Available online at www.sciencedirect.com

SciVerse ScienceDirect

Procedia - Social and Behavioral Sciences 70 (2013) 1078 – 1089

Procedia
Social and Behavioral Sciences

Akdeniz Language Studies Conference 2012

Collocation teaching effect on reading comprehension in advanced EFL setting

Banu Tekingül*

Faculty of Education, ELT Department, Pamukkale University, Denizli, Turkey

Abstract

The current study tried to address whether explicit collocation teaching has a positive effect on reading comprehension compared to explicit single-item vocabulary instruction. Vocabulary Knowledge Scale (VKL) and vocabulary pretest were used to determine prior knowledge of 3rd year ELT department students in Pamukkale University. Of the two treatment groups one received explicit collocation teaching and the other received single-item vocabulary instruction followed by a reading passage (Flesch-Kincaid Reading Ease score: 28). Five of the six reading comprehension questions aimed to elicit the target collocations in the answers. The two-tailed t-test significance values were higher than 0.05 for all the questions (q1: 1,000; q2: 0,64; q3: 0,39; q4: 0,106; q5: 0,768), and yet indicated differences between participant means were likely due to chance and not likely due to the difference in treatment types (single-item vocabulary instruction and collocation instruction). The inconclusive findings could be due to only one treatment session.

Selection and/or peer-review under responsibility of ALSC 2012

*Keywords:*collocation; explicit instruction; reading comprehension

1. Introduction

Collocations are word combinations, like *gain insight, hold on, close ranks,* and they receive much attention from researchers both on theoretical and pedagogical aspects. Corpus studies showed that an immense part of both spoken and written language is composed of chunks, or in other words various types of frequent word combinations (Sinclair, 1991; Stubbs, 2001; Biber et al., 2004). because they play an important role in the learner's interlanguage development, being part of formulaic sequences (Wray,

* Corresponding author. Tel: +00 000 000 0000; fax: +00 000 000 0000
E-mail address: balfar@pau.edu.tr

1877-0428
Selection and/or peer-review under responsibility of ALSC 2012
doi:10.1016/j.sbspro.2013.01.161

2000), and they are indispensable in second language or foreign language learning contexts (Hussein, 1990; Bahns & Eldaw, 1993; Nesselhauf, 2003; Webb & Kagimoto, 2010). Collocations should be taught not only for competence, but also for accuracy and fluency (Wray, 2002).

Research on collocations has been interest of researchers for the last two decades; however, majority of studies done on collocations are corpus-based and mostly descriptive in nature. A handful of researchers did classroom based research and addressed the question of how to teach collocations most effectively (Wei, 1999, Nesselhauf, 2003, Lewis, 2000). More empirical and classroom based studies are needed to determine how to teach collocations at different proficiency levels.

1.1. Corpora Based Studies

The study of collocations, especially with available corpora now on-line like British National Corpus, Collins Cobild Bank of English, Multimodel Learning Corpus Exchange, etc., has increased (Nesselhauf, 2005; Shin & Nation, 2007). Though most of the research done is based on corpora, and remains descriptive except maybe Nesselhauf 's (2003) corpora study with implications for teaching, like advising teachers to teach all possible combinations including articles and prepositions that form the collocations. Still corpus based research is also very valuable because researchers have opportunities to study the interlanguage of learners, and the most commonly made mistakes with collocations. Moreover, investigating native corpora also yields information on most used collocations, and shed light for second language and foreign language instruction on what kind of collocations should be taught to learners.

1.2. Empirical research and Explicit collocation teaching

On the other hand, there are few studies in the field that are empirical research based on classroom applications and teaching. Hussein's (1998) study aimed to learn what strategies (transfer, synonymy, avoidance) Jordanian EFL students, who were English majors in university of Amman, used to locate the correct collocation. The study's findings showed that still in advanced level students could only render 39% of the collocations correctly, and they used negative transfer, synonimty, and avoidance strategies respectively.

