

Student Attitudes Towards Learning the Academic Formulas List Using Memrise

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Abstract

This case study investigates student attitudes towards learning the Academic Formulas List (AFL) using the spaced repetition software (SRS) Memrise. While many studies have shown students have positive attitudes towards learning single items of vocabulary in SRS applications, a gap in the literature exists when it comes to learning formulaic sequences in these applications. The Academic Formulas List (AFL) was chosen because it contains academic formulas that are useful across a wide range of academic subjects. There were 3 participants in this study who completed the whole research activity. Participants were all Japanese undergraduate students at an English medium university in Japan. For each of the students English was an L2. Student perceptions of using Memrise were collected through semi-structured interviews. Results showed that students were broadly positive about learning academic formulas using the Memrise application but found distinguishing between similar formulas difficult. Furthermore, despite claims that formulaic sequences can be recalled in a more efficient manner than by applying grammatical rules, students in this study expressed the need for additional grammar explanations with formulaic sequences that contain elements such as articles, singular or plural forms and prepositions in order to better retain and understand them.

Introduction

In the last thirty years, books by Sinclair (1991) and Lewis (1993) have called for a focus on the formulaic nature of language and highlighted the benefits of learning formulaic sequences. These claims have been bolstered by corpus research that has confirmed that to a large extent, language consists of said formulaic sequences (Schmitt & Rogers 2019). At the same time a major development in the field of computer aided language learning (CALL) has been the development of spaced repetition software (SRS). SRS is algorithmic software that emulates the ‘forgetting curve’ (Godwin-Jones, 2010). The forgetting curve being the rate at which items of vocabulary are forgotten over time. Vocabulary applications have been developed to apply this curve to optimize when vocabulary flashcards are shown to users to boost the efficiency of learning. Although it has been established that learning individual vocabulary items through the use of SRS is effective for learning large amounts of vocabulary quickly (Fitzpatrick, Al-Qarni, & Meara, 2008; Nakata, 2011), there is a gap in the research as to whether formulaic sequences can also be effectively learnt using SRS.

The Academic Formulas List

The Academic Formulas List (AFL) was developed by Simpson-Vlach and Ellis in 2010. The authors aimed to make a list of formulaic sequences that were pedagogically useful and suitable for academic purposes. Simpson-Vlach and Ellis used a mixed-methods approach to compile their list which contrasts with lists based only on frequency. Their methods utilised psycholinguistics, quantitative and qualitative criteria and used both corpus research and instructor insights. The authors wanted to go beyond frequency-based lists as they found many common sequences of words such as “and of the” as occurring frequently but not having psycholinguistic salience or pedagogical relevance. In addition, they felt that instructors with limited classroom time needed a list that was of maximum benefit to students but also manageable in length. The AFL goes beyond previous lists such as one by Biber, Conrad and Cortes (2004) that identified formulaic sequences through frequency analysis, only on four-word bundles and did not filter for non-academic formulas.

Attitudes Towards Using SRS

With the development of SRS applications, a body of academic literature has arisen focusing on the experiences of students who use these applications. In a study of 41 Taiwanese undergraduate students, Chien (2015) found positive attitudes and motivation towards using three web-based flashcard applications (Quizlet, Study Stack and Flashcard Exchange). Chien’s study used classroom observations and semi-structured interviews to collect data. Significant findings from the study included user-friendliness as an important factor, and that students were motivated in using the online applications and improved their vocabulary knowledge, particularly in spelling (Chien, 2015, p.119). Altiner (2011) incorporated the SRS program Anki into her class activities. Thirteen intermediate level students on an intensive EAP program participated and Altiner found that students perceived an improvement in their vocabulary knowledge and positive attitudes towards using the software. She also found that students changed their attitudes towards vocabulary learning. Many had negative perceptions before the study activities but after using Anki they became more positive. This finding concurs with the suggestion by Dörnyei (2005) that effective study strategies increase learner motivation. In a study with 32 participants, Łuczak (2017) investigated the possibilities in using the program Memrise to learn English legal vocabulary and collocations. This was one of the few studies to investigate learning of formulaic sequences. Unfortunately, beyond a description of the importance of learning collocations and prepositional phrases in legal English there was no discussion of how learners found the experience of learning formulaic sequences. However, Łuczak did find that students held positive attitudes using Memrise and found it an effective memorisation tool due to the frequency of reviews given by the application. Łuczak also found that there were benefits in the students actively co-authoring the Memrise course content. This shows that the students spent more time engaging with the material and resulted in higher test scores. Łuczak suggests that students can

