

# Effect of Cognitive Semantic Analysis of Node Words on Collocation Learning--Construct of Collocation: Isolated or Integrated

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**Abstract:** The intrinsic feature of collocation, analyzable or integrated, has become controversial in recent years and resulted in diverse teaching approaches on collocations. This paper aimed to verify the constitutive property of collocations and proper teaching approach to second language learners. This design compared the effect of the cognitive semantic approach with that of form-focused instruction. The former taught collocations as predictable, while the other regarded them as integral units. Sixteen lexical collocations with cross-linguistic incongruence were selected and the node word in each collocation functioned with extended meaning rather than prototypical meaning. The results verified the analyzable inherence of collocation as well as the predominant effect of cognitive semantic approach.

**Keywords:** collocation, cognitive semantic approach, form-focused instruction, analyzable inherence

## Introduction

Collocation, as one typical component of formulaic language, with its paramount importance as well as difficulty in second language acquisition, has been found to be a tough barrier to foreign language learners, even to advanced L2 learners<sup>[6][21][23]</sup>. Some researchers viewed collocations as fixed or unpredictable<sup>[1][19]</sup>. "From a learning point of view, it makes sense to regard collocations as items which frequently occur together and have some degree of semantic unpredictability"<sup>[19]</sup>. On the contrary, Wray found that adult second language learners took an essentially non-formulaic approach to collocation learning as they analyzed them into individual words but did not retain them as a unit.<sup>[32]</sup> Also, the cognitive analysis to constitutes had strong positive effects on learning formulaic sequences<sup>[2][10][15][26]</sup>.

In consequence, the divergent viewpoints about the constitutive nature of collocations have generated diverse teaching approaches. Lewis put forward the Lexical Approach, which considered language in larger units as unbreakable structures without any compositional analysis<sup>[14]</sup>. On the contrary, collocation was deemed as semantically and conceptually motivated, and engaging in the conceptualization practice of node words could provide L2 learners with an opportunity to internalize its meaning<sup>[27][31]</sup>. Liu suggested that the noticing-and-memorization-only approach not only ignored the motivated nature of collocations but also the effects of cognitive analysis on collocation.<sup>[15]</sup> Also, teaching formulaic sequences as a unit might overlook the factors that dominated the acquisitional and processing strategies of learners. Teaching should be beneficial to genuine language usage or focus directly on analytic learning.<sup>[33]</sup>

In sum, teaching collocations as a whole unit or as divisible parts demonstrates a reaching gap. This paper aimed to explore the analytic inherence of collocations by comparing the effect of the cognitive semantic approach, which emphasizes on the cognitive motivation of node words with that of form-focused instruction, which created situations for

learning collocations as integrated units.

## **1. Literature review**

### **1.1 Cognitive semantic approach**

The cognitive semantic approach, which takes a stand on the analytic and concept motivated nature of formulaic expressions, has attracted attention for teaching formulaic sequences<sup>[15][27][31]</sup>. Boers conducted three empirical designs and confirmed the positive effect of cognitive awareness on processing figurative items.<sup>[2]</sup> “Employing cognitive efforts to identify source domains and to make categorization judgements promotes deep-level cognitive processing, which in turn promotes memory storage.”<sup>[2]</sup> Liu found that most collocations were motivated by the semantic meaning of node words and proposed that cognitive analysis could be more effective for learning collocations.<sup>[15]</sup> Tsai compared the effect of concept-based instruction with that of form-focused instruction on teaching verb - noun collocations and came to the conclusion that an endeavor to recognize the conceptually motivated node words in collocation could help L2 learners notice more about the association in form and result in deeper understanding.<sup>[27]</sup> In Tsai’s research, the targeted node words were all function words, such as ‘get’, ‘make’, ‘do’ and ‘take’. In this study, we chose the notional words as node words and the targeted collocations were all incongruent from a cross-linguistic perspective as L1-L2 incongruity was considered as challenging hinderance for L2 learners<sup>[9][35]</sup>.

