ENAWL: Enriching the New Academic Word List with Emotional Valence, Familiarity, and Knowledgeability[1)]

Yu KANAZAWA*, Louis LAFLEUR**

情動価・親密度・知識度の観点から新アカデミックワードリストを増強する

金澤　　佑，ラフラー　ルイ

Abstract:

There is a need for academic word items suitable for tertiary education to be supplemented with wider data including ones of subjective nature. This research reports on the accumulated data from 222 Japanese university students who were enrolled over a period of 24 weeks to assess the subjective lexical attributes, i.e., their familiarity (perceived encounter frequency of word items), emotional valence (perceived positive/neutral/negative value of word items), and knowledgeability (yes/no receptive knowledge test) of the New Academic Word List (NAWL)'s 963 word items. Familiarity correlated very highly with knowledgeability, which presents a strong argument as to how both concepts are closely related. Extremity of valence (i.e., the higher the score, the more positive or negative the stimulus is) correlated considerably with familiarity and also with knowledgeability. These results present a good argument for measurable emotional valence being a positive influence for word familiarization and knowledgeability. The previously published NAWL frequency data and this study's data permitted a hybrid re-sequencing of the word items based on both objective and subjective concepts. Furthermore, the authors supplemented the NAWL with subjective lexical attribute data collected by the study. These public-domain modifications were implemented to permit more in-depth studies and pedagogical applications in the future.

要旨：高等教育に適した学術英単語は、主観的指標を含む広範なデータで補完されることが望ましい。本研究では、日本の大学生 222 名を対象に 24 週間にわたって実施した調査の蓄積データを報告する。参加者は、New Academic Word List（NAWL）963 語について、主観的語彙属性である親密度、情動価、知識度を評価した。結果、親密度と知識度は高い正の相関を示し、両者の密接な関係が示唆された。また、情動価極度は、親密度とも知識度とも正の相関を示した。これらの結果は、情動価が単語の親密度と知識度にプラスの影響を与えている可能性を示している。既存の NAWL 頻度データと本研究のデータにより、客観的概念と主観的概念の両方に基づくハイブリッドな単語項目の再順序付けが可能となった。さらに、著者らは NAWL に主観的な語彙属性データを付加した。これらの拡張は、将来の詳細な研究や教育的な応用に役立てられるために電子上で公開されている。

*Assistant Professor, School of International Studies, Kwansei Gakuin University
**Associate Lecturer of English, School of Policy Studies, Kwansei Gakuin University

1）This paper is based on the authors' previous presentations at the conference of the British Association for Applied Linguistics (Kanazawa & Lafleur, 2019) and the International Congress of Psychology (Lafleur & Kanazawa, 2021)

Key words: academic words, NAWL, vocabulary, English, emotional valence, familiarity, knowledgeability

Introduction

Relying too much on frequency data in vocabulary studies can be problematic (Hashimoto & Egbert, 2019; Hashimoto, 2021). There are a number of lexical attributes that are connected to foreign language vocabulary acquisition (FLVA). Although there has been a plethora of studies that investigated or controlled objective lexical attributes (e.g., corpus frequency, number of letters), subjective lexical attributes have tended to be investigated or controlled to a lesser extent (Kanazawa (ed.), 2020).

One of the key subjective lexical attributes is emotional valence (the continuum of whether the target stimulus is positive, neutral, or negative). Emotion is an interdisciplinarily fundamental phenomenon that affects cognition and learning (Barrett, 2017). Accordingly, foreign language acquisition (FLA) researchers are increasingly interested in emotion (Dewaele, 2015), not only socioculturally (Swain, 2013) but also cognitive psychologically (Sharwood Smith, 2017). The importance of emotional aspects is also becoming recognized in the field of FLVA albeit slowly and gradually (Schütze, 2017). Needless to emphasize, careful selection or building of a word list with emotional data is a prerequisite step to scientifically investigate the effect of emotion on FLVA. Inspired by the affective norms of English words rated by English as a first language speakers (Bradley & Lang, 1999) and focusing on the fundamental psychological construct of emotional valence, Kanazawa (2016) developed an affective norm of English words for Japanese English as a Foreign Language (EFL) learners (proto-ANEW-JLE), which enabled multiple empirical investigations on emotion in FLVA (e.g., Kanazawa, 2020; 2021a; 2021b). However, a common limitation of these studies was that their selected target words were familiar and frequent, i.e., already known by many tertiary EFL learners, which lowers the value of the proto-ANEW-JLE list in designing and scheduling pedagogical activities to aid undergraduate students in acquiring new vocabulary items. Making an advanced proto-ANEW-JLE with not-so-easy academic words that enable acquisition studies is needed for the sake of higher pedagogical and ecological validity.

