Comparison Study of Synonyms in the Perspective of International Chinese Education

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Abstract: This article attempts to analyze the differences and similarities in domain, collocation, and semantic prosody of the Chinese synonyms "jiǎn, qiē, kǎn, gē" in the Chinese native language corpus and the learner corpus, using the online corpus retrieval tool Sketch Engine. Firstly, the usage domains and word frequency distributions of these four verbs in the corpus are statistically analyzed. Secondly, the common collocations of these four verbs are retrieved and sorted based on LogDice values, and their distributions are visually presented through charts. Additionally, the "lexical sketch contrastive analysis" function is used to further compare and analyze the differences in collocations among these four words. Finally, by observing the collocations of these four verbs, the semantic prosody of each word is summarized. It is believed that through corpus-based comparative research, this method can serve as a new approach for distinguishing Chinese synonyms, and further promote the application of corpora in international Chinese education.

1. Introduction

With the end of the COVID-19 pandemic, international Chinese education has entered a period of vigorous development again. Since last year, there have been continuous deployments of new international Chinese education volunteers and Chinese language teachers. In international Chinese education, vocabulary plays a crucial role as the building material of language. Within the Chinese vocabulary, there are numerous synonyms. Due to the comparable functions and semantic similarities of these synonyms, it can be challenging for both native Chinese speakers and Chinese language learners to appropriately utilize them. Therefore, the study of synonyms has always been a hot topic in the research and teaching of Chinese language.

Currently, we are in the era of Chat-GPT, where various large-scale language models have emerged. Upon closer examination, it is evident that word collocation is of utmost importance in these language models. In order to enable chatbots to generate coherent text, they need to continuously learn the common collocations of various words from a large amount of data. This is where corpora come into play. Corpus-based research indicates that the collocational behavior of words exhibits certain semantic tendencies: certain words tend to frequently attract other words with similar semantic features to be collocated together. As these words frequently appear in the same context, the latter words become "infused" with the associated semantic features, leading to

the presence of a specific semantic range in the entire context. This is known as semantic prosody[1]. Therefore, mastering word collocations is of great importance not only for machine learning but also for Chinese language learners. It is essential to learn not only the grammatical collocations between words, known as colligation[2], but also the semantic collocations between words in order to grasp the semantic prosody of words. Through a comparison between Chinese and English, we can observe that the English word "cut" can correspond to the Chinese words "jiǎn, qiē, kǎn, gē" which are synonyms. This poses a significant learning challenge for Chinese learners whose native language is English.

Traditional methods of distinguishing Chinese synonyms mainly include analysis of semantic components and analysis of semantic composition [3]. However, for Chinese learners, their reliance is often limited to bilingual dictionaries. Dictionaries primarily focus on definitions while neglecting usage and collocations, sometimes even leading to synonymous explanations. This only leads to temporary memorization of individual words without understanding the flexible use of a set of synonymous words. As a result, students may develop a fear of difficulties and adopt avoidance strategies, causing misuse and errors in word usage. In contrast, "Contrastive Interlanguage Analysis" (CIA) based on corpora[4] employs basic techniques and methods of corpus research, utilizing relevant data from reference corpora and learner corpora in a range of dimensions. It summarizes the main differences, patterns, and learner behaviors between interlanguages, discovers non-native language features of the interlanguage, and explores the underlying reasons behind these features [5]. Through corpus comparison, Chinese learners can intuitively understand various aspects of word collocation, such as colligation, collocation, discourse, semantics, and domains within a set of synonyms.

This article adopts the aforementioned methods to conduct comparative research on the usage of synonyms by Chinese language learners. The reference corpora used are the BCC Corpus of Beijing Language and Culture University, the Chinese Web 2017 (zhTenTen17) Simplified, while the learner corpus used is the Guangwai-Lancaster Chinese Learner Corpus. The study utilizes collocation word index statistics and collocation word data. The focus words of the study are "qiē" "jiǎn" "kǎn" and "gē" The retrieval tool used is the online corpus retrieval tool Sketch Engine (referred to as SkE), which provides an intuitive presentation of word colligation, collocation, as well as a lexical sketch contrastive analysis function.