### **1.2 Form-focused instruction**

Form-focused instruction was first proposed by Long (1991) and redefined by Ellis (2001)<sup>[7][16]</sup>. “FFI can aid acquisition by drawing learners’ attention to forms in the input that otherwise they might not notice and thus fail to intake”<sup>[7]</sup>. Compared with the cognitive semantic approach, which focused on meaning, the primary purpose of form-focused instruction was to grasp a predetermined form and the learners were required to focus on the specific form intensively<sup>[7]</sup>. Form-focused instruction on vocabulary or formulaic sequences in classroom environment was examined and compared, although the results showed great divergency.<sup>[8][17][25][30][34]</sup>

In sum, it is still in a state of emergency to probe a more systematic pedagogy for teaching collocation. The research questions were as follows:

- 1) Can the cognitive semantic approach outperform Form-focused instruction on learning word parts of collocation at receptive or productive levels?
- 2) Can the cognitive semantic approach outperform Form-focused instruction on the concepts and referents of meaning of collocation at receptive or productive levels?
- 3) Can the cognitive semantic approach outperform Form-focused instruction on the associations of meaning of collocations at receptive levels?

## **2. Research methodology**

### **2.1 Research participants**

A total of 60 freshmen from two intact classes at a university in China participated this study. All of them were native Chinese speakers who had studied English as a foreign language (EFL) for a minimum of 9 years. Their age ranged from 18 to 20. The two intact classes were randomly assigned to the cognitive semantic approach group (23) and the receptive-productive integration group (30). Data from seven participants who did not follow the procedure properly were not included in the analysis. The English proficiency of the two groups was based on their English test scores of College Entrance Examination. The independent t-test showed that the English proficiency of the two groups had no significant difference ( $t(51) = 0.8, p = .428 < .05$ ).

### **2.2 Target collocations**

As collocations with semantic vagueness are usually the most difficult to learn (Nesselhauf, 2003), the targeted collocations were L1-L2 incongruent and the meaning of node word was non-prototypical and unknown to the learners.<sup>[22]</sup>

For example, the core meaning of easy is ‘not difficult; done or obtained without a lot of efforts or problems’, while in easy target, easy means ‘open to attack or not able to defend’. Selecting an unknown meaning of the node word was used to avoid the possibility of measuring an individual word but not the target collocation.

According to Nation & Webb, the framework on collocation was classified into three primary categories, each of which includes three aspects: form (spoken, written, word parts), meaning (form and meaning, concept and referents, associations), and use (grammatical functions, collocations, constraints on use [register, frequency...]).<sup>[20]</sup> Moreover, each aspect involves knowledge at two levels, receptive and productive. The majority of empirical studies on collocation usually focused on the written form of collocation in the form dimension, and form and meaning in meaning dimension<sup>[22-24][30]</sup>. This study is novel in other three aspects of collocation that require the learners’ deeper processing: (1) word parts of form (Receptive aspect: what words are recognizable in this collocation? Productive aspect: what words are needed to express the meaning?); (2) concepts and referents of meaning (Receptive aspect: what is included in the concept? Productive aspect: what items can the concept refer to?), and (3) the associations of meaning (Receptive aspect: what other words or collocations does this make us think of?). Considering the English proficiency of the participants, we did not test the productive aspect of the associations of meaning.

## **2.3 Research methods**

The experiment consisted of a learning session followed with an unannounced immediate test and delayed test after an interval of five days. Time was controlled and monitored to ensure that all participants could complete the learning process.

### **2.3.1 Form-focused instruction**

Each collocation was shown in conjunction with its Chinese translation and three glossed sentences with the collocation highlighted in bold listed beneath. The receptive task functioned as model input to draw students’ attention to the form and appropriate usage in context. After the instructor’s explanation and confirming the students’ comprehension, the students were required to make a sentence with the target collocation. This part aimed to help students’ further engage in deep learning.