Research findings of collocation teaching studies mostly favored explicit teaching compared to implicit teaching, input enhancement or incidental teaching. To date, Lien (2003), Hsu & Hsu (2007) and Hsu (2010) examined the impact of explicit teaching effects of collocations in EFL classrooms with relation to reading in Taiwanese setting, Wei (1999) elementary ESL learners in the United States. The studies just mentioned concluded that learners seem to benefit from direct teaching of collocations, and the test scores showed that the treatment groups received higher scores compared to no treatment, and only vocabulary treatment groups. Webb & Kagimoto's (2010) study also looked at explicit learning of collocations with Japanese EFL learners, they used three factors that can be effective in learning collocations in relation to quantity of collocates, position of node words and synonimty. They found that learning multiple collocates for the same node words seemed to be more effective than multiple collocates and multiple node words. The position of the node words did not affect the outcome, and synonimty had a negative effect on learning collocations. Sun & Wang's (2003) study with Taiwanese EFL learners' results; on the other hand, showed that inductive learning of collocations with concordances were more effective compared to deductive learning in their study.

In Turkish EFL setting only two unpublished master's theses studies were done. One study looked at data-driven learning, explicit instruction and combined method effects (Akıncı, 2009), on verb + noun collocation learning. The results indicated that the explicit instruction and combined method groups outperformed the data-driven group but they did not significantly differ from each other. On the other hand, participants reported that corpus consultancy was very beneficial for collocation learning. Gençer (2004) study was also a corpus driven study with explicit collocation chunking instruction to one group of EFL upper-intermediate participants, and no instruction to the other, the results indicated that the collocation chunking group outperformed the no instruction group.

1.3. Research Question

Personal observations during classes show that even advanced level Turkish EFL learners have problems recognizing and using collocations. In one of the departmental faculty meetings one reason for low retention and fossilization of collocation usage was discussed and one of the ideas was that students do not do enough authentic reading and learn collocations with certain awareness. Collocations are not necessarily taught explicitly to advanced level students, as instructors we assume that learners will learn from context, look up dictionaries, or read authentic texts. This research aims to answer the following question: Does collocation teaching have a positive effect on reading comprehension compared to single-item vocabulary instruction?

2. Methodology

2.1 .Setting and Participants

The research took place at Pamukkale University ELT Department. 50 third year pre-service English teachers, 38 female and 12 male, ages ranging between 20 to 25 attended the current study.

At the advanced level learners get specific and explicit instruction on collocations in the "Lexicology" class delivered during the second year of ELT Department curriculum. There is no fixed book that instructors use for this course. However, this year Lexis class instructor was a Fulbright Fellow, who is a native speaker of English, and has been teaching EFL for 35 years. He used a specific book called *Focus on Vocabulary: Mastering the Academic Word List* (2005) by Schmitt & Schmitt to teach the lexicology. The book is based on Coxhead's (2000) Academic Word List. The book consists of various chapters with authentic texts that contain the target words, word family, expansion, and various collocation exercises (fill in the blanks, matching, writing sentences with collocations) targeting the academic word list. During the interaction with the Lexis class instructor, he revealed that he specifically concentrated on collocation teaching. Because the sophomores are already taking the lexicology class, they will not be included in this study, in case they might be familiar with the procedures. However, the juniors who took this class with another instructor last year did not explicitly focus on collocations during the lexicology class and they are not familiar with this particular book nor the reading passages, but because they are advanced level students they were chosen to be the participants of this research. The third year level students were not randomly selected to be in one of two groups; the classes were intact, so the sampling was not random. The participants were divided into two treatment groups: Single-item vocabulary instruction, and collocation instruction.

Unfortunately, due to time constraints (the research took place in the last week of classes) only 1 session of treatment was possible.

2.2. Research Design and Instruments

The present study used the following instruments: vocabulary knowledge scale, vocabulary pretest, single-item vocabulary instruction, collocation instruction, reading text (key words and collocations were selected from), comprehension questions

The research design is presented in table 1.