2. Previous Research on Synonyms in the Context of International Chinese Education.

Zhang Bo (2007) argues that research on "synonyms" in Chinese linguistics should shift its focus and prioritize the analysis and distinction of easily confusable words based on learner errors[6]. The study identifies the main types of easily confusable words in Chinese based on factors that affect word confusion and proposes several considerations for researching these words.

Li Shaolin (2010) provides further explanation and arguments for this viewpoint from the perspectives of Chinese word forms and meanings. It suggests that word distinction should follow four principles: simplicity, practicality, clarity, and addressing key contradictions[7].

Zhao Xin and Hong Wei (2013) discuss the key points and challenges in teaching Chinese synonyms based on teaching experiments, questionnaire surveys, and teaching practices[8]. They explore teaching strategies and methods, as well as the effectiveness of these approaches.

Lu Fangzhe (2016) proposes a framework for the distinction of synonyms based on the Beijing University CCL Corpus and the Beijing Language University BCC Corpus[9]. The framework includes considerations of word position in sentences, word collocation, and domain distribution, which are explained in detail. This study systematically examines the use of various synonyms in corpora but lacks statistical analysis of mutual information (MI) values for word collocations and

the generalization of word class associations and semantic prosody.

Li Yuan (2019) argues for the feasibility and effectiveness of using chunks theory in teaching synonyms[10].

Wang Yu (2022) selects experimental materials from the "Chinese language proficiency levels standards for international Chinese education" and utilizes an interlanguage corpus to understand the use and errors of synonyms in the standards[11]. Through a questionnaire survey, the study examines the difficulty of acquiring different types of synonyms (classified based on whether they contain the same morpheme), differentiating between various aspects of synonyms, and quantifies and ranks the difficulty of acquiring synonyms using quantitative methods. It further analyzes the national characteristics of synonym acquisition difficulty using Vietnamese and Thai students as representatives.

Li He (2023) uses the HSK level 6 word pair "rěnshòu – rěnnài" as an example to discuss and analyze the error issues of advanced Chinese learners when using synonyms based on the HSK dynamic essay corpus[12]. The study analyzes the characteristics of synonym errors made by advanced Chinese learners from three perspectives: semantic errors, direction of misuse, and errors involving the same morphemes. It also provides relevant teaching suggestions. The discussion in the study is comprehensive, but the corpus it is based on is relatively old, ending in 2005, and there is a lack of relevant factor analysis before proposing teaching suggestions.

In summary, in recent years, teaching Chinese synonyms has received increasing attention in the field of Chinese language education. From the overall framework of synonym research to the teaching design of individual synonym pairs, corpus-based synonym research has become more common. However, comparative research and statistical analysis of corpus data related to the use of synonyms are still not comprehensive and intuitive enough. As a new generation corpus retrieval platform, SkE provides convenient tools such as word sketch difference comparison and word index, which facilitate the induction and comparative research of typical collocations for users. This will completely change the traditional methods of synonym distinction. In China, research conducted using this platform has primarily focused on English (Yang Jiezhi, 2007; Wang Yueli, 2013; Lu Huaguo, Zhang Ya, 2015), and research on Chinese synonyms is relatively limited. Representative studies found in CNKI include Yang Bei's (2016) comparative study on "kěnéng" "yěxǔ" "dàgài" and "kěnéng" in terms of Chinese ontology[13]. However, this study did not consider the usage of this word group in Chinese learner corpora.

3. Research Design

3.1. Research Questions

This study aims to investigate the usage characteristics of the verbs "qiē" "jiǎn" "kǎn" and "gē". The research questions include:
(1) What are the differences in frequency of use among these four verbs?
(2) What are the semantic features of significant collocations associated with these four verbs?
(3) How do these four verbs differ in their usage?

