

# Embodied Learning for Foreign Language Education

## “からだで学ぶ” 外国語教育

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### Abstract

The present article provides an overview of embodied cognition, which theorizes that conceptual knowledge is grounded in sensorimotor, emotional, and bodily states, and how it can be applied to an embodied learning approach for foreign language instruction. Specifically, I consider this from three different perspectives: the use of gestures, especially learners producing gestures while interacting in the L2; raising learners' awareness of metaphors and how they ground abstract concepts to concrete and physically embodied source concepts; and applying an enacting and multisensory approach to the teaching of English phrasal verbs. In all three of these cases, optimizing the link between language and the body has the potential to enhance foreign language learning, especially for enriching the encoding of vocabulary.

**Keywords:** Embodied cognition, embodied learning, gesture, metaphor, phrasal verbs

### 1. In tandem: Action experiences and cognition

Action as well as the perceptual and emotional systems are all involved with supporting cognition, including memory, language, and thought (see Barsalou, 2008; Gibbs, 2005; Pecher & Zwaan, 2005 for overviews). That is to say, sensorimotor experiences and cognition work in tandem and cognitive mental structures are not necessarily decoupled from the body. This theoretical approach is widely referred to as embodied cognition, and yet far from unified, a few claims made by embodied cognition theorists are that cognition is situated, the environment is part of the cognitive system, and cognition is for action (Wilson, 2002).

The American pragmatist, John Dewey, is commonly referred to as one of the early proponents of an embodied perspective for he emphasized the primacy of concrete experiences for meaning creation (Dewey, 1938). For him, “high” cognitive processes like thought and language emerge from “low” cognitive processes (perception, action). In other words, there is *continuity* from the organic activities of bodily experiences in a dynamic environment (that is physical, social, and cultural) to the mind in all of its rational and complex operations. He famously described this embedded nature of the body in the environment when he stated, “to see the organism *in* nature, the nervous system in the organism, the brain in the nervous system, the cortex in the brain is the answer to the problems which haunt philosophy” (Dewey, 1928, p. 198). Therefore, within a learning context, Dewey (1938) argued for an environment that is integrated with the experiences that give rise to its meaning. As embodied cognition has “come of age” (Meteyard, Cuadrado, Bahrami & Vigliocco, 2012) and research programs continue to emerge, grow and become more interdisciplinary, it is important to consider

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its implications within the field of education. As a consequence, in this paper I consider embodied theories of cognition from the perspective of embodied learning, particularly in regards to foreign language learning.

## 2. From embodied cognition to embodied learning

When considering foreign language (FL) instruction and having students use motoric action in the classroom, most instructors are likely to think of the teaching approach from the 1970s called Total Physical Response (Asher, 1969, 1977). Despite having potential, this approach did not make much headway within the field of FL instruction, particularly due to its lack of empirical studies and the predominant theories of this time period, namely those influenced by Chomsky's (1959) Universal Grammar (UG) (Macedonia & von Kriegstein, 2012). According to UG, language is something innate and purely mentalistic and therefore disembodied and detached from the situation, the environment, and the body's morphology. As a result, language instruction was viewed as an abstract activity that did not involve the body, but instead focused on rule-based grammar drills and memorizing decontextualized vocabulary lists. This view of language, as purely a mental phenomenon, coincided with the dominant view of the time in regards to cognition, as in, the computer metaphor of the mind. Under this paradigm, cognition, including language, arises from computations performed on abstract and amodal symbols (see Fodor, 1983; Neisser, 1967; Newell, 1980). Yet over the past 30 years, researchers have shown that language comprehension recruits brain areas typically associated with sensory modalities and action behavior (Fernandino et al., 2015; Glenberg & Kaschak, 2002; Hauk, Johnsrude, Pulvermüller, 2004; Zwaan & Taylor, 2006). Boulenger, Hauk, and Pulvermüller (2009) describe this interlinkage as "semantic somatotopy" to highlight how semantic representation comes about through the dynamic interaction of the body within an environment. These studies show the significant role the sensorimotor systems play in semantic representation and this is one of the central features of an embodied view of cognition.