### **2.3.2 Cognitive semantic approach**

The instructor guided the students to learn collocations in five steps. (1) Read the collocation, analyze and guess the meaning of collocation by its construction. (2) Read the first sentence and speculate the meaning of the collocation. (3) The instructor checked their analysis and then gave the correct meaning. (4) Ask the students to analyze the meaning of node word, then gave its correct answer. This process was intended to inspire the students that collocation was conceptually motivated by node word. (5) Students read two more sentences to further analyze the collocation. (5) Students make a sentence for each collocation.

## **2.4 Measurement**

After the teaching process, five tests were administered. To prevent a test effect, the five tests were sequenced as follows: word part of form at productive level, word part of form at receptive level, concepts and referents of meaning at productive level, concepts and referents of meaning at receptive level, and the associations of meaning at receptive level.

The first test aimed to measure the productive knowledge of the word part of form. The participants were given the collocates of target collocations and required to write the node words.

The second test aimed at the receptive knowledge of the word parts of form. A match format was used in which the four node words were in the left column, while four targeted collocates and four distractions were listed on the second column. The participants were required to match the node word with its collocate. For each set, all the distractions were the same part of speech and were known to the participants to avoid unnecessary confusion. As there were 16 target collocations, totally four sets were prepared. The third test assessed the productive knowledge of concepts and referents of meaning in which the participants need to write a word or collocation with the identical or similar meaning of the given collocation.

The fourth test measured the receptive knowledge of concepts and referents of meaning. This test aimed to diagnose the motivation of node word, which required the learners to select an appropriate collocate to target node word. A multiple-choice format was used. If they did not know or were uncertain about the answer, they should circle the fifth choice ‘I don't know’. For example, the meaning of blind faith is ‘a belief which seems to be unreasonable but accepted without question’, which bears resemblance to the meaning of unquestioning belief.

The fifth test aimed at the receptive knowledge of associations of meaning of collocation and aimed to ascertain whether learners had acquired the peripheral meaning of the node word and could flexibly analyze and select its other collocates not taught before. A multiple-choice format was used in which the node word of each collocation was offered and the participants were required to circle its collocate or ‘I don't know’ if they were uncertain. As the example shows below, the correct answer is ‘date’ as blind in ‘blind belief’ and ‘blind date’ has the same meaning: ‘seeming to be unreasonable but accepted without question or be out of control’ (blind date means ‘an arrangement made for you to spend a romantic day or evening with someone you have never met before’).

Example: Select an appropriate word which can form a collocation.

Blind \_\_\_\_\_

A. country B. date C. hope D. heart E. I don't know

### 2.5 Scoring standard

The scoring standard to the receptive test of associations of meaning was that proper collocation or word with the equivalent meaning to target collocation would be given one score and the spelling errors were ignored. To the other four tests, a strict scoring system was adopted. Hence, the full mark for each test was 16. Five days later, the delayed test was implemented but the items and choices were reordered to minimize the test effects from immediate test.

### 3. Research results

This study adopted a two-factor hybrid design with Teaching treatment (cognitive semantic approach vs form-focused instruction) as between variable and Time (immediate vs delay) as within variable, and the test score as dependent variable. The descriptive data of the five tests were listed in Table 1.

Table 1 The descriptive data of the five tests

	Cognitive semantic approach				Form-focused Instruction			
	Immediate test		Delay test		Immediate test		Delay test	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Words parts of form at receptive level	15.04	1.49	14.73	1.94	12.33	4.10	11.47	3.84
Words parts of form at productive level	9.91	3.38	9.35	3.20	8.70	4.96	8.37	5.08
Concepts and referents of meaning at receptive level	13.48	1.24	13.35	1.27	12.77	1.52	12.14	2.33
Concepts and referents of meaning at productive level	10.65	2.71	10.57	2.54	8.66	2.28	7.33	2.63
Associations of meaning at receptive level	10.39	1.62	10.12	1.70	8.80	2.04	8.33	2.50