Table 1. Research design

Time	Group I	Group II
25 min.	Vocabulary Knowledge Scale	Vocabulary Knowledge Scale
30 min.	Vocabulary Pretest	Vocabulary Pretest
30 min.	Single-Item Voc. Instruction	Collocation Instruction
30 min.	Reading Passage	Reading Passage
30 min.	Comprehension Questions	Comprehension Questions

The instruments used in the study are as follows:

2.2.1. Vocabulary Knowledge Scale (VKS): This self-report instrument (Appendix A) was adapted from Peribakht and Wesche (1993, 1996). The VKS is a five-point scale self-report test measuring lexical knowledge on a continuum from no knowledge to the ability to produce the target word accurately in a sentence. This test was used to determine prior knowledge of the target items by learners (Nassaji &Tian, 2010: Paribakht & Wesche, 1996; Read & Chapelle, 2001; Kim, 2008).

The participants scored their knowledge of the targeted items on a scale from 1 to 5 as follows:
1. I don't remember having seen this word before.
2. I have seen this word before, but I don't know what it means.
3. I have seen this word before, and I think it means _____ (synonym or translation).
4. I know this word. It means _____ (synonym or translation).
5. I can use this word in a sentence (write a sentence): _____.

2.2.2. Vocabulary Pretest: This test comprised of 22 fill-in-the-blanks possible target items from the reading passage. The contextualized sentences were adopted from *Oxford Advanced Learner's Dictionary, 7th Edition* and Merriam-Webster Online Dictionary. The aim of the test was to determine prior knowledge of the target items by learners in addition to the Assessing Vocabulary Scale (Appendix B).

2.2.3. Single-item vocabulary instruction: Five target collocations were selected to be taught as single-item vocabulary. For instance, for the collocation "commence meeting" only the lexical meaning of "commence" was explained. The instructor gave explicit dictionary definitions of the target items that were retrieved from *Oxford Advanced Learner's Dictionary, 7th Edition,* and Merriam-Webster Online Dictionary, and provided sentences regarding the target words. After the explicit instruction and examples, the instructor elicited examples from the participants. The treatment lasted for approximately 30 minutes.

2.2.4. Collocation instruction: Five target collocations were selected to be taught. The instructor gave explicit dictionary definitions of the target items, and provided sentences regarding the target

collocations, and possible variations. For instance for the collocation of the target word "commence" examples such as "commence meeting", commence a speech" were also given. Example sentences and possible collocations were retrieved from *Oxford Advanced Learner's Dictionary, 7th Edition* and Merriam-Webster Online Dictionary. After the explicit instruction and examples, the instructor elicited examples from the participants. The treatment lasted for approximately 30 minutes.

2.2.5. Reading Passage: The reading passage was chosen to be used for the reading comprehension test, so it was important that it met 3 criteria: length, number of collocations, and level of difficulty (Hsu, 2010). The passage was taken from *Focus on Vocabulary. Mastering the Academic Word List* (2005) by Schmitt & Schmitt, an authentic reading passage adapted from Harland (1994) around 1060 words, including the 22 target words from the Academic Word List (AWL) compiled by Coxhead (2000). The readability index calculator (tested at http://www.standards-schmandards.com/exhibits/rix/index.php) indicated that the reading passage had a Flesch-Kincaid Grade level of 15 and Flesch-Kincaid Reading Ease score was 28. In other words the passage was college level advanced reading passage (Appendix C). Participants were given 30 minutes to read the passage and they kept the text during the comprehension questions.

2.2.6. Comprehension Questions: 6 reading passage comprehension questions were asked targeting the collocations taught (Appendix D). 5 questions targeted the collocations and one question was a distracter. The comprehension questions were prepared by the researcher and they were verified by two EFL instructors in the ELT department one of whom was a native speaker of English. The questions were designed to specifically elicit the target items in the reading passage.

2.3. Data analysis and Statistical Procedures

All the data were recorded and computed by Microsoft Office Excel program and Statistical Package for Social Science (SPSS) version 18. An independent rater (native speaker of English) also rated the whole data in both steps of assessing Vocabulary Knowledge Scale results and comprehension questions results. An interrater reliability analysis using the Kappa statistic was performed to determine consistency among raters.

In order to find whether there are differences between the two instruction groups, independent t-tests were run, and participants' mean scores were compared used descriptive statistics.

