Is Semantic Memory the winning component in Second Language Teaching with Accelerative Integrated Method (AIM)?

E. (Eleni) Zimianiti
RMA Linguistics, Utrecht University, Utrecht
Course 'Second Language Acquisition and Education'

KEYWORDS
second language acquisition
semantic memory
embodied learning
gestures
brain activation

ABSTRACT
This paper constitutes a research proposal based on Rousse-Malpalt's (2019) dissertation, which extensively examines the effectiveness of the Accelerative Integrated Method (AIM) in second language (L2) learning. Although it has been found that AIM is a greatly effective method in comparison with non-implicit teaching methods, the reasons behind its success and effectiveness are yet unknown. As Semantic Memory (SM) is the component of memory responsible for the conceptualization and storage of knowledge, this paper sets to propose an investigation of its role in the learning process of AIM and provide with insights as to why the embodied experience of learning with AIM is more effective than others. The tasks proposed for administration take into account the factors of gestures being related to a learner's memorization process and Semantic Memory. Lastly, this paper provides with a future research idea about the learning mechanisms of sign languages in people with hearing deficits and healthy population, aiming to indicate which brain mechanisms benefit from the teaching method of AIM and reveal important brain functions for SLA via AIM.

1   Introduction

Second language teaching and learning have been approached from a wide range of angles, Complex Dynamic Systems Theory (CDST) being one of them. CDST perceives language as continuously emerging through the combination in use of interactive and complex sub-systems over time. In compliance with that angle, L2 development is perceived as an embodied socio-cognitive procedure that evolves around the brain and body's interactions with the learning environment (Laarsen-Freeman, 2020), while L2 learning is viewed as a dynamic procedure. A teaching method using this approach is the Accelerative Integrated Method (henceforth, AIM) (Maxwell, 2001).

AIM is an implicit, story-based method that includes gestures linked to words. The language used is pared-down with very few grammatical instances, such as plural and finite-verb markers, that have a specific gesture assigned to them as well. There is no explicit instruction or focus on grammatical forms. More attention is paid to listening and speaking skills at the first six months of the learning

procedure and afterwards, reading and writing are actively involved as well. Key features of this method are meaningful exposure to input, repetition, context and involvement of gestures, which make the learning process embodied.

Ferreira (2021) in her review regarding embodied learning suggests that learning as a complex, active and situated process of knowledge construction should be investigated by analyzing bodily engagements and stored knowledge. Such an investigation will explore aspects of the learning process, which can reveal cognitive abilities, such as memory components (working, episodic, semantic), that might be responsible for the effectiveness of certain teaching methods, such as AIM. As Semantic Memory (henceforth, SM) is the component of memory responsible for the conceptualization and storage of knowledge, this paper aims to propose an investigation of its role in the learning process of AIM and provide with insights as to why the embodied experience of learning with AIM is more effective than others.

The structure of this research proposal is as follows. Section 2 presents Rousse-Malpalt's (2019) dissertation which extensively examines the effectiveness of AIM in comparison to non-implicit teaching methods. Moreover, Section 2 contains essential information of studies that present the function of SM in the language process. Section 3 presents the research question and proposed design of the present study. Lastly, Section 4 concludes with proposed lines for further research and limitations of this study.

2 Literature Review on AIM and Semantic Memory in Embodied Learning

2.1 The effectiveness of the implicit method AIM in Second Language Acquisition

Rousse-Malpalt (2019) explored in her dissertation the effectiveness of two methods in L2 teaching, an implicit and an explicit one, by examining L2 learners of French in the Netherlands attending the 8th Grade. In addition, this dissertation sought to address a series of research questions, namely:

(1) Which type of instruction has more significant effect as higher general proficiency on oral and written skills at the beginning of L2 acquisition in a foreign language context? An explicit or an implicit program?

(2) Which predictor is the most significant (type of instruction or L2 exposure) in explaining the results of Question (1)?

(3) Do the different methods (implicit vs. explicit) yield a difference in their effects on oral proficiency (fluency, grammar and vocabulary) after three years of instruction?

(4) Do the different methods (implicit vs. explicit) yield a difference in their effects on writing complexity after three years of instruction?

In order for the researcher to answer these questions, she conducted three main studies and a preliminary one.

Firstly, in order for the necessity of implicit methods in L2 teaching to be proven, Rousse-Malpalt (2019) conducted a preliminary comparison between two implicit programs, the Movie Approach and AIM, and explicit programs that followed traditional semi-communicative lines, meaning that there was explicit instruction or focus on grammatical forms. This comparison revealed that both implicit methods were more effective than the explicit one. What is striking is that the in-between comparison of the Movie Approach and the AIM showed that AIM was the most effective. Although both programs focus on meaning, input and repetition, and both include interaction between speakers, gestures, eye gaze and body movements, there is a distinct difference. AIM involves L2 learners kinesthetically in the teaching-learning process, while the Movie Approach presents input of interaction without inviting the learners to use their body at full potential, rather than exposing them to these circumstances via using a Movie that involves the aforementioned desired input.