Another notable subjective lexical attribute is familiarity (i.e., how often language users feel they see or hear each specific lexical item; Amano et al., 2008). Familiarity and frequency are different because the former is a subjective attribute rated by users' impressions while the latter is an objective attribute calculable by consulting corpora. Previous studies suggest that, despite their similarity, familiarity—the subjective version of frequency—and the objective corpus frequency are two distinct concepts that cannot be reduced into one construct, especially for foreign language users (Kanazawa, 2021c). Supplementing a frequency-based wordlist with familiarity data is a valuable step toward subjective enrichment.

The construct of familiarity has a limitation, i.e., it is unclear whether the rated scores are the result of accurate semantic access. In other words, even when a participant rated a lexical item as highly familiar, it could either accompany successful knowledgeability (understanding) or not (misunderstanding). Therefore, familiarity could be compensated by checking knowledgeability (i.e.,

whether the meaning of the target item corresponds to the expected meaning), which is also a subjective lexical attribute.

In sum, enriching a wordlist with emotional valence, familiarity, and knowledgeability data would pave the way for future studies with subjective lexical attributes. To overcome the limitation of the proto-ANEW-JLE list, the new wordlist should be pedagogically practical for tertiary education learners of English as a foreign language. We selected the New Academic Word List (NAWL; Browne, Culligan, & Phillips, 2013a) to cater to the requirements of this study because (a) it was carefully designed in its academic word-item selection from a larger and more recent corpus than the corpus used in developing the original Academic Word List (AWL; Coxhead, 2000), (b) it complements the basic items in the New General Service List (NGSL; Browne, Culligan, & Phillips, 2013b), (c) it is suitable for university students learning academic English as a foreign language, (d) it is a frequency-based wordlist that can be benefitted by additional subjective data, (e) the number of words (n = 963) is manageable for students to study throughout an academic year, and (f) it has been utilized in recent English language teaching practices.

Purpose and research questions

The purpose of this study was to further develop the New Academic List (NAWL) with supplemental subjective lexical data sets. In addition, the research set out to answer the following exploratory research questions:

1. How closely is frequency related to knowledgeability?
2. How closely are subjective lexical attributes related amongst themselves?

Methodology

This research reports on the accumulated data from 222 undergraduate participants learning English as a foreign language in Japan. Google Forms online questionnaires were completed by the participants (see Appendix A). Each questionnaire included a seven-point Likert valence judgement task (perceived positive/neutral/negative value of word items), a seven-point Likert familiarity judgement task (perceived encounter frequency of word items), and a yes/no receptive knowledgeability task for 40 word items. All 963 word items of the NAWL were assessed over a period of 24 weeks (～40 word items assessed x 24 weeks) via their personal computers or smartphones. Completing one questionnaire required participants ～12 minutes on average per week. Each participant's consent was obtained before collecting data.

Results & Discussion

Data collection was successfully implemented, enabling the authors to utilize the accumulated data to produce an Enriched NAWL (ENAWL) with subjective lexical attribute data. In order to assess the questionnaire's Likert-scale data reliability and uncover statistical variances/correlations, the authors calculated Cronbach's alpha, Pearson r, mean scores, standard deviation values using Google Sheets. However, yes/no binary responses related to knowledgeability were not included in the calculation of Cronbach's alpha because of the differences in nature and scale of the data. The final Cronbach's alpha score based on a 7-point Likert scale data points of valence and familiarity was high ($\alpha = .99$), which shows the validity of the collected data.

As for the first research question of this study (how closely frequency is related to knowledgeability), contrary to an initial expectation of moderate positive correlation similar to McLean, Hogg, & Kramer (2014), NAWL word-item frequency and knowledgeability values produced a significant yet very weak negative correlation $r(961) = -.104$, $p < .05$. In comparison to previous studies which compared very frequent word items to receptive knowledge, it must be noted that NAWL items are not from a familiar register and are very infrequent as they do not include any of the 2,800 most frequent items which are exclusive to the NGSL, which could rationalize the different result. The result also shows the discrepancy between frequency and knowledgeability of academic words, further corroborating the need to avoid overreliance on frequency in vocabulary studies.