3. Findings

The reading passage used for the study was measured to be 15 according to Flesch-Kinkaid Grade Level with reading ease score of 28. In other words a highly advanced level reading passage was chosen. Both the Vocabulary Knowledge Scale (adapted from Paribacht and Wesche 1996), and fill-in-the-blanks test of the 22 target words from the reading passage were analyzed. The interrater reliability for the raters was found to be Kappa = 0.72 ($p < .0.001$), for the VKS indicating moderate agreement (Landis & Koch, 1977). Although, there was moderate agreement between the raters the complex part was to distinguish whether the participants actually had prior knowledge of the target items. For instance, twelve of the participants marked the word "aggregate" as 4 on the scale "I know this word. It means _____ (synonym or translation)" as "abartmak" (which means "exaggerate" in Turkish) , five of the participants marked 3 on the scale "I have seen this word before, and I think it means _____ (synonym or translation)" as "kızdırmak" (which means "aggravate" in Turkish), one participant said "It means to make a deal", one participant said "hızlandırmak" (which means "accelerate" in Turkish), one participant used it in a sentence "I do aggregate" obviously this sentence does not reveal whether the

participant actually knows the word, two participants said "kötüleştirmek" (which means "worsen" in Turkish), the rest of the participants mostly marked 1 as "I don't remember having seen this word before" or 2 "I have seen this word before, but I don't know what it means". Therefore, the results of the vocabulary fill-in-the blanks test was used to determine which target items would be used for the explicit instruction sessions.

In the vocabulary pretest the frequency of incorrect answers revealed that the participants did not have prior knowledge or about approximately 12% to 14% knew the target words in table 2. Out of 22 possible target items only 5 items were chosen for the treatment group as the result of the vocabulary pretest (table 2). Thus, the teaching sessions concentrated on the five vocabulary items in table 2.

Table 2. Target items and the number of students who answered correctly

words	N. of corr. Answers/N. Participants
aggregate	0/50
prospect	5/50
commence	6/50
concurrent	6/50
offset	7/50

The vocabulary treatment group (n: 25) received a 30 minute single word target vocabulary instruction immediately followed by reading the text and comprehension questions. The collocation treatment group (n: 25) also received 30 minutes target collocation instruction immediately followed by reading the text and comprehension questions.

The five comprehension questions that elicited the five target collocations and vocabulary items were analyzed and the answers were categorized into three groups: incorrect or no answer; partially correct (if the synonym or equivalent of the vocabulary item was provided then, it was accepted as partially correct, e.g. instead of saying "commence building nests", if a participant answered as "start to build nests"); and correct answer. The coding of the results was as follows: 1 point was given for incorrect answer or no answer, 2 points were given for partially correct answer, and 3 points were given for correct answer. The interrater reliability was calculated and the value Kappa = 0.89 ($p < .0.001$), was found indicating almost perfect agreement (Landis & Koch, 1977) between the raters.

The descriptive statistics of the mean values of the two groups (the single-item vocabulary instruction and collocation instruction) show slight differences in the mean values of the second, third, and fourth comprehension questions to the advantage of the collocation instruction group, question 1 showed no difference between two groups with a low mean, and the fifth question's mean value is slightly higher with the vocabulary instruction group (Table 3).

Table 3. Descriptive Statistics of single- item vocabulary instruction group, and collocation group

Items Tested	groups	N	Mean	Std. Deviation	Std. Error Mean
q1	vocab. instruction	25	1,4800	,87178	,17436
	coll. instruction	25	1,4800	,82260	,16452
q2	vocab. instruction	25	2,2800	,97980	,19596
	coll. instruction	25	2,7200	,61373	,12275

q3	vocab. instruction	25	2,4400	,91652	,18330
	coll. instruction	25	2,6400	,70000	,14000
q4	vocab. instruction	25	2,4800	,87178	,17436
	coll. instruction	25	2,8000	,40825	,08165
q5	vocab. instruction	25	1,9600	1,01980	,20396
	coll. instruction	25	1,8800	,88129	,17626

An independent t-test was performed to compare the two groups, and to inquire if there were significant differences between these groups regarding the type of treatment (table 4).