Aiming to provide insights regarding research questions (1) and (2), Rousse-Malpalt (2019) conducted a study using two instructional approaches, an implicit and an explicit. AIM was used as the implicit method, relying on repetition and pared-down language and targeting at first the oral skills and later the writing skills, while the explicit method was topic-centered and focused on all competences. The implicit method was found to have a more significant effect than the explicit method. The reason given by the researcher was the mere exposure to the targeted language due to the fact that AIM used the targeted language throughout their lessons from the beginning of the program, whereas the explicit method increased the use of the targeted language gradually. Therefore, hours of exposure have been found to predict the effectiveness of the method.

Moreover, Rousse-Malpalt (2019) delved into comparing the implicit and explicit method in order to examine their effect on oral skills and provide answers to research question (3). The results of this study showed that implicit learners (AIM learners) were more fluent and used more complex grammar, but performed relatively the same in terms of vocabulary. Although the results indicated AIM as more effective, Rousse-Malpalt (2019) did not provide an explanation with specific variables at play for these results, but rather highlighted that the different perspective of language teaching is the key.

Lastly, the effect of the implicit and explicit methods on writing skills was explored in terms of syntax and morpho-syntax in order to answer research question (4). Similarly to question (3), L2 learners taught via the implicit method (AIM) performed significantly better in almost all syntactic and morpho-syntactic conditions.

In terms of methodology, the three main studies and the preliminary study were conducted in live-teaching settings aiming to trace the development of 229 learners of French as an L2 in their real, physical classes throughout three years of instruction. As mentioned earlier, the comparison included both the oral and written performance of L2 learners, which was assessed via (semi-) free response tasks.

Although this dissertation provided significant insights for L2 acquisition and development by extensively examining the effect of AIM as an implicit teaching method, it also contains certain limitations. Most importantly, both CDTS methods of the Movie Approach and AIM are more effective than more traditional approaches in educational systems where L2 is taught in a less communicative environment. Their effect is detectable after a long time of implicit exposure and not in one-off intervention, because implicit learning of specific forms requires more time than explicit learning. Furthermore, conditions of live classrooms in a three-year timeframe cannot be easily controlled, so other factors arise for the explanation of the current results that are not taken into account by the author, such as individual differences or emotional involvement. Lastly, this dissertation provides evidence for the effectiveness of AIM, an implicit method, in L2 teaching, but does not reveal specific factors that make this method explicitly effective, except hours of exposure.

As mentioned previously, the key difference of AIM is the use of gestures for every word of the targeted L2. To my knowledge, there is no study examining whether cognitive abilities are a distinguishing factor for AIM in comparison with other methods and more specifically whether semantic memory is at play.

2.2 Semantic Memory and Embodied Learning

Components of memory are pivotal and greatly involved into acquiring, processing and using language. More specifically, semantic memory (SM) is the component responsible for storing conceptualized information giving us the opportunity to retrieve it whenever required. According to Binder and Desai (2011, p. 527) SM is defined as follows: "It is an individual's store of knowledge about the world. The content of semantic memory is abstracted from actual experience and is therefore said to be conceptual, that is, generalized."

Many studies have examined the role of SM in SLA when using explicit methods of teaching (e.g. Dörrzapf, 1999; Bordag et al., 2017). From the perspective of learning a language as a bodily experience, only a limited number of studies have examined the relationship of SM and embodied learning. Davis and Yee (2021) conducted a review that delved into the development of SM through embodied and distributional language experience. After a synthesis of several approaches, they arrived at the suggestion that linguistic and embodied experiences should be perceived as inseparable procedures because they both activated meaning and knowledge that are stored in SM. More specifically, Davis and Yee (2021) highlighted that conceptual representations were built in SM and stemmed from the

fact that learning was a sensory, perceptual, and motor experience. That is, "the more you experience something in a particular modality, the more its corresponding concept is represented in that modality" (Davis and Yee, 2021, p. 13).

Kompa (2019) investigated embodied accounts of language comprehension and the relationship of embodied learning and cognition. More specifically, he supports that in order to understand a linguistic expression, one has to mentally reproduce the corresponding experience. For example, a person who hears the word "kick" will recall and mentally reproduce the action of kicking. Assuming that they have kicked before, they will simulate the action successfully and comprehension of the word will be achieved. During the recall of the relevant experience, the listener presents relevantly the same pattern of neural activity that took place in the initial experience. Likewise, embodied representations of language, which combine movement and linguistic input, follow the same pattern of brain activation aiming to store the conceptualized knowledge of the input in SM.

