Language and Movement: A Literature Review

Maj 2023
NCFF

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2. udgave 2025

Forfatter: NCFF

Indholdsfortegnelse

Overview

This literature review presents an overview of recent research into the relationship between second language acquisition and bodily movement, with themes ranging from gestures and vocabulary, virtual reality, embodied learning, physical exercise, and theater-based classroom interventions. Movement in relation to vocabulary-learning is the most widely-discussed topic within the available research, but some studies address movement and grammar, and others address CLIL (Content and Language Integrated Learning) approaches. Many, though not all, of the available studies focus on children, and span a broad range of contexts and languages: English, Italian, Greek, Finnish, German, Hebrew, Spanish, and even novel (that is, invented) languages. Overall, the research overwhelmingly affirms the benefits of incorporating movement into language classrooms, as long as these movements are relevant to the content being learned, and do not increase the cognitive load on students. Likewise, the literature also affirms that physical movement more broadly, when combined with language learning, boosts language acquisition.

Key words / search terms: Embodied learning, physical exercise, movement and language acquisition, body and language

Introduction

The link between the mind and body has perplexed philosophers for centuries, and language researchers for decades. How do mind and body interact when learning a language, considering that language is produced within the body? This review provides an overview of articles that consider the body as a site for learning language.

Numerous studies—far too many to cite in a single review— across fields and contexts speak to the benefits of movement in learning more generally, as well as to the importance of presenting information in multiple modalities in the language classroom. To begin, some background: in the context of this literature review, two foundational **neuroscientific studies** that explore the link between exercise (in the traditional sense) and language-learning are those of Winter et. al. (2007) and Schmidt-Kassow et. al. (2010). These studies provide a solid base on which many of the later studies focused on movement (in other, more varied forms, beyond "exercise") and language acquisition are built. Winter et. al. studied whether exercise has immediate beneficial effects on cognition. In their study, adult German men performed either high impact exercise, low-impact exercise, or rested, and were then given learning tasks. The results showed that vocabulary learning was 20 percent faster after high-impact exercise, as compared to learning after low-impact exercise and rest. From a slightly different angle, Schmidt-Kassow et. al. examined the effect of regular, simultaneous physical activity (such as bicycling) on verbal learning, as compared to learning while physically passive, over a long-term period. Similar to Winter et. al., the subjects performed better on vocabulary tests when physically active while learning new words, indicating that engaging in physical activity while learning facilitates memorization.

Additionally relevant to the topic of movement and language acquisition is the concept of Embodied Learning. Historically, Asher's Total Physical Response (TPR) approach (1969) was one of the first proposed methodologies for incorporating movement into language-learning, though it is now perceived as rather dated. However, in what could be considered a continuation of that line of research, Kosmas and Zaphiris (2020) provide a comprehensive overview of a new pedagogical paradigm, **Embodi-**

ed Pedagogy and Learning, which argues for the centrality of the body in the learning process through teaching methods based on Embodied Cognition. Their study examines a movement-based learning intervention, PanBoy, in first and second grade classrooms in Cyprus. In each session, students watched engaging videos that walked them through different movements in relation to ten new words. The results of the study indicate considerable improvements in both students' academic performance and emotional engagement in the learning process. While this intervention is focused on L1 language-learning, the methods described could also hold relevance for the L2 classroom. Kosmas' and Zaphiris' work suggests that the body is a tool to mobilize within the classroom to enhance the learning experience for children. Importantly, the physical movement involved is very much connected to emotional expression and connection, allowing students to better express their emotions and form more meaningful ties to the language they are learning.

Gestures

One of the most widely-researched topics within the area of movement and language is the specific relationship between **gestures** and language acquisition, specifically vocabulary acquisition. Curiously, most studies found within this area concentrate their experiments on young children (perhaps due to that age group's limited reading abilities, thus a reliance on other modes of visual or spatial representation becomes necessary), ranging from preschool-aged to eight years old, with the exception of Macedonia and Klimesch (2014), who focus on college students.