Concerning the second research question (how closely subjective lexical attributes are related amongst themselves), knowledgeability and familiarity values proved to be very closely linked as results indicate a high positive correlation $r(961) = .883$, $p < .05$. Figure 1 shows participants' average Likert scale knowledgeability and familiarity results for all lexical items. Binary 0 (unknown) or 1 (known) knowledgeability results were converted to 1 (unknown) or 7 (known) for the purposes of being visually compared/represented on the same scale as other data.

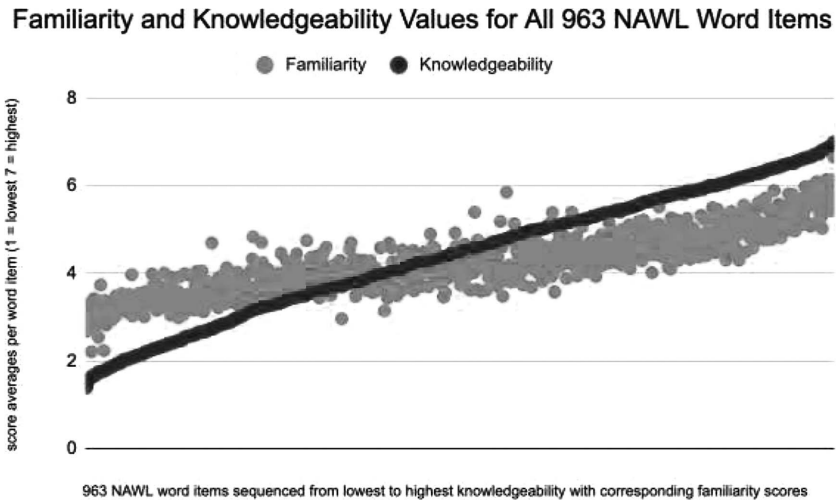

Figure 1　Familiarity and Knowledgeability Values for all 963 Word Items

Table 1　Valence to Extremity of Valence Score Conversion Table

Emotional valence Likert value	Extremity of valence value
1 "very negative"	3 "very extreme"
2 "negative"	2 "extreme"
3 "somewhat negative"	1 "somewhat emotional"
4 "neither / neutral"	0 "neither / neutral"
5 "somewhat positive"	1 "somewhat emotional"
6 "positive"	2 "extreme"
7 "very positive"	3 "very extreme"