be trained before starting to use Memrise on how to adjust course settings such as how many cards they see in one session and by learning to use the Ignore function for vocabulary they already know. A study by Aminatun and Oktaviani (2019) with 18 participants taking an English for Business subjects course found that Memrise usage improves independent learning and feelings of learner autonomy. The aspect of learner autonomy is relevant for this study as students will be directed to use Memrise in their free time because one consideration will be whether the participants will feel motivated to learn formulaic sequences outside of their class time.

Methodology

Research Question

The research question for this study was:

1. To what extent do students find using Memrise to learn formulaic sequences helpful for language acquisition?

The Context

The research was carried out at a public English medium university in Japan. In the first year of study, students take an EAP program so that they can learn the conventions of academic English and will be able to fully participate in later undergraduate liberal arts courses where a high level of English ability is required.

The Participants

Three participants - Minami, Shiho, and Hiro (pseudonyms) agreed to take part in the study. All three students were Japanese nationality 2nd-year undergraduates who had passed through the EAP program. English was an L2 for all the participants. Convenience sampling (Bryman, 2012) was used to contact the students. In order to avoid conflicts of interest and ethical requirements, the students approached for participation were students that the researcher had previously taught but were not taking any of his classes when the study was conducted. All four students had entered university straight from high school, so in terms of age and education experience are representative of the majority of students at the university.

Research Activity

Memrise was chosen for this study because it offers SRS functionality and has an easy-to-use user interface. As outlined above, the AFL was selected as suitable material to learn because it was thought to be a potentially useful list of academically researched formulaic sequences for students' academic English studies. The students were given a 30-minute training

session on how to use Memrise and an introduction to the AFL. Then students were asked to use Memrise for 10 minutes a day, 10 times, over the course of two weeks. Students were asked to record the time they spent using Memrise in an Excel spreadsheet (see Table 2 below) so that their activity could be accurately recorded. It was communicated to students that using Memrise was not a compulsory activity but entirely voluntary, as if they felt learning through Memrise was uninteresting or unmotivating, this would be useful information for the research project. Semi-structured interviews were conducted before using Memrise and after the learning activities were finished to ascertain the students' experiences of using Memrise and other SRS applications and how they felt about learning the AFL. Interviews were audio-recorded and transcribed.

For the research activity, the AFL list was prepared with the addition of sample sentences in Japanese and English and translation in Japanese. Example sentences were sourced from an online Japanese English dictionary (Weblio, 2022) that included Japanese and English sentences. English definitions were not used as some of the formulaic sequences have vague meanings which meant that a clear definition was not always possible.

In Memrise, one testing method is a multiple-choice test where the user has to select the correct answer from four choices. If there are two identical answers given in the four choices, the user would not know which one to select. To avoid this, similar phrases with only a one-word difference or the same Japanese translation were numbered to prevent confusion in Memrise. See Table 1 below.

Table 1. Examples of similar formulaic sequences and translations in the AFL Database

English	Japanese
as a result of (1)	の結果 (1)
as a result (2)	その結果
a result of (3)	結果
the result of (4)	の結果 (4)

Findings

Likes and Dislikes of Using Memrise to Learn the AFL

In terms of likes, each student identified different positive aspects of using Memrise. Hiro indicated that he liked the ability to review words that he already knew. In particular, he regarded the function of spelling out the formulaic sequences as being particularly useful for assessing his self-knowledge. The spelling feature was also thought of positively by Shiho. Furthermore, Hiro said that he liked the leaderboard display in Memrise, as seeing the points that others had collected gave him motivation to also use the app to try and go up the leaderboard.