3.2. Research Corpus

This research utilizes a comparative approach using both a Chinese native language corpus and a learner corpus. The reference corpora include the BCC Corpus developed by Beijing Language University and the "Chinese Web 2017(zhTenTen17) Simplified" corpus developed by Lancaster University. The learner corpus used is the Guangdong University of Foreign Studies (GUFS) – Lancaster Chinese Learner Corpus (GLCLC), which is a collaborative effort between GUFS and

Lancaster University. The Guangwai-Lancaster Chinese Learner Corpus (CLC) is a corpus of Mandarin Chinese created specifically for learners of the language. It is a collaboration between Guangdong University of Foreign Studies and Lancaster University, and it contains approximately 1.2 million words. Research Tool:

This study utilizes the corpus retrieval tool "Sketch Engine" (SkE) for research. SkE is a prominent representative of the fourth-generation corpus retrieval tools. SkE has the following advantages: Firstly, it contains embedded corpora in multiple languages, including English, Chinese, Japanese, Italian, German, etc., such as GLCLC, zhTenTen17, CHILDES, and also allows researchers to upload their own corpora. Secondly, SkE utilizes natural language processing techniques to preprocess corpora, including word segmentation, part-of-speech tagging, and syntactic parsing. Thirdly, SkE provides seven statistical methods for calculating collocation strength, including T-value, Mutual Information (MI), MI3, Log-likelihood, Minimum Sensitivity, LogDice, and MI_log_f. Higher numerical values indicate stronger collocation. Among these seven methods, LogDice is considered the best and is the default setting in SkE.

3.3. Research Procedure:

Firstly, we will use SkE's Chinese corpora, zhTenTen17 and GLCLC, and utilize the Concordance feature to search for the verbs "jiǎn" "qiē" "kǎn" "gē". We will compare the frequency and frequency per million words of these verbs in the two corpora.

Secondly, we will employ SkE's Collocations feature to extract collocates for these four node words within a span of -5/5 and determine significant collocates. The top ten collocates, ranked by LogDice value, will be identified as significant collocates.

Thirdly, using SkE's Word Sketch feature, we will explore the collocational patterns of these four verbs, focusing on their object collocations, and conduct a comparative analysis to summarize their semantic associations. Based on this, we will deduce the typical collocations, interlanguage collocations, and exceptional collocations of these four verbs in learner corpora of Chinese.

Fourthly, we will utilize SkE's Word Sketch Difference feature to analyze and compare the usage patterns of these four verbs, and present the results in the form of distribution graphs.

4. Results and Discussion

4.1. The frequency of use for the verbs ""jiǎn" "qiē" "kǎn" "gē"

By utilizing SkE's Concordance feature, we can directly observe the contextual usage of these four verbs in the corpus. SkE also automatically calculates their raw frequency and frequency per million words. The Table 1 shows the results obtained by indexing the lines in the GLCLC corpus for these four verbs and filtering them based on the author's selection.

Table 1: Frequency of Usage of "jiǎn" "qiē" "kǎn" "gē" in GLCLC

	jiǎn	qiē	kǎn	gē
Raw Frequency	10	11	3	1
Frequency per Million Words	6.01	6.61	1.8	0.6

After comparing, it is not difficult to notice that the frequency of usage for "jiǎn" and "qiē" is significantly higher than that of "kǎn" and "gē". Based on this observation, the author further compared the frequency of usage for these four verbs in the reference corpus zhTenTen17, and the results are shown in Table 2.

Table 2: Frequency of Usage of "jiǎn" "qiē" "kǎn" "gē" in zhTenTen17

	jiǎn	qiē	kǎn	gē
Raw Frequency	155600	329685	178269	113471
Frequency per Million Words	9.38	19.87	10.74	6.84

After comparing, it is not difficult to find that the frequency of usage for "qiē" is much higher than the other three verbs. Comparing the data in the GLCLC corpus, it can be observed that the usage rates of these verbs are quite low in the interlanguage of Chinese learners. When sorted by frequency per million words, in GLCLC, the order is: qiē< jiǎn < kǎn < gē, whereas in zhTenTen17, the order is: qiē< kǎn < jiǎn < gē. Whether in terms of raw frequency or frequency per million words, there exists a significant difference in the usage of "jiǎn" and "kǎn" between Chinese learners and native Chinese speakers.