#### 3.1 The results of words parts of form at receptive level

The results of testing words parts at receptive level indicated that there was no significant interaction between Teaching treatment and Time ( $F(1,1) = 1.938, p > .05$ ) but there were significant main effects of Teaching treatment ( $F(1,51) = 11.986, p < .05$ ) and Time ( $F(1, 51) = 8.404, p < .05$ ). In the immediate session, the learning effect of the cognitive semantic approach ( $M=15.04$ ) outperformed that of Form-focused instruction ( $M=14.73$ ) analyzed by the independent t-test ( $t(51) =$

4.05,  $p < .05$ ). And the delay session showed the same trend ( $t(51) = 4.046$ ,  $p < .05$ ). The retention rate of cognitive semantic approach decreased 2% while that of form-focused instruction decreased 6.9%.

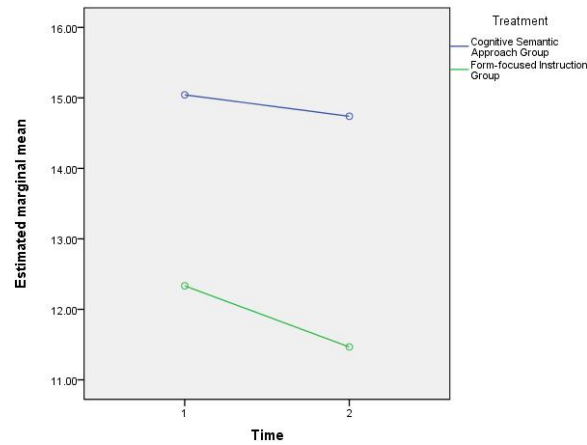


Figure 1 The results of words parts of form at receptive level

### 3.2 The results of words parts of form at productive level

The results of the test of word parts at productive level indicated that there was no significant interaction between Teaching treatment and Time ( $F(1,1) = 0.15$ ,  $p > .05$ ), and no significant main effect of Teaching treatment ( $F(1,51) = 0.877$ ,  $p > .05$ ) and Time ( $F(1,51) = 2.249$ ,  $p > .05$ ), which means that the two teaching methods did not have significant differences during the two time sections. The two instruction methods showed great learning effect, 61.9% and 58% at the immediate test, and 54.3% and 52.3% at delay test.

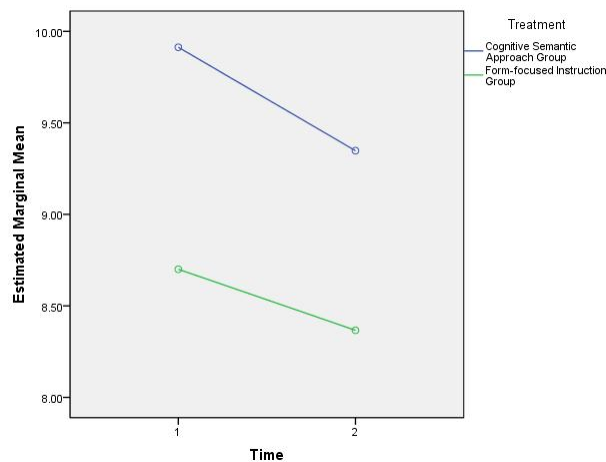


Figure 2 The results of words parts of form at productive level

### 3.3 The results of concepts and referents of meaning at receptive level

The results for the test of concepts and referents of meaning at a receptive level indicated that there was no significant interaction between Teaching treatment and Time ( $F(1,1)=1.316$ ,  $p > .05$ ) and no significant effect of Time ( $F(1,51)=3.036$ ,  $p > .05$ ), but significant effects of Teaching treatment ( $F(1,51) = 5.355$ ,  $p < .05$ ). In the immediate session, the learning effect of cognitive semantic approach ( $M=13.48$ ) showed marginal significant out performance ( $t(51)=1.824$ ,  $p=.054$ ) than that of form-focused instruction ( $M=13.35$ ). In the delay session, its learning effect showed significant learning retention ( $M=12.77$ ,  $t(51) = 2.254$ ,  $p > .05$ ) over that of form-focused instruction ( $M=12.14$ ). The retention rate with the cognitive semantic approach decreased 4.43% and it decreased 7.5% with Form-focused instruction.