Taking into account the involvement of gestures in AIM and the contribution of sensory-motor involvement in conceptualizing knowledge in SM, one could assume that gestures are related a learner's memorization process. However, such a research question has not been formulated yet with the aim of explaining the effectiveness of AIM in second language learning.

3   The Proposed Study

3.1 Research Question and Hypothesis
In order to improve our understanding regarding the reasons behind the effectiveness of AIM in second language teaching, the proposed study aims to investigate whether the level of SM increases in L2 learners that are taught with AIM in the timeframe of three years of teaching. The research question is formulated as follows.

Research Question. Does Semantic Memory improve in AIM second language learners throughout three years of instruction?

Hypothesis. Based on the literature with regard to the center role of embodiment in language learning and SM (section 2.2), it is expected that L2 learners will develop higher levels of SM after three years of being taught via AIM, rather than an explicit method.

3.2   Method
Aiming to answer the research question of this study, certain tasks are proposed to be administered in a sample of population with specific characteristics, as described in the next sections. The proposed experimental design follows partially Rousse-Malpalt's (2019) experimental design.

3.2.1 Participants

Two groups of high school students attending Grade 8 at the beginning of the study are to participate. Each group will consist of approximately 100 participants. The students will be Dutch high school L2 learners of French attending two different schools and will be traced for three years with regard to their improvement in learning French and their level of SM. The participants will have no prior knowledge of French.

Participants will be distributed in class groups by their schools, without knowing with which method they would be learning French. The two groups examined in this study will be: students learning French with an explicit method (using the textbooks *"Grandes Lignes"* or *"D'accord"*) and students learning French with an implicit method (AIM). The duration of both instruction methods will be three years with no change of teaching method.

In order to control for teacher effects, teachers will be chosen via interviews with the same criteria as chosen by Rousse-Malpalt (2019, p. 47) for her study.

3.2.2 Proposed Tasks and Procedure

Aiming to answer the research question of this study, an assessment of the general proficiency in French will take place along with an assessment of learners' SM. Both assessments will take place once in the beginning, in particular six months after the beginning of the lessons, and once at the end of the training program.

In this section, the assessment of the general proficiency in French and assessment of SM are presented in detail.

3.2.2.1 *Assessment of General Proficiency in French*

For the purposes of this study, the assessment of general proficiency in French will be assessed in the same manner as in Rousse-Malpalt (2019) dissertation aiming for a replication of her assessment. Therefore, general proficiency in French will be examined holistically by administering the Student Oral Proficiency Assessment (SOPA) developed by the Center of Applied Linguistics (see http://www.cal.org/ela/sopaellopa/). A writing proficiency task will also be administered, as in Rousse-Malpalt (2019, p. 55). Both tasks will be scored based on the relevant criteria presented by Rousse-Malpalt (2019, p. 55-59), on which I will not elaborate in detail due to word limitations.

Both tasks will be administered in both groups of implicit and explicit teaching, so that the effectiveness of AIM is assessed. Each task will be completed in one session, resulting in two main sessions for each participant at the end of the three year instruction.

3.2.2.2 Assessment of Semantic Memory

Aiming to assess the capacity of SM between students that were taught with the implicit method of AIM and an explicit one, a battery of tasks examining SM is proposed to be administered at the beginning of the teaching programs in order to ensure that levels of semantic memory do not present a big difference and at the end of the third year of instruction. The tests will be administered in a quiet room at school and in a standardized order. Each test lasts approximately an hour and therefore, each test will be completed in a separate session with at least a day apart from the next one. The evaluation of the tests will be conducted during each session by the researcher. Dutch versions of the following tests will be used in the present study:

(i) *Sentence Memory subtest of the WRAML2* (Sheslow and Adams, 2003): This measures the performance on a sentence repetition task with sentences of increasing length and complexity.

(ii) *WISC-III Vocabulary* (Wechsler, 1991): Participants will be instructed to give as many characteristics as possible to a presented word.

(iii) *Verbal Fluency (animals and foods)* (Kosmidis et al., 2004): Participants will be instructed to orally generate a list of animals and a list of foods in a timeframe of 60 seconds for each category.

(iv) *Boston Naming Test* (Kaplan, 1983): This measures the object naming using 60 line drawings.