Table 4. Independent Samples Test for the difference between the groups

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
q1	Eq. var. assumed	,096	,758	,000	48	1,000	,00000
	Eq. var. not assumed			,000	47,839	1,000	,00000
q2	Eq. var. assumed	23,089	,000	-1,903	48	,063	-,44000
	Eq. var. not assumed			-1,903	40,321	,064	-,44000
q3	Eq.var. assumed	4,930	,031	-,867	48	,390	-,20000
	Eq. var. not assumed			-,867	44,891	,390	-,20000
q4	Eq. var. assumed	19,483	,000	-1,662	48	,103	-,32000
	Eq. var. not assumed			-1,662	34,043	,106	-,32000
q5	Eq. var. assumed	8,164	,006	,297	48	,768	,08000
	Eq. var. not assumed			,297	47,012	,768	,08000

Levene's test for equality of variances indicates a higher value from 0.05 in questions 1 and 3 and 5 showing the variability in two treatments are not significantly different, the two-tailed t-test significance values are higher than 0.05 for all three questions (q1: 1,000, q3: 0,39, q5: 0,768), indicating differences between participant means are likely due to chance and not likely due to the difference in treatment types (single-item vocabulary instruction and collocation instruction).

Levene's test for equality of variances indicates a lower value from 0.05 in questions 2 and 4 showing the variability in two treatments are significantly different, and the two-tailed t-test significance values are higher than 0.05 (q2: 0,64 and q4: 0,106) again indicating differences between participant means are likely due to chance and not likely due to the difference in treatment types (single-item vocabulary instruction and collocation instruction).

4. Discussion and Conclusion

The independent t-test results showed that the answer to the research question: *"Does collocation teaching have a positive effect on reading comprehension compared to single-item vocabulary instruction?"* is inconclusive. According to the test results there are no significant differences between single-item vocabulary instruction treatment and collocation teaching treatment. One plausible

explanation could be that at advanced level EFL learners have already mastered quite a few metacognitive strategies for reading comprehension (Carrell, Gajdusek and Wise, 1998). Thus, the treatments were not effective, and the participants could locate the answers even without the treatment sessions. The slight differences in means of two groups could be explained as individual differences, and maybe effective for only a couple of the participants in the collocation instruction group. Still, the difference is not significant enough. Another conclusion for lack of significance of the findings could be due to a single reading passage. Lien (2003), and Hsu (2010) used multiple reading passages in their studies, however, the main aims in their studies was to look at retention of the target collocations.

Although there were no significant differences found between the two treatment groups, this study proved that maybe instead of reading comprehension, the effect of collocation teaching could be investigated in other skills such as speaking comprehension (Hsu & Chiu 2008) or writing (Lewis, 2000). On the other hand, reading comprehension studies could investigate the effect of collocation instruction effectiveness with lower proficiency levels.

Studies are needed for pedagogical interventions especially in traditional teaching settings on how to successfully integrate collocation teaching in advanced level EFL classes where learners can be fluent and make use of correct collocations. These interventions could also be very beneficial for pre-service as well as in-service English teachers who are still figuring out how to best teach collocations in EFL settings.

References

Akıncı, M. (2009). *Effectiveness of corpus consultancy in teaching Verb+Noun collocations to first-year ELT student.* Unpublished Master's Thesis, Boğaziçi University, İstanbul.

Bahns, J. & Eldaw, M. (1993). Should we teach EFL students collocations? *System, 21,* (1), 101-114.

Biber, D., Conrad S., & Cortes, V. (2004). If you look at...:Lexical Bundles in University Teaching and Textbooks. *Applied Linguistics 25,* (3), 371-405.

Carrell, P., Gajdusek, L., and Wise, T. (1998). Meatcognition and ESL\EFL reading. *Instructional Science, 26,* 97–112.

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly, 34*, 213-238.

Gençer, B. (2004). *Raising EFL learners' awareness of verb-noun collocations through chunking to extend their collocational knowledge of familiar nouns.* Unpublished Master's Thesis. Anadolu University, Eskişehir.

Hsu, J-Y., & Hsu, L-C. (2007). Teaching lexical collocations to enhance listening comprehension of English majors in a technological university of Taiwan. *Soochow Journal of Foreign Languages & Cultures, 24*, 1-32.