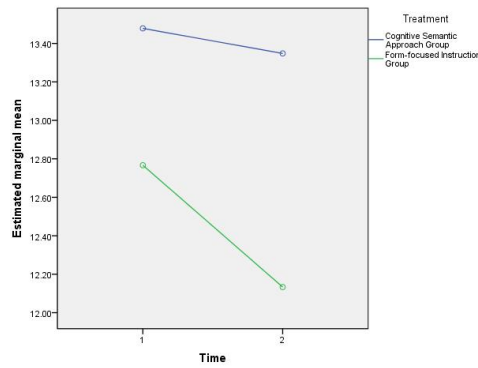


Figure 3 The results of concepts and referents of meaning at receptive level

### 3.4 The results of concepts and referents of meaning at productive level

The results for the concepts and referents of meaning at productive level indicated significant interaction between Teaching treatment and Time ( $F(1,1)=6.764, p<.05$ ) and significant main effect of Teaching treatment ( $F(1,51) = 15.636, p<.05$ ) and Time ( $F(1, 51) = 8.783, p<.05$ ). The learning effect of cognitive semantic instruction ( $M=10.65$ ) showed significant out performance over that of form-focused instruction at the immediate test ( $t(51) = 3.346, p<.05$ ) as well as delay test ( $t(51)=4.046, p<.05$ ). The retention rate by cognitive semantic approach decreased 12.44%, while it decreased 20.25% by form-focused instruction.

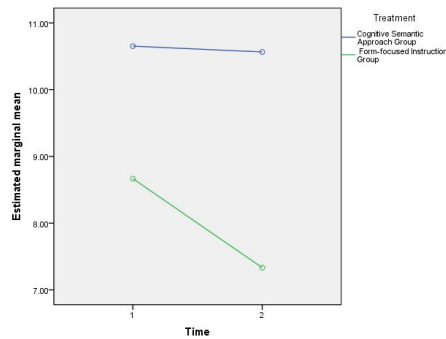


Figure 4 The results of concepts and referents of meaning at productive level

### 3.5 The results of associations of meaning at receptive level

The Fifth part of the research studied the receptive knowledge of associations of meaning. The results indicated that there was no significant interaction between Teaching treatment and Time ( $F(1,1) = 0.019, p>.05$ ) but a significant effect for Teaching treatment ( $F(1,51)= 9.788, p<.05$ ). The learning effect of the cognitive semantic approach showed significant outperformance over that of Form-focused instruction during the immediate test ( $t(51)=3.071, p<.05$ ), as well as the delay test ( $t(51)=2.613, p<.05$ ). The retention rate with cognitive semantic approach decreased 1.7%, while the retention rate by form-focused instruction decreased 2.9%.

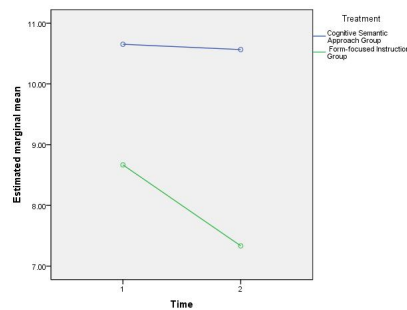


Figure 5 The results of associations of meaning at receptive level

## 4. Discussion

In response to the first research question targeting word parts of form aspect of collocations, the cognitive analysis intervention and form-focused intervention had significant difference at the receptive level but no significant difference at the productive level. As Ellis (2001) proposed, in Form-focused Instruction, the teacher and students know that the primary purpose of the activity is to learn a pre-determined form and the learners are required to focus intensively on these specific forms in order to learn them<sup>[7]</sup>. This result is contrary to that of Tsai (2018, 2020), which found that meaning-focused instruction outperformed the form-focused Instruction on two levels. The difference may stem from the teaching difference as Tsai's study used SCOPA to show the concept of node words, while this study analyzed the concept of node word in sentence context.<sup>[26-27]</sup> Also, in Tsai's study, the node words were all function words, while node words were all notional words in this study. In sum, to the form aspect of collocation, meaning-focused approach did not show superiority than that of form-focused instruction.