Shiho liked the SRS function that automated the review schedule, and overall, she regarded using Memrise as being more effective than using pen and paper. Minami liked the ability to learn anywhere once she had downloaded Memrise to her phone. She felt that this was effective as she could learn the AFL while outside and away from her study desk, such as waiting in line at shops. Minami said, "I found with like the change from browser to app is really big change... so I found the small time and do it, so like using the app on the phone is really effective for me." Moreover, again like Shiho, Minami was positive about the review schedule of intervals between formulaic sequences she had learnt. In particular, this helped with phrases that contained prepositions such as "in", "on", or "at", as she found these the most difficult to recall correctly.

For dislikes, Hiro and Shiho had concerns about the way similar formulaic sequences were dealt with. As mentioned in the methodology section, similar formulas were given numbers so that students could differentiate them in the multiple-choice tests. However, both indicated that the number system was problematic as they felt that there were inconsistencies with the numbering that made choosing the correct phrase difficult. For Hiro, this was frustrating as he felt that he had selected a correct answer, but the Memrise system indicated that he was wrong. This concern was followed up with Minami, who stated that she did not notice this was a problem when she was using the app. Hiro also found that Memrise was not good for learning completely new formulaic sequences as he suggested that the testing of them came too quickly. He stated that as he was newly exposed to the formulaic sequences, he had not had time to memorise them before the testing occurred. In terms of the Memrise tests, Shiho mentioned that the multiple-choice testing methods were not useful as the displayed choices sometimes made it too easy to select the correct answer. The choices that were shown were often a mixture of Japanese and English which made selecting the correct answer in English easier than intended, reducing the choices from four possible answers to two in some cases.

Was Memrise Effective for Learning the AFL Formulas?

Overall, Minami was positive about using Memrise to learn the AFL. She mentioned that the notification service was useful for reminding her that she needed to do her daily reviews. She noticed this feature once she had downloaded the application to her mobile phone as it was not a feature of the browser-based application. On the Memrise study decks (collection of vocabulary cards) page, there is a daily goal-setting function that allows users to set reminders so that they get a notification on their phone each day. In addition, she thought that the progress bar was useful as it showed her how much of the deck had been learnt.

Alternatively, Hiro emphasised that the grammatical aspects of the AFL were not addressed adequately in Memrise. For instance, he said that learning formulas such as "there is a" or "there is an" was problematic as Memrise did not indicate how these differ in terms of usage.

Time Spent Using Memrise

Table 2. Students' Memrise Usage Data (in minutes)

<u>Session</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Average</u>	<u>Total</u>
Hiro	27	10	17	13	15	13	18	11	7	14	14.5	145
Minami	7	15	5	12	12	10	15	0	0	0	7.6	76
Shiho	10	10	10	5	12	5	5	5	5	0	6.7	67

From the data collected, Hiro was the student who used Memrise the most - 10 times in the two weeks. He also completed the most total time spent using Memrise, 145 minutes, and his average time spent was 14.5 minutes per session. Minami spent on average 7.6 minutes per session, in total 76 minutes, but completed the fewest sessions, 7 out of 10. Lastly, Shiho used Memrise 9 out of 10 times and spent an average of 6.7 minutes and 67 minutes in total. The average time spent using Memrise of all three participants was 9.6 minutes per session. This was close to the requested time of 10 minutes per session. None of the participants were able to complete the entire AFL set in Memrise in the 10 sessions. Hiro completed the most but still did not pass halfway, with just less than 100 formulas learnt. In total, Minami studied 57 formulas and Shiho 37 formulas.

Discussion

Findings from this study indicate that the three participants who used Memrise did not have strongly one-sided positive or negative attitudes towards using Memrise to learn the AFL. Instead, participants expressed a range of specific concerns, particularly regarding the implementation of the AFL on Memrise, whilst also each identifying unique positive aspects. Positive appraisals concerned the automatic sorting of formulaic sequences to review, the points leaderboard, and the ability to learn anytime and anywhere. Regarding the AFL itself, students were broadly positive about the potential benefits of learning it, particularly as they had already noticed AFL sequences in readings they were doing at the same time as participating in this study. However, issues concerning the types of tests on Memrise, the implementation of the AFL on Memrise and the wider context of students' already full schedules at the university mean that there are several issues that instructors would benefit from addressing if learning the AFL through Memrise were to be included in lesson plans and as part of a syllabus.