Macedonia (2014, 2019) and Macedonia and Klimesch (2014) have carried out several studies that ultimately advocate for embodied language-learning practices through the use of gestures. They juxtapose embodied learning with passive, "mentalistic" learning practices in which the body does not factor into the learning process. These studies confirm the necessity of gestures that are semantically related to the words being learned, as well as the necessity of learners performing the gestures themselves, not merely watching the gestures be performed by others. Macedonia and Klimesch carried out a long-term (14-month) study that analyzed the impact of gestures on **memory** in language-learning. Participants were divided into two conditions: audiovisual and gestural, wherein the former group read, heard, and spoke the words, while the latter group had the additional feature of symbolic gesturing. The language "learned" was a novel (that is, invented) language, to prevent the influence of other languages students may speak. The participants then performed translation tests over the course of several months. The results show that gestures significantly enhance vocabulary-learning in both quantity and over time, with gesture-accompanied words better encoded into both short and long-term memory, as the gesture strengthens a word's neural representation. This is line with previous findings by Tellier (2008), who studied the impact of gestures on memory of vocabulary words in particular, in young French children learning English words. The study found that gestures build deeper connections to words, leaving a richer, more pronounced trace in memory (3).

In related studies, Mavilidi et. al. (2015) and Toumpaniari et. al. (2015) assess preschoolers' foreign language vocabulary learning through both physical exercise (whole-body movements) and gesturing (part-body movements). Mavilidi et. al. examined preschoolers learning Italian words in three conditions: integrated physical exercise (that is, enacting the words learned through physical exercises), non-integrated physical exercise (that is, performing physical exercises unrelated to the words learned), gesturing (while seated), and conventional (verbally repeating words while seated). They found that children in the integrated physical exercise group obtained the highest learning outcomes.

Similarly, Toupmaniari et. al. tested whether gestures *combined with physical activity* leads to high learning outcomes than teaching with *just* gestures, or than teaching with conventional (verbal) strategies. They conclude that combining physical activities on top of task-relevant gestures leads to even better learning outcomes than either activity alone. They also point out the physiological and emotional benefits that accompany the cognitive improvements; that is, children enjoy being active and performing the physical movements in the classroom, leading to a more positive experience for learners.

In their respective studies, Andrä et. al. (2020) and Rowe et. al. (2013) triangulate the relationship between foreign language vocabulary and gestures by adding pictures to their experiments. In their study carried out with German eight-year-olds, Andrä and colleagues found, contrary to their hypothesis, that learning enhanced by either gestures or pictures benefited children equally well, with very little difference in longer-term outcomes between the two approaches. They conclude that gestures are not more beneficial than the use of pictures to accompany learning, and suggest, then, that verbal materials be supplemented with either. This study stands out in its more nuanced endorsement of gesturing.

Rowe et. al. approached the topic from a slightly different angle, to analyze whether nonverbal supports (gestures and pictures) *benefit all learners equally*. They carried out a study in which 62 preschoolers with diverse backgrounds and abilities learned vocabulary words for everyday objects in a novel language. The children were divided into three groups: word only, word plus gesture, and word plus picture. What is novel about this study in particular is its emphasis on differences in learner characteristics. The team found that, in line with McNeil et. al. (2000)'s "complexity hypothesis," non-

verbal cues are more beneficial to novices than more advanced learners.[1] Furthermore, and taking Andrä's findings a step further, Rowe et. al. found that *for higher-level students, pictures were more beneficial than gestures*. Children with already strong language abilities were more likely to remember words learned in the word plus picture condition, than in the other two groups. They hypothesize, then, that this condition "places the least demands on working memory during encoding of the novel word" (116). That is, by having a visual aid already provided, these students exert fewer mental resources than the gesturing or word-only students, who need to conjure a visual representation of the object on their own when learning new vocabulary.

Eskildsen and Wagner (2015) also tackle the question of pairing specific gestures with specific vocabulary words, though they do so through the lens of Conversation Analysis. They study the relationship between speaking and embodiment—what they call "gesture-talk combinations" (268) in the context of an ESL (English as a Second Language) classroom. The study ultimately shows that the prepositions "under" and "across" are particularly embodied linguistic constructions. That is, over time, learners will continue to use the same gestures they initially used when learning those words. An additional notable concept the authors articulate in this study is that, "humans use the entire body to participate in socially organized processes of understanding and learning" (291)—an important point to keep in mind in the context of language classrooms in particular.

