of the study is that the research was conducted online and participants had more chances to look for words. However, it was the only solution to conduct this study during the global coronavirus pandemic. Future research can compare these outcomes to the ones of face-to-face data collection. Finally, a limitation concerned the high frequent words used in the definition task. The reason behind this choice was explained in the section of methodology. Notwithstanding, future research can investigate definitional skills of adults in low frequent words.

Conflict of interest - The authors declare that they have no conflict of interest.

Ethical approval - All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional Ethics Committee of Democritus University of Thrace (60589/2111/31–8-2018) and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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