4.2. Typical Collocations and Semantic Characteristics of "jiǎn" "qiē" "kǎn" "gē"

4.2.1. The Typical Collocations and Semantic Characteristics of "jiǎn"

Based on the further filtering and statistical data, here are some common collocations of the verb "jiǎn" (to cut) and their translations:

	Word	Cooccurrences ?	Candidates ?	T-score	ME	LogDice ↓	
1 ☐	fingernail	6,146	109,153	78.39	13.05	9.84	•••
2 ☐	Short	4,618	104,632	67.95	12.70	9.46	•••
3 ☐	hair	8,858	522,718	94.08	11.31	8.84	•••
4 ☐	Grilles	1,634	11,160	40.42	14.43	8.78	•••
5 ☐	bangs	1,916	101,351	43.76	11.47	8.21	•••
6 ☐	hairstyle	2,859	316,717	53.43	10.41	7.78	•••
7 ☐	toenail	721	6,031	26.85	14.13	7.66	•••
8 ☐	plait	764	25,385	27.63	12.14	7.53	•••
9 ☐	umbilical cord	729	35,680	26.99	11.58	7.35	•••
10 ☐	wool	863	74,090	29.36	10.77	7.26	•••

Figure 1: Statistical Data of Prominent Collocational Noun Objects with "jiǎn" in zhTenTen17

After analysis the Figure 1, it can be observed that the top ten noun objects most closely associated with "jiǎn" possess the semantic features of [+concrete object] and [+small size].

Furthermore, comparing the usage of "jiǎn" in the GLCLC corpus, it is evident that learners have only used the collocation "jiǎn tóufa" (to cut hair). There is also an erroneous sentence:

(1) ※…nǐ jiǎn tóufà nàme hǎokàn …

The Chinese learner mistakenly used the attributive structure that should be the subject element "nǐ jiǎn de tóufa" as the verb-object structure "jiǎn tóufa", indicating that there are certain issues with the learners use of "jiǎn".

4.2.2. Typical Collocations and Semantic Characteristics of "qiē"

Through the use of SkE index line search function, the verb "qiē" was searched, specifically

focusing on its collocations with noun objects. The search results indicate a total frequency of 181,126 occurrences with a rate of 10.92 occurrences per million words. After further filtering and analysis, the data of Figure 2 was compiled. By observing the top ten prominent collocational noun objects, we can notice that the verb "qiē" tends to collocate with noun objects that possess the semantic features of [+concrete object][+edible][-human].

Furthermore, comparing the usage of "qiē" in the GLCLC corpus, it is evident that the normal collocation "qiē dōngxi" (to cut things), exists. However, there are also cases of abnormal collocations such as "qiē shù" (to cut trees) and "qiē mùtou" (to cut wood).

	Word	Cooccurrences ?	Candidates ?	T-score	ME	LogDice ↓	
1	Cake	4,695	411,426	68.44	9.67	7.90	•••
2	onions	1,657	76,017	40.68	10.60	7.46	•••
3	silk	4,768	835,883	68.88	8.67	7.19	•••
4	Watermelon	1,860	232,741	43.05	9.15	7.03	•••
5	fruit	3,463	715,638	58.68	8.43	6.90	•••
6	scallions	1,049	93,396	32.35	9.64	6.72	•••
7	potato	1,267	197,171	35.52	8.84	6.59	•••
8	bean curd	1,149	163,193	33.83	8.97	6.57	•••
9	carrot	903	96,964	30.00	9.37	6.49	•••
10	Cucumber	835	110,126	28.84	9.08	6.32	•••