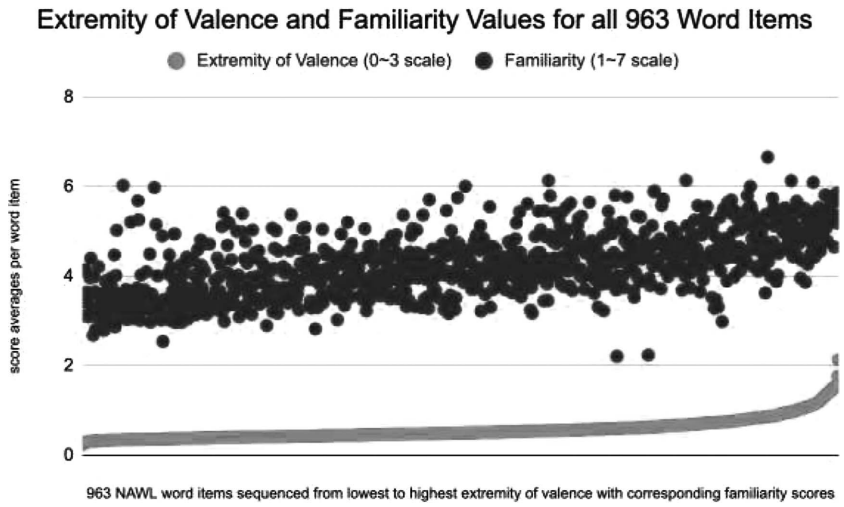

Figure 2　Extremity of Valence and Familiarity Values for all 963 Word Items

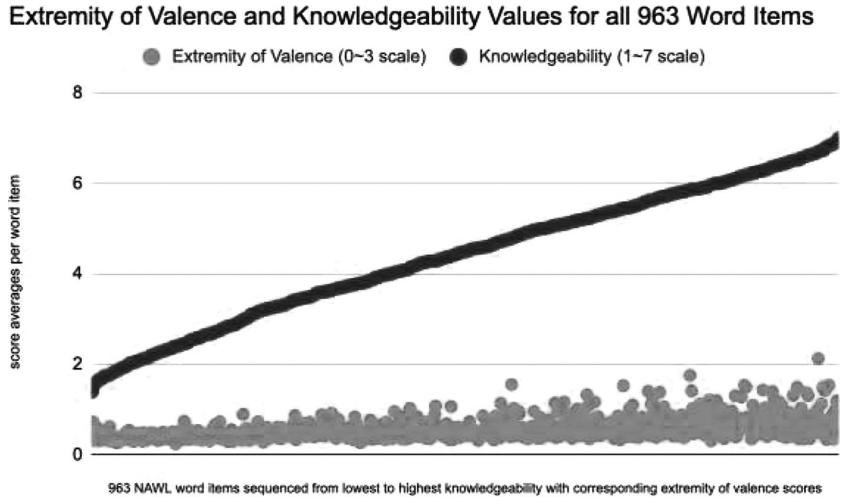

Figure 3　Extremity of Valence and Knowledgeability Values for all 963 Word Items

Figure 2 shows participants' average Likert scale extremity of valence and familiarity results for all 963 word items. Emotional valence results were converted into extremity of valence values (the higher the score, the more positive or negative the stimulus is; Rocklage et al., 2018) to calculate statistical variances/correlations in order to account for the dualistic nature of emotionality (see Table 1). On the other hand, familiarity values were included as originally provided by the participants on a 7-point Likert scale. Extremity of valence and familiarity values proved to be closely linked as results indicate a moderate positive correlation $r(961) = .553$, $p < .05$, echoing with de Sousa's (2002) note that the emotional aspect of recognition is subject to a familiarity marker.

Figure 3 shows participants' average Likert scale extremity of valence and knowledgeability results for all 963 word items. Extremity of valence and knowledgeability values proved to be closely linked as results indicate a moderate positive correlation $r(961) = .492$, $p < .05$, which corresponds to the first language finding that emotional valence plays an important role in word knowledge de-

velopment (Martínez-Huertas, Jorge-Botana, & Olmos, 2021), and further extends it to foreign language.

Conclusion and Future Directions

This study focused on underinvestigated subjective lexical attributes in the field of foreign language vocabulary acquisition and successfully enriched the New Academic Word List with data of emotional valence, familiarity, and knowledgeability rated by Japanese undergraduate learners of English as a foreign language. The exploratory analyses implied interesting interrelations between the constructs, which needs to be investigated further in the future studies. More notably for now, the resulting data of this study inspired the authors to match this study's accrued data with previously published NAWL word-item frequency data (Browne et al., 2013a) to create a hybrid re-sequencing of the word items based on both the concepts of frequency and knowledgeability. First, the items were sequenced into frequency-based word bands of 100 word items. Second, each individual word band's items were re-sequenced from easiest to most difficult according to the yes/no knowledge test results. Finally, the authors supplemented the NAWL with additional subjective lexical data (ENAWL; Appendix B). Furthermore, the authors added synonyms, example sentences, Japanese translation of words, Japanese translation of example sentences, audio files of the words, and audio files of the example sentences (ENAWL Pedagogical Resources; Appendix C).

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Appendix A　Sample Questionnaire and Questions

(Please note that such questionnaires were originally conducted via Google forms and in Japanese so formatting is not representative and English translations were added.)

NAWL Activity (Step 1)

それぞれの単語を、意味がポジティブかネガティブかについて７段階で判定しましょう。

“Judge each word on a seven-point scale as to whether it has a positive or negative meaning.”

◯ 1. とてもネガティブ ☹☹☹ “very negative”

◯ 2. ネガティブ☹☹ “negative”

◯ 3. ややネガティブ☹ “somewhat negative”

◯ 4. どちらでもない “neither”

◯ 5. ややポジティブ☺ “somewhat positive”

◯ 6. ポジティブ☺☺ “positive”

◯ 7. とてもポジティブ☺☺☺ “very positive”

	1	2	3	4	5	6	7
#1 acceleration	◯	◯	◯	◯	◯	◯	◯
#2 admission	◯	◯	◯	◯	◯	◯	◯
#3 algebra	◯	◯	◯	◯	◯	◯	◯

…

Note. The order of word items was randomized each time the form was loaded.