However, gestures are not only tied to vocabulary-learning. The relationship between gestures and **grammar**-learning is also addressed by the literature. Suñer and Roche (2021) explore embodiment and the learning of German light verb constructions in a group of French-speakers. One group watched multimedia animations that taught embodied concepts related to light verb constructions, while the other group received form-based explanations of the same verbs. The results show that the use of bodily engagement led to significantly better performance, while also positively impacting students' attitudes about how grammar can be learned.

Additionally, Boieblan (2022) studies the acquisition of English spatial prepositions in Spanish-speakers with a B1 level of English. The study discards notions that the relation between prepositions and their use is arbitrary, operating instead under the a theory that, "entertains the meanings of spatial prepositions as being systematically grounded

1. Rowe notes that, "previous work on gestures found the nonverbal aids to be more helpful in comprehension when the task was more complex for the learner, and less useful or necessary when the task was less complex" (111), citing: McNeil, N. M., Alibali, M. W., & Evans, J. L. (2000). The role of gesture in children's comprehension of spoken language: Now they need it, now they don't. *Journal of Nonverbal Behavior, 24*(2), 131–150.

in the interaction between the body and environment" (6). Participants were divided into a control group, and an embodied-based training group, and presented with cloze tests. The study yielded statistically significant results that supported the effectiveness of the embodied approach to learning prepositions.

Finally, another subtopic that appears in the literature on vocabulary learning and gestures is movement in the form of, or enhanced by, **Virtual Reality (VR)**. Fuhrman et. al. (2021), for example, approach vocabulary learning through the use of VR as an embodied learning tool. In this study, Hebrew-speaking adults learned Finnish vocabulary words for everyday objects. They were divided into three conditions: seeing an object without performing any movement, performing an irrelevant movement, or performing a movement with a logical connection to the object's use. They were then given word-picture matching tests to assess recall. Their results indicate better comprehension rates for those in the third group, who performed logical movements in tandem with viewing the objects, suggesting that VR may be effective as an authentic, multisensory tool in language learning. On the other hand, incorporating irrelevant hand gestures actively, negatively impacts language acquisition due to it increasing the cognitive load on the learner.In other words,the gestures themselves must be meaningful—there needs to be a logical link between the movement performed and the word or phrase itself.

Physical Activity

Physical exercise in a broader sense, beyond individual gestures, is also addressed by the literature. Several recent studies focus on **Content and Language Integrated Learning (CLIL)** approaches in Physical Education (PE) classes, which combine language education with PE by essentially teaching PE classes in the target language. These studies are primarily presented through a PE-focused, rather than language acquisition lens, though. Salvador-García et. al. (2018), for example, studies whether a CLIL approach to PE classes in a high school in Spain ultimately compromises students' physical activity, due to time spent on language instruction. The study finds that it does not, and that CLIL is an effective method for learning both language and PE skills. However, in a similar study focused on CLIL, Coral et. al (2020) finds that blended, language-focused PE courses ultimately end up reducing the overall amount of time children spent performing physical exercise in class, contradicting Salvador-García, thus no consensus has been reached on this question.

Kyriaki and Laskaridou (2017) also examined CLIL approaches by implementing a "movement alphabet" program in a second-grade classroom. Like Coral and Salvador-García, this (more descriptive) study examines PE classes taught in English, though with a team-teaching approach; that is, the English and PE teacher join forces to design and co-teach each session. The program goes beyond just teaching isolated vocabulary; students learn directions, songs, how to stretch, and how to respond to movement-based cues. Given the number of practical examples in this study, it could serve as a useful resource for the elementary-school level.

Beyond CLIL specifically, Mullender et. al. (2016) examined the use of physical activity in both math and language classes (L1) in twelve elementary schools over a two-year period. They concluded that "physically active academic lessons significantly improved mathematics and spelling performance of elementary school children and are therefore a promising new way of teaching" (1). While this study was carried out in the students' native language courses, it could also hold relevance for the second-language classroom.