The second question aimed at the meaning aspect of collocation, the concepts and referents of meaning. The cognitive semantic approach outperformed the form-focused instruction in two time sections. This result is in line with the Depth of Processing Theory, which illustrated that the processing at a semantic level required the alliance of a word with context on the basis of memorization and identification, while form-level processing was a kind of mechanical repetition process<sup>[5]</sup>. This result is also in accord with that of Boers & Strong (2016), who proposed that accessional cognitive operations to long-term memory were required for keeping new words in long-term memory<sup>[4]</sup>. In this study, the results confirmed that conscious cognitive analysis guidance could significantly outperform form-focused instruction on the semantic-level processing. Also, cognitive analysis could accelerate deeper processing at meaning level because of the deep analysis and elaborate learning processes.

The third question also focused on the meaning aspect of collocation but required deeper processing and extended appliance of the association of node words -- the appropriate connectivity with other collocates not taught by instructors. The results further confirmed the idea that collocations were not arbitrary and unpredictable but semantically and conceptually motivated. This result meant that cognitive analysis could assist learners to understand the collocating characteristics of the node, which helped them internalize the knowledge and could recognize other collocates of this node word in new contexts. This result was in accordance with Van der Veer (2000), who suggested that memorization without conceptual processing might inhibit the application of knowledge in new contexts.<sup>[28]</sup> In other words, the learners' knowledge was limited to what had been taught and could not be flexibly used or extended. This study was also in line with Liu (2010) and Tsai (2018, 2020), who proposed that cognizing the core meanings of target verbs by cognitive linguistic analysis could enhance the learning of collocations.<sup>[15][26][27]</sup> Moreover, the delay test of this study also verified the Theory of Depths of Processing, which demonstrated that superficial processing resulted in short time retention, while deep analysis and elaborate processing allowed for longer retention<sup>[5]</sup>.

## 5. Pedagogical implications and limitations

"It would behoove teachers to guide ESL/EFL students through some 'idiomatic' phrasal verbs by analyzing their component parts and then looking for a logical relationship within a specific context"<sup>[12]</sup>. In this study, the cognitive semantic approach was found to be effective in learning collocation, especially at a semantic processing level. The cognitive semantic approach could also assist and extend the limited in-class learning to analyze and recognize new collocations using the analyzed node words. This cognition oriented approach was not meant as a substitute to form-focused instruction, which is especially beneficial to form learning, but rather as a complementary pedagogical method. In other words, the integration of cognitive motivation, conceptual analysis and experiences in context, as well as form-focused tasks can be comprehensive and ideal pedagogical approach for collocations.

The design of this study has several limitations that need to be acknowledged. First, the productive knowledge at the level of associations of meaning was not tested, considering the English proficiency of the participants, which can be supplementary research for further verification. Second, the collocations in this study were all formed by high frequency

words, and whether the cognitive semantic approach could show processing advantage to the learning of new words, as well as their collocations, could be an area for further research.

## 6. Conclusion

This study verified the predictable properties of collocation by the cognitive semantic approach. The noticing-exposure commitment features of form-focused instruction intangibly directed learners to recognize and memorize collocations as a whole but showed a relatively weak effect on learning collocations at a semantic level. With proper instruction, learning is to grasp the semantic “spin,” which was more natural and enjoyable than sheer memorization.<sup>[11]</sup> The cognitive oriented instruction showed its significant superiority especially in the aspect of meaning. Cognitive awareness could direct learners to cognize and deepen processing on learning collocation. Also, the semantic and conceptual mastery of node words played a critical part in motivating the learning of its collocates, as well as speculating the meaning of new collocation stemming from the node word. In summary, analytic engagement accommodating of cognitive analysis approach can enable learners to address the challenges of learning collocations in a more systematic manner.

## Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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