Figure 2: Statistical Data of Prominent Collocational Noun Objects with "qiē" in zhTenTen17

4.2.3. Typical Collocations and Semantic Characteristics of "kǎn"

Through the SkE index line search function, a search was conducted for the verb "kǎn", focusing on its collocations with noun objects. The search results show a total frequency of 109,297 occurrences and a frequency of 6.59 occurrences per million words for the noun objects of "kǎn". Further filtering and analysis resulted in the following statistical data:

	Word	Cooccurrences ?	Candidates ?	T-score	ME	LogDice ↓	
1	tree	9,694	836,857	98.40	10.65	8.38	•••
2	bargain	808	26,985	28.42	12.02	7.50	•••
3	The head	1,796	267,459	42.33	9.86	7.25	•••
4	bamboo	762	59,868	27.59	10.79	7.12	•••
5	sugar cane	495	58,663	22.23	10.19	6.51	•••
6	firewood	595	120,455	24.36	9.42	6.34	•••
7	tree	855	239,824	29.18	8.95	6.28	•••
8	twig	472	84,915	21.70	9.59	6.24	•••
9	People	278	23,062	16.66	10.71	6.00	•••
10	divide	11,756	6,087,992	108.02	8.07	5.96	•••

Figure 3: Statistical Data of Prominent Collocational Noun Objects with "kǎn" in zhTenTen17

By observing the noun objects of the verb "kǎn" in Figure 3, we can identify three categories: Abstract nouns, such as "jià" in the collocation "kǎn kǎn jià" (to bargain).

Concrete objects, such as "zhúzi" (bamboo), "shù" (tree) and "gānzhè" (sugar cane).

People, as seen in the collocation "kǎn rén zhě" (a person who kills).

Compared to the verbs "jiǎn" and "qiē", the verb "kǎn" has a broader semantic category.

Furthermore, by conducting a search in the GLCLC corpus for the usage of the verb "kǎn", only three instances were found, all of which were typical collocations involving "kǎn shù)" (to cut down trees). No abnormal collocations were identified.

4.2.4. Typical Collocations and Semantic Characteristics of "gē"

Through the SkE index line search function, a search was conducted for the verb "gē", focusing on its collocations with noun objects. The search results show a total frequency of 86,270 occurrences and a frequency of 5.2 occurrences per million words for the noun objects of "gē". After further filtering and analysis, the typical collocational data for noun objects are shown in the following Figure 4:

		Word	Cooccurrences ?	Candidates ?	T-score	ME	LogDice ↓	
1	☐	Double eyelids	10,109	92,543	100.54	14.18	10.76	•••
2	☐	meat	14,618	634,543	120.87	11.93	9.35	•••
3	☐	leek	2,766	65,188	52.59	12.81	9.12	•••
4	☐	foreskin	2,485	94,220	49.84	12.13	8.73	•••
5	☐	wheat	1,350	27,102	36.74	13.04	8.47	•••
6	☐	rope	1,166	82,933	34.13	11.22	7.72	•••
7	☐	rice	477	7,450	21.84	13.41	7.21	•••
8	☐	Hogweed	449	2,418	21.19	14.94	7.20	•••
9	☐	tongue	657	89,242	25.61	10.29	6.85	•••
10	☐	tail	661	127,934	25.68	9.78	6.58	•••

Figure 4: Statistical Data of Prominent Collocational Noun Objects with "gē" in zhTenTen17

By observing the Figure 4 and analyzing the specific contexts of the corresponding indexed lines, it can be observed that the noun objects can be divided into two categories:

(1) Those with the literal meaning of the noun, such as "gē màizi" (to harvest wheat), "gē shuāngyǎnpí)" (to have double eyelid surgery), and "gē dàozi" (to harvest rice).

(2) Those with metaphorical usage of the noun, such as "gē jiǔcài" (to exploit someone financially), and "gē...wěiba" (to cut off someone's livelihood or source of income).