Hsu, J-Y. & Chiu, C-Y. (2008). Lexical Collocations and their Relation to Speaking Proficiency of College EFL Learners in Taiwan. *Asian EFL Journal, 10,* (1), 181-204.

Hsu, J-Y. (2010).The Effects of Collocation Instruction on the Reading Comprehension and Vocabulary Learning of Taiwanese College English Majors. *Asian EFL Journal, 12,* (1), 47-87.

Hussein, R. F. (1990). Collocations: The missing link in vocabulary acquisition amongst EFL learners, *Papers and Studies in Contrastive Linguistics, 26*, 123–36.

Hussein, R. F. (1998). Collocations revisited. *J. King Saud Univ., Lang. & Trans., 10,* 39-47.

Kim, Y. (2008). The contribution of collaborative and individual tasks to the acquisition of L2 vocabulary. *Modern Language Journal*, *92*, 114–30.

Landis, J. R., Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics* 33:159-174.

Lewis, M. (2000). Teaching Collocation: Further Developments in the Lexical Approach. Hove, England: Language Teaching Publications.
Lien, H-Y. (2003). *The effects of collocation instruction on the reading comprehension of Taiwanese college students*. Unpublished doctoral dissertation, Indiana University of Pennsylvania, Pennsylvania. Retrieved from ProQuest Digital Dissertations. (AAT 3067752).
Nassaji, H, and Tian, J. (2010). Collaborative and individual output tasks and their effects on learning phrasal verbs. *Language Teaching Research,14,* (4), 397-419.
Nesselhauf, N. (2005). Structural and functional properties of collocations in English: A corpus study of lexical and pragmatic constraints on lexical co-occurrence. *International Journal of Corpus Linguistics 10*, 266–70.
Nesselhauf, N. (2003). The use of collocations by advanced learners of English and some implications for teaching. *Applied Linguistics*, *24*(2), 223-242.
Paribakht, S. & Wesche, M. (1996). Enhancing vocabulary acquisition through reading: A hierarchy of text-related exercise types. *Canadian Modern Language Review*, *52*, 155–78.
Paribakht, S. & Wesche, M. (1993). Reading comprehension and second language development in a comprehension-based ESL program. *TESL Canada Journal*, *11*, 9–29.
Read, J. & Chapelle, C. (2001). A framework for second language assessment. *Language Testing*, *18*, 1–32.
Readability Index Calculator. Retrieved from: http://www.standards-schmandards.com/exhibits/rix/index.php.
Sinclair, J. (1991). Corpus, Concordance, Collocation. Oxford: OUP.
Schmitt, D. & Schmitt, N (2005). *Focus on Vocabulary Mastering the Academic Word List.* Pearson Education, Inc. WhitePlains, NY10606.
Shin, D., & Nation, P. (2007). Beyond single words: The most frequent collocations in spoken English. *ELT Journal Advance Access;doi:10.1093/elt/ccm091*.
Stubbs, M. (2001). Words and Phrases: Corpus Studies of Lexical Semantics. Oxford: Blackwell.
Sun, Y. -C. & Wang, L. -Y.(2003). Concordancers in the EFL classroom: Cognitive approaches and collocation difficulty. *Computer Assisted Language Learning, 16*, 83-94.
Webb, S. & Kagimoto, E. (2010). Learning collocations: Do the number of collocates, position of the node word, and synonymy affect learning? First published online: December 17, 2010, doi: 10.1093/applin/amq051 *Applied Linguistics December 17, 2010,* 1-19.
Wei, Y. (1999). Teaching Collocations for Productive Vocabulary Development. Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages (New York, NY, March 9-13,1999). Retrieved from: http://eric.ed.gov/PDFS/ED457690.pdf
Wray, A. (2002). *Formulaic Language and Lexicon.* New York: Oxford University Press.
Wray, A. (2000). Formulaic sequences in second language teaching: Principle and practice. *Applied Linguistics*, *21*(4): 463-489.