3.3 Proposed Analysis

In order to analyze the data that will be collected for the present study, two main comparisons will be conducted. The first comparison will refer to the effectiveness of AIM, as an implicit method against an explicit one (using the books "*Grandes Lignes*" or "*D'accord*"). The second comparison will be held for the capacity of SM between AIM learners and explicit learners at the end of the third year of instruction in order to provide insights for the research question formulated in the present study.

3.4 Expected Results

Based on the existing literature on the function of SM and the effectiveness of AIM it is expected that AIM learners will perform significantly better in both the oral and writing assessment, while demonstrating an extended capacity of SM. That will indicate that AIM facilitates the neural patterns of both semantic conceptualization of knowledge and sensory-motor experience achieving an enhancement of mappings between second language properties and specific movements.

4   Discussion

To sum up, the present study aims to shed light upon the factors responsible for AIM's effectiveness, except hours of exposure as indicated in Rousse-Malpalt (2019). More specifically, the question to be answered as regards the cognitive ability of SM that potentially receives better training in the process of learning with AIM and results in significantly better levels of proficiency in SLA.

Although this study sets as a goal to gain knowledge on SM and implicit learning with AIM, it constitutes only an indication of preliminary research towards the explanation of AIM's success. I would strongly advise future researchers to delve into the learning mechanisms of sign languages in people with hearing deficits and healthy population. More specifically, cognitive abilities in people using sign languages could indicate which brain mechanisms benefit from the teaching method of AIM and reveal important brain functions for SLA via AIM. Moreover, such findings will be greatly beneficial not only for better understanding how a person acquires a second language when using an embodied method of teaching, but also for teachers, students and the educational systems in general.

As a final remark, I would like to refer to limitations of this study, regarding factors of live classes that are not taken into account and may influence the effectiveness of AIM. In addition, SM is assessed in a young population that is constantly under the cognitive training of learning, let alone in a process of development. Therefore, a potential ceiling effect could be because of constant learning and not due to unique characteristics of AIM. ■

References

Binder, J. R., & Desai, R. H. (2011). The neurobiology of semantic memory. Trends in cognitive sciences, 15(11), 527–536. https://doi.org/10.1016/j.tics.2011.10.001

Bordag, D., Kirschenbaum, A., Rogahn, M., Opitz, A., & Tschirner, E. (2017). Semantic representation of newly learned L2 words and their integration in the L2 lexicon. Studies in Second Language Acquisition, 39(1), 197-212. doi: http://dx.doi.org/10.1017/S0272263116000048

Davis, C., & Yee, E. (2021). Building semantic memory from embodied and distributional language experience. WIREs Cogn Sci., 12:e1555. doi: https://doi.org/10.1002/wcs.1555

Dörrzapf, V. (1999). Cross language priming effects and the integration of second language lexis into semantic memory. Working Papers in English and Applied Linguistics, 9, 57-86.

Ferreira, J. (2021). What If We Look at the Body? An Embodied Perspective of Collaborative Learning. Educ Psychol Rev 33, 1455–1473. doi: https://doi.org/10.1007/s10648-021-09607-8

Kaplan, E., Goodglass, H., & Weintraub, S. (1983). The Boston Naming Test. 2nd
    Edition, Lea & Febiger, Philadelphia.

Kompa, N. (2019). Language and embodiment—Or the cognitive benefits of abstract
    representations. Mind & Language, 36(1), 27-47.
    https://doi.org/10.1111/mila.12266

Kosmidis, M. H., Vlahou, C. H., Panagiotaki, P., & Kiosseoglou, G. (2004). The
    verbal fluency task in the Greek population: normative data, and clustering
    and switching strategies. Journal of the International Neuropsychological Society, 10(2),
    164-172. doi: 10.1017/S1355617704102014.

Larsen-Freeman, D. (2020). Complex Dynamic Systems Theory. In VanPatten, B.,
    Keating, G.D., & Wulff, S. (ed.), Theories in Second Language Acquisition:
    An Introduction (3rd ed.). Routledge. eBook: ISBN 9780429503986.

Maxwell, W. (2001). Evaluating the effectiveness of the accelerative integrated
    method for teaching French as a second language. Unpublished Master,
    University of London Institute in Paris.

Rousse-Malpat, A. (2019). Effectiveness of explicit vs. implicit L2 instruction: a
    longitudinal classroom study on oral and written skills. PhD Dissertation.
    Groningen: Rijksuniversiteit Groningen.

Sheslow, D., & Adams, W. (2003). Wide range assessment of memory and learning
    (2nd ed.). Lutz, FL: Psychological Assessment Resources, Inc.

Wechsler, D. (1991). Wechsler Intelligence Scale for Children–Third Edition. San
    Antonio, TX: Psychological Corporation.