Additionally, through further comparison with the usage of the verb "gē" in the GLCLC corpus, only one indexed line was found with the typical collocation "gē shǒuwàn" (to cut one's wrist). No abnormal collocations were identified.

1) ... ér jìnrù gǔshì, pǔtōngrén jīběnshàng jiùshì bèi gē jiǔcài de mìngyùn, mǎifáng zé xiāngduì kào pǔ...

2) .. liùshí niándài hòuqī, yóuyú shòu "gē zīběn zhǔyì wěibā" de yǐngxiǎng, sān huá lǐshù bèi dàliàng kǎnfá....

Furthermore, comparing the usage of the verb "gē" in the GLCLC corpus, only one typical collocation "gē shǒuwàn" (to cut one's wrist) was found, and no abnormal collocations were identified.

4.3. Word Sketch Difference Analysis

To examine the differences in the objects collocated with "jiǎn" "qiē" "kǎn" and "gē", the Vocabulary Sketch Difference function in the SkE platform can be utilized to visualize their respective distributions with object collocations in the zhTenTen17 corpus.

4.3.1. Word Sketch Difference Analysis of "jiǎn" and "qiē"

By retrieving the collocations of objects with "jiǎn" and "qiē", we obtained the data shown in Figure 5. The collocations with "jiǎn" are represented in blue, while the collocations with "qiē" are represented in red. The larger the circle representing a collocation, the more typical it is, while the smaller the circle, the more exceptional it is. By observing Figure 1, we can clearly see typical collocations for "jiǎn" such as "jiǎn zhǐjia" - to trim nails, and for "qiē" such as "qiē dàngāo" (to cut a cake). At the same time, we can also see atypical collocations for "jiǎn" such as "jiǎn duàn" (to cut into segments), and for "qiē" such as "qiē zhǐjia" - to cut nails. Therefore, the typical object collocations for "jiǎn" and "qiē" are often in contrast, with the typical object collocations for "jiǎn" often being atypical collocations for "qiē" such as "zhǐjia" - nails, and vice versa.
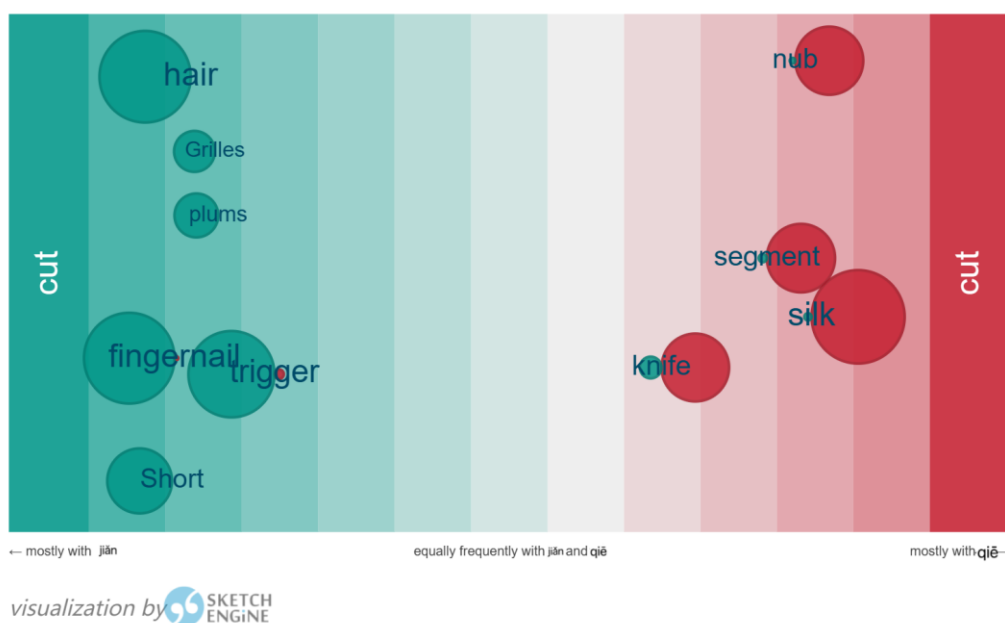