Appendix A. Assessing Vocabulary Knowledge

Look at each of the words written in **bold**. Use the scale below to give yourself a score for each word. If you choose 3, 4, or 5 please provide what the scale asks.
1. I don't remember having seen this word before.
2. I have seen this word before, but I don't know what it means.
3. I have seen this word before, and I think it means _____ (synonym or translation).
4. I know this word. It means _____ (synonym or translation).
5. I can use this word in a sentence (write a sentence): _____.

_____ **aggregate** _____
_____ **analogy** _____

_____ **circumstance** _____
_____ **commence** _____
_____ **conceive** _____
_____ **concurrent** _____
_____ **coordinate** _____
_____ **definite** _____
_____ **depress** _____
_____ **hierarchy** _____
_____ **hypothesis** _____
_____ **imposing** _____
_____ **intervene** _____
_____**likewise** _____
_____ **logical** _____
_____ **offset** _____
_____**phenomenon** _____
_____ **prospect** _____
_____ **ratio** _____
_____ **react** _____
_____ **temporarily** _____
_____ **unified** _____

Appendix B. Fill in the blanks with the words in the box

aggregate analogy circumstance commence conceive concurrent coordinate definite depress hierarchy hypothesis imposing intervene likewise logical offset phenomenon prospect ratio react temporarily unified

1. The threat is great so the country will _____ preparations for war.
2. I don't mean to _____ you, but there's no way we can win.
3. The results of the experiment did not support his _____ .
4. For example, we talk more loudly in cars, because of a _____ known as the Lombard effect—the speaker involuntarily raises his voice to compensate for background noise.
5. The team with the highest _____ score wins.
6. There was chaos in the country so the military had to _____ to restore order.
7. We haven't decided which car to buy yet. We're still looking at a few _____*s*.
8. I was surprised. I didn't expect him to _____that way.
9. You have to stop delaying us. We'll need a _____ answer by Tuesday.
10. He killed two people at the same time so he's currently serving two _____ life sentences for murder.
11. Since she helped us before, it's _____ to assume that she'll help us again.
12. She says that her client is a victim of _____ and should not be blamed for the accident.
13. A _____ transport system will make things easier because then they will be joined together.
14. We regret that this service is _____ unavailable, but it will be running soon.
15. The teacher drew an _____ between the human heart and a pump.
16. I don't believe this! I cannot _____ that he would want to hurt us!
17. They appointed a new manager to _____ the work for the team, because there was a lot of work that needed to be distributed.

18. She is high up in the management _____ . She is in a high rank.
19. The _____ of applications to available places currently stands at 100:1.
20. Wow! This is a grand and _____ building!
21. He voted for the change and he expected his colleagues to do _____.
22. Prices have risen in order to _____ the increased cost of materials.

Appendix C. Reading Passage

THE COSTS AND BENEFITS OF SOCIAL BEHAVIOR

Why do some animals live together in "social" groups, while others are solitary? According to recent research, there are concurrent costs and benefits to living in social groups. We human beings are social creatures who live in largely hierarchical societies, where people perform certain cooperative roles according to their rank and in order to preserve the community. As humans, we like to flatter ourselves into believing that our social behavior is the "most advanced" way of life, and by analogy, also the best kind of behavior for animals. It may be difficult for us to conceive of a situation in which social living is not advantageous. However, although it is true that living and cooperating with others has a variety of benefits, we will see that social behavior is not inherently superior to solitary behavior in the animal kingdom.

Sociality gives certain creatures definite advantages. Black-headed gulls, for example, capture food more easily when they hunt in flocks rather than forage by themselves. A pride of lions acting in a unified manner can better defend a hunting territory than a single lion can. A pair of birds can often care for its younger better than a single parent can; one parent can guard the nest while the other is temporarily released from this responsibility in order to gather food. And social animals that are preyed upon by others can often coordinate their efforts to repel an enemy more effectively than solitary animals can.

But if sociality is so beneficial, why are social species so few and far between in most species of animals? Perhaps because there are many ecological conditions for which the negative effects of living together exceed the positive ones. There is no doubt that social life can create extra competition for food, as well as the risk that social foragers will be exploited by others within the group, as is true with lions. Likewise, animals that live together often face reproductive competition from other group members. For example, the destruction of eggs is a regular phenomenon within societies of the acorn woodpecker, a bird that forms groups containing as many as three breeding females and four breeding males. The females place their eggs all in the same nest, from which individuals remove and destroy the eggs of their "cooperatively breeding" companions, as females try to maximize the chances of their own offspring!