Hiro's interview data and usage of Memrise are interesting to contrast. He was the participant who appeared to express the most negative points concerning Memrise. Yet, at the same time, he was the participant who used Memrise the most, almost double the amount of time as one of the other participants. In some ways, this could be simply read as indicating he was the

most motivated to use it, but also other reasons such as individual learning styles or even the amount of free time he had could also explain his usage. His perspective that using Memrise should not be the first step in learning the AFL was an interesting point. This view differs from research indicating that reviewing vocabulary items using spaced intervals is an effective study strategy (Balota, Duchek & Logan, 2007; Fitzpatrick, Al-Qarni, & Meara, 2008) and that testing in itself is a more effective study strategy than other review methods (Allen, Mahler & Estes, 1969; Bangert-Drowns et al., 1991; Karpicke & Roediger, 2008). Hiro indicated that he would learn better if he had more time to digest the formulaic sequences before being tested on them. In addition, he felt the similar formulaic sequences were problematic, and while he knew each individual word in the phrase, he felt the use of articles and prepositions without grammar explanations was a barrier to his progress. This aspect was echoed by Shiho, who also found problems with the similarities between formulaic sequences and the number method that was used to distinguish between them. Shiho indicated that the vague nature of some of the formulaic sequences meant that they were not easily memorised. This point converges with the criticism of direct vocabulary learning in that decontextualized vocabulary and phrases are not easy to remember (Nation, 2013). At the same time, Shiho also mentioned that she had not used the add note function of Memrise in her study sessions. This is the function of Memrise that appears on the screen when wrong answers are given and allows users to add notes, pictures and audio that could help them identify the vocabulary or formula that they have previously answered incorrectly. While this was introduced in the Memrise introduction session, in future, it may be worthwhile to emphasise that this feature exists so that students make full use of it.

While Minami did not find the numbering system was a problem, she also felt some kind of grammar explanation would be beneficial to support learners with choosing the correct formulaic sequence and for their wider language knowledge. This perspective was interesting as this goes against ideas from Lexical Approach proponents that indicate that learning chunks of language obviates the need for learning grammar (Lewis, 1997). Instead, this finding indicates that grammar does have a useful role to play in learning formulaic sequences, particularly when learners need to distinguish between different but similar forms. In future, it could be emphasised to students that they could add their own grammar notes to Memrise that would help them recognise the different formulaic sequences.

Shiho and Minami both indicated that the automated function of Memrise to select which formulaic sequences to learn was a benefit. This finding is in line with suggestions by Nation (2013) and Kerr (2015) that indicate that computer-aided learning can be a form of adaptive learning and can save time for students who do not need to organise which items to learn but can effectively outsource this task to the application.

In terms of motivation, while Hiro appeared to have been the least keen of the three to use Memrise, he actually used Memrise the most in terms of total time spent - 145 minutes, average time spent - 14.5 minutes and total number of sessions completed - 10. One aspect of Hiro's apparent motivation was that seeing the leaderboard on the Memrise website made him

feel like studying. While this was not emphasised to the students during the introductory session to Memrise, this gamified feature evidently became a source of motivation for him. Gamification of L2 language learning is a nascent research area (Flores, 2015) but is perhaps becoming more relevant in this age of students who are considered Digital Natives (Prensky, 2001).

In terms of testing types that were appraised positively, the typing tests were viewed favourably by Hiro and Shiho. Hiro felt the typing tests showed him how well he knew the formulaic sequences. He affirmed the idea that the act of typing out the formulaic sequence was more cognitively demanding than simple recognition.