Figure 5: Visualization of the distribution of prominent noun objects collocated with "jiǎn" and "qiē"

4.3.2. Word Sketch Difference Analysis of "kǎn" and "gē"

By searching for the objects collocated with "kǎn" and "gē", we obtained the data shown in Figure 2. By observing Figure 6, we can see that typical collocations for "kǎn" include "kǎn shù" (to chop trees), "kǎn zhúzi" - to chop bamboo, and atypical collocations such as "kǎn ròu" - to chop meat. On the other hand, "kǎn ròu" is the most typical collocation for "gē", along with typical collocations like "gē shéngzi" (to cut the rope), "gē dàozi" (to harvest rice), "gē màizi" (to harvest wheat), and also atypical collocations such as "gē nǎodài" (to behead someone), "gē shù" (to cut down trees), or "gē zhúzi" (to cut bamboo). Therefore, the typical object collocations for "kǎn" and "gē" are generally in contrast.
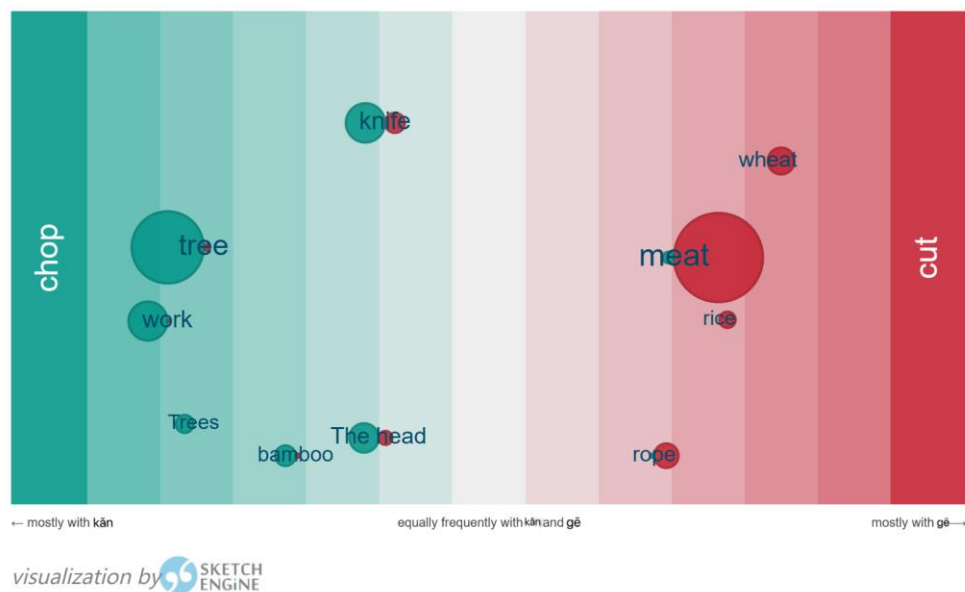
Figure 6: Visualization of the distribution of prominent noun objects collocated with "kǎn" and "gē".

5. Conclusion

This study uses the method of interlanguage analysis, utilizing the index line search function and Vocabulary Sketch Difference function in the SkE platform to retrieve data from the zhTenTen17 Chinese native language corpus and the GLCLC Chinese learner corpus. The data includes collocates with the verbs "jiǎn" "qiē" "kǎn" and "gē" as their object. This study compares and analyzes the typical and atypical collocations used by native Chinese speakers and Chinese learners when using these four verbs. Based on this analysis, the semantic characteristics of noun objects associated with these verbs are summarized.

The research findings show that Chinese learners use these four verbs less frequently and are prone to using them incorrectly, resulting in atypical collocations. This is related to their insufficient understanding of the typical collocations with these verbs. Therefore, the author hopes that more scholars and teachers can make better use of the SkE platform to conduct related research and teaching.

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