Still another cost of sociality is the increased prospect of *brood parasitism,* as the cliff swallow demonstrates. This bird nests in groups ranging from a couple of breeding pairs to over 3,000 individuals, with the swallows building their mud nests side by side under overhanging cliffs, bridges, and culverts. The females sometimes slip into neighboring nests to lay eggs. The neighboring swallow usually reacts to this intrusion by tending the extra egg, the presence of which apparently depresses her own egg-laying rate. The probability of occurrence of this form of brood parasitism is dramatically greater in large colonies than in groups with fewer than ten nestling females.

Cliff swallows have to deal with a different kind of parasite as well, the swallow bug, a bloodsucking relative of the notorious bedbug. Here too, a positive correlation exists between the risk of parasitic infestation and the size of cliff swallow colonies. In large nesting groups, there is a greater chance that an infested adult will be present to seed the colony with these rapidly reproducing pests. Swallow bugs so most of their reproductive damage to cliff swallows by drinking the blood of swallow babies. When nestlings were weighed and the number of bugs attacking them counted, it was found that the higher the ratio of bugs per bird, the less a ten-day-old nestling weighed. In colonies where the aggregate parasite loads were extreme, the survival rate of the young declined by as much ad 50 percent.

Cliff swallows illustrate that social living is far from an absolute blessing. If sociality is to evolve, special ecological conditions must intervene so that the many costs of associating with others will be offset by certain benefits to social individuals. The primary benefit of social life may be improved success in dealing with predators.

Consider the social bluegill sunfish and its close relative, the solitary pumpkinseed sunfish. Bluegills become temporarily social during the breeding season, when groups of 50 to 100 males commence building their nests (depression in a sandy lake bottom) side by side. Although it is possible that bluegills nest together in part because some places are better than others for nest building, males in the colony derive a definite benefit in terms of a reduction in predator pressure on the eggs deposited in their nests by spawning females. For example, by defending overlapping territories, social males "cooperate" in offering a united front against egg-eating catfish.

But social bluegills pay a price for their antipredator benefits. An individual that nests in a group must intervene to deter his neighbors (and other non-nesting bluegills attracted to the group) from consuming the eggs in his nest which he has fertilized. Moreover, fungi that destroy eggs may be transmitted from nest to nest in a dense colony. These costs reduce the net benefit enjoyed by the bluegills.

In contrast to their bluegill relatives, pumpkinseed sunfish do not breed in colonies. Whereas bluegills have small, delicate mouths designed for "inhaling" small soft-bodied insects, pumpkinseeds have more imposing jaws adapted for picking up, crushing, and consuming heavy-bodied mollusk prey (e.g., snails and mussels). Thus, although a bluegill cannot pick up a snail and cart it away from the nest, pumpkinseeds are easily able to do this (and may consume their egg-loving enemy to boot). In addition, a bluegill's bite does little damage to a nest-raiding bullhead catfish, but a pumpkinseed's attack packs considerably more wallop. The fact that pumpkinseeds are relatively free from nest predation and are solitary, whereas bluegills are more vulnerable to nest predation and are social, supports the hypothesis that social living is adaptive only when certain benefits can counterbalance the clear costs of sociality. Pumpkinseed sunfish are in no way inferior or less well adapted than bluegills because they are solitary; they simply face different ecological circumstances, under which colonial nesting would yield reduced individual success. As with all animals, it is only logical to be social if the benefits outweigh the costs.

Appendix D. Comprehension Questions

Please answer the questions in full sentences.

1. According to recent research what kind of costs and benefits are there to living in social groups?
2. What is another cost of sociality in the cliff swallow?
3. In what kind of colonies of cliff swallows did the survival rate of the young decline by as much as 50 percent?
4. During breeding season when do bluegill males become temporarily social?
5. If sociality is to evolve why must ecological conditions intervene?
6. What should an individual bluegill that nests in a group do to deter his neighbors from consuming the eggs in his nest?