Minami, who had particularly positive impressions of using Memrise, also emphasised positive aspects of mobile-assisted language learning (MALL). Minami found that being able to learn on her smartphone meant that small pockets of time could be utilised for learning when she was away from her study desk. In her interview, Minami demonstrated strong motivation to learn, particularly in her comment that "sometimes you have to take a hard way". This comment indicates that for Minami learning a language is not always fun or enjoyable but instead, there are times when it is necessary to find the motivation to learn even if it is a struggle. Linking this perception to the previous comment on finding that learning can be done in many environments and not just at her desk shows a determined individual who makes use of technology to learn in non-traditional ways. This point can be juxtaposed with research by Kuimova et al. (2018) that found that mobile learning can enhance opportunities for language practice and encourage independent learning. Looking forward, these advantages of MALL could be conveyed to students, particularly in the case where vocabulary learning or learning of formulaic sequences are to be done independently outside of the classroom. Lastly, Minami's attitude can be contrasted with the experiences of Lotherington (2018), who found using Memrise ineffective and an "endless memorisation task" (p.210). While the tasks set for in this study and Lotherington's were different (Lotherington's aim was to critically examine the language learning experiences given by language apps), perhaps having a set goal, such as in this task where the memorisation task is not endless makes a difference as students can feel that the goal is limited and achievable. In this study, each participant mentioned learning around 100 to 300 vocabulary items a week for vocabulary tests in high school. As such, the around 200 items on the AFL would appear to be achievable for students at this university. Nevertheless, as Memrise learning takes a long time due to the number of repetitions, a longer period of time would be needed to be allocated for this task.

In terms of learning the AFL, all participants found benefit in learning the formulaic sequences in the list. They indicated that in their reading activities, they had already noticed formulaic sequences and felt able to understand what they meant. However, each indicated more time would be needed to learn the whole list and to be able to produce formulaic sequences in their speaking and writing would require specific practice. Overall it appears that using Memrise is useful for the first stage of learning formulaic sequences such as recognition, including being able to spell and type the formulas out, but students may benefit from additional input such as grammar explanations and reminders to use all of the functions on Memrise.

Conclusion

In conclusion, in response to the main research question:

To what extent do students find using SRS to learn formulaic sequences helpful for language acquisition?

The three participants who took part in this study found that using Memrise to learn the AFL was helpful for their language acquisition to different degrees. Minami and Shiho identified the SRS function as useful as they both identified that this was an efficient way for them to learn the formulaic sequences. Hiro had a somewhat ambivalent attitude towards the repetitions required when using Memrise, feeling that these were frustrating at times, particularly when he felt that he knew the formula but his answer was marked as incorrect. On the positive side, he indicated that the gamification of learning such as seeing the progress leaderboard was a source of motivation and the typing tests were particularly useful to test his knowledge. All three students found that seeing the formulaic sequences in academic readings they were doing at the same time was also a useful motivator as they could link their learning of the AFL with real use cases. Lastly, Minami found that being able to use Memrise while away from her computer was useful as she could make use of her time efficiently and study anytime anywhere.

Study Limitations

Future research could overcome the limitations of time that this study was bound by. Extending the study over a whole semester would be useful to see how long it would take students to complete the whole AFL. In terms of how the AFL was implemented on Memrise, a major limitation of this study was the treatment of similar formulaic sequences. On reflection, the numbering system would need more thorough testing and/or changes to make sure that similar items were easier to distinguish perhaps with the use of additional symbols instead of numbers. In addition, as suggested by Hiro and Minami, adding grammatical explanations would be useful to support learners in their learning of the AFL. One workaround for this would be for each student to enter their own grammar explanations. This would give the students the opportunity to search for and review grammar themselves rather than passively receiving the grammar explanations from the teacher. This purposeful activity has the potential to make the academic formulas they are learning more memorable as they would spend more time thinking about the formulaic sequences and how to apply or use them rather than simply reviewing each formulaic sequence in isolation.

Pedagogical Implications

In this study, Memrise usage was an independent study activity where the students used their own time to study. However, as in the study by Aminatun and Oktaviani (2019), some

feedback on Memrise use and the AFL formulas during class time would be beneficial to check that students are using all the functions of Memrise (add notes, set daily reminders, ignore known formulas) in order to maintain efficient usage of Memrise and to reduce student frustration. In addition, instructors could support students with formulaic sequences that are difficult to recall by suggesting example sentences or by clarifying grammar issues. Lastly, additional productive writing and speaking activities that extend this initial learning of formulaic sequences is recommended so that students are able to feel comfortable using them in their subsequent studies.

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