NAWL Activity (Step 2)

それぞれの単語を、見聞きする程度によって 7 段階で判定しましょう。※「意味を知っているかどうか」ではなく、「どの程度見聞きするか」で判定しましょう。

“Judge each word on a 7-point scale according to how often you see or hear it, not whether you know its meaning.”

◯ 1. まったく見聞きしない “absolutely never read or hear it”

◯ 2. 見聞きしない “never hear or read it”

◯ 3. あまり見聞きしない “almost never hear or read it”

◯ 4. どちらでもない “neither”

◯ 5. 少し見聞きする “sometimes read or hear it”

◯ 6. よく見聞きする “often read or hear it”

◯ 7. とてもよく見聞きする “very often read or hear it”

	1	2	3	4	5	6	7
#1 acceleration	◯	◯	◯	◯	◯	◯	◯
#2 admission	◯	◯	◯	◯	◯	◯	◯
#3 algebra	◯	◯	◯	◯	◯	◯	◯
…							

Note. The order of word items was randomized each time the form was loaded.

NAWL Activity (Step 3)

それぞれの単語の意味を確認しましょう。あなたが思っていた意味と大体同じであれば YES を、全く違う意味だった場合や意味を知らなかった場合は NO を回答しましょう。＊回答は成績に影響しません。“Check the meaning of each word. If the meaning is almost the same as what you thought it meant, answer YES; if it means something completely different or you didn't know the meaning, answer NO. *Your answers will not affect your grade.”

	YES	NO
#1 acceleration 加速	○	○
#2 admission 入ることの許可; 入場; 入場料; 入会; 入学; 自認; 自白	○	○
#3 algebra 代数; 代数学	○	○
…		

Note. The order of word items was randomized each time the form was loaded.

Appendix B　Sample ENAWL Items

NAWL Word	eNAWL#	Alphabet#	NAWL.Frequency.number*	NAWL.Frequency#*	Knowledgeability	Knowledge.order	Familiarity	Valence	Ext.Valence
impact	1	417	63.491	7	6.885167	6	6.129187	4.712919	0.971292
graph	2	389	61.814	18	6.885167	7	6.023923	4.177033	0.349282
robot	3	762	60.055	50	6.666667	29	5.629630	4.401235	0.561728
ion	4	475	62.179	14	6.514286	52	5.123810	4.576190	0.680952
marker	5	521	60.234	48	6.510204	55	5.122449	4.413265	0.556122
beam	6	86	59.017	95	6.504587	58	4.986239	4.169725	0.766055
publish	7	703	62.897	9	6.416667	76	5.284722	4.305556	0.555556
translation	8	902	60.695	40	6.393939	80	5.434343	4.388889	0.530303

*Frequency data are provided by Browne et al., (2013a).

**The whole list is downloadable via the authors' ResearchGate.net public profile pages (https://www.researchgate.net/profile/Yu-Kanazawa-2 ; https://www.researchgate.net/profile/Louis-Lafleur)

Appendix C　Sample ENAWL Pedagogical Resources

NAWL Word	Synonyms	Japanese words and synonyms	English example sentence	Japanese example Sentence
impact	effect	衝突；強い影響；衝撃	My efforts had no impact.	私の努力は何も影響を及ぼさなかった。
graph	chart, graphic	図表；図式；図	I am good at drawing nice graphs.	私は図表をうまく書くことが上手だ。
robot	robotic	人造人間；自動機械；機械的に働く人	I won the robot competition.	私はロボットコンテストで優勝した。
ion		（物理学；理化学）イオン（電荷を帯びた原子や原子団）	They enjoyed the negative ion hair dryer.	彼らはマイナスイオンヘアドライヤーを楽しんだ。
marker		印を付ける人；印を付ける道具；採点者；目印；標識	I bought quality markers.	私は質の良いマーカーを購入した。
beam	pillar, column, post	梁（はり；建物の骨組みに使う水平の支柱またはジョイント）；光線；信号電波；満面の笑み；平均台	This house is supported by many strong beams.	この家は多くの強靭な梁［はり］で支えられている。
publish	print	出版する；発表する；公布する	My research was published in a famous journal.	私の研究は有名な論文誌で出版された。
translation		翻訳；翻訳物；置き換え	My translation was correct.	私の翻訳は正しかった。

*The whole list is downloadable via the authors' ResearchGate.net public profile pages（https://www.researchgate.net/profile/Yu-Kanazawa-2；https://www.researchgate.net/profile/Louis-Lafleur）