Importantly, in the most thorough of the studies in this section, Liu, Sulpizio, Kornpetpanee & Job (2017) attempt to probe whether physical activity is still beneficial to language-learning when learners already have a certain degree of proficiency. The study also aims to assess whether these benefits extend beyond the vocabulary/ lexical level, into the sentence/ semantic level. This was tested using both Word-Picture verification tasks, as well as Sentence Semantic Judgment Tasks with Chinese learners of English after learning phases in which the experimental condition participants rode a bicycle during the presentation of new information. The results of the study clearly demonstrate that learning a foreign language while performing physical tasks leads to a better performance not only at the level of vocabulary acquisition, but also at the level of sentence processing. Notably, this performance also seems to be fairly long-lasting, as participants continued to exhibit high performance scores a month after the initial training sessions. Also of note is the finding that the physical tasks were beneficial to both novice *and* more advanced learners.

Theater, Drama & Classroom Interventions

Another recurring trend noted in the literature is that of qualitative studies focused on theater and English-language acquisition in particular. While the vast majority of research found was, unsurprisingly, written in English, a few Spanish-language articles emerged (from Chile and Argentina, specifically) that take theater, drama, and movement-based intervention projects in language classrooms as their object of study.

Barrientos et. al. (2022) presents a qualitative study of the affective impact of movement-based activities on students in English classrooms at public schools in Valdivia, Chile. Interestingly, Barrientos and colleagues make note of the how movement can be used to reduce the stress and affective filters that often accompany foreign-language learning. Using surveys and feedback from students and teachers, the researchers validate the impact that movement-based programs have on students' emotional engagement in the classroom, claiming that the activities generated increased motivation, well-being, and confidence, while decreasing anxiety when learning English, in turn facilitating a better learning environment.

Bérodot (2014) carried out a qualitative study of a theater activities in Spanish-language classrooms for international adolescent students studying in Argentina, championing the use of theater as a method to develop oral competence and non-verbal communication in a new language. Beyond language, the theater activities were used to introduce new cultural concepts to the students. Like Barrientos et. al., Bérodot highlights the emotional, affective benefits of students embodying language as actors. They also point out that, given that the aim of the exercises is to enjoy language-learning, the objectives are not achieved if students are actively uncomfortable putting themselves in a vulnerable situation on stage.

Similarly, Lizasoain et. al. (2012) discusses the "English: Acting Out Language" project implemented in Valdivia, Chile. The goal of the project is to develop effective teaching methodologies, thereby "turning the foreign language into action and knowledge"

(157). Like the previous two studies mentioned in this section, the emotional aspects of movement- and theatre-based learning are central considerations. The authors observed that motivation and confidence in students increased, while anxiety, inhibition, and frustration decreased. Notably, these new ways of using language also spilled over into their native language, thereby contributing to a more effective use of language more broadly. One caveat Lizasoain and her colleagues point out, however, is the need for both updated materials, and properly-trained teachers who can effectively implement theatre techniques into the language classroom, which requires resources and time.

This trend is not, however, limited to a Latin American context. Greenfader and Brouillette (2013) also speak to the positive impact of dramatization and movement on English-language-learning through the Teaching Artist Project (TAP), piloted in K-2 classrooms in California public schools. This project pairs teachers with a practicing artist, to use dance and embodied storytelling to boost oral literacy and vocabulary in children with limited English proficiency. The researchers point out that, through dramatization, students "may build a stronger and more direct pathway from the decontextualized language on the page to comprehension of what the words mean" (174). Aligned with the studies mentioned above, the authors highlight the positive emotional component of such an intervention, as students displayed greater confidence in the classroom.

These qualitative contributions are valuable in that they demonstrate the success and importance of creativity in movement-based projects in the language classroom. Specifically, the emotional component of movement and learning is brought to the foreground.

By Way of Conclusion

Overall, the literature suggests overwhelmingly positive associations between movement and second or "foreign" language acquisition. However, topics not addressed by the existing literature, and which represent further questions to explore, include: more research on adult subjects, studies beyond vocabulary acquisition, and specific examples of how to concretely incorporate movement into the classroom.

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