Theories of embodied cognition widely range in terms of degree of embodiment and often these theories are placed on a continuum from weak to strong (Meteyard et al., 2012; Wilson, 2002). In the stronger version, the semantic system re-creates or runs a simulation of direct experiences and thus uses the same resources as sensory-motor processing (Meteyard et al., 2012). That is to say, the sensory-motor system provides a basis for higher cognitive mechanisms and interacts in linguistic and semantic/pragmatic processing, so there is "neural reuse of action and perception mechanisms for language, concepts and communication" (Pulvermüller, 2018, p. 36). To better grasp this idea, I use an example from Barsalou (1999) who described communication as the reactivating of sensory states that correspond to those that were active during the actual bodily condition of action or perception. For instance, when we think of or read or hear the word "guitar", we run a mental simulation that reactivates experiential traces of our experiences physically interacting with guitars, which include perception, action, and internal states. This could include sensory information from vision, the shape and color of it; auditory information, the sound of it; especially for those who play the instrument, motor information, as in, the action of the arms/hands playing the notes while strumming; and even olfaction, the smell of the wood. These experiential traces in the form of a simulation provide linguistic meaning to the concept. Whereas, in a weaker view of embodiment, simulation, or the conceptual grounding of a word, is not always necessary every time it is processed, especially for highly familiar language. In this weaker view, multiple systems interact simultaneously during language comprehension, a faster, shallower *linguistic system*, which provides a short-cut to processing, and a deeper *simulation system*, which recruits the sensorimotor systems for processing more novel language and complex linguistic processing (Barsalou, Santos, Simmons, & Wilson, 2008). Nonetheless, both the strong and weak views of embodiment emphasize the importance of the body, action, and the situation for language comprehension.

From an educational perspective, embodied learning is based on the idea that higher level cognition needs "appropriate sensory-motor experiences" to develop (Kiefer & Trumpp, 2012, p. 19) and thus there is a need

to shift the teaching of a foreign language from one that focuses on abstract teaching to embodied and situated teaching and learning. It is important for FL instructors to take notice of the growing research field of embodied cognition (Barsalou, 2008; Gallese & Lakoff, 2005; Wilson, 2002), and specifically embodied learning (Glenberg, 2008; Kiefer & Trumpp, 2012; Shapiro & Stolz, 2019) and consider ways to integrate these research findings into current FL instruction (Birdsell, 2015). Over the past decade, a growing number of monographs and papers suggest, as Holme (2009) expressed in his review of research on language teaching and embodiment, “vocabulary learning can be helped by the physical enactment of vocabulary” (p. 44). Three areas for embodied learning to enhance foreign language instruction include, but not limited to, the use of gestures, grounding abstract concepts through metaphors, and presenting phrasal verbs through multisensory enactment. In short, in this paper I review these three possible ways to integrate embodied learning into the foreign language classroom as a way to enhance, facilitate, and more deeply encode the target language of the L2.

### *2. 1. How gesture facilitates language learning*

The evolutionary trajectory of language in hominids is contentious, but one theory posits that language evolved from gestures. This is commonly referred to as the *gesture first* hypothesis, which suggests that spoken language emerged from adapting gestural communication (Corballis, 2002; Tomasello, 2008). Some evidence to support this hypothesis comes from research that looks at the ontogenesis of speech and gesture. For example, developmental psychologists suggest that gesture precedes speech and is an important cognitive tool that aids infants in their early language development (Iverson & Goldin-Meadow, 2005). Moreover, McNeill (2008, 2012) has pointed out that gestures are components of speech for all ages of people, not accompaniments, but actually integral parts of it and therefore should not be viewed as peripheral for communication, but a fundamental part of it. In other words, gesture and verbal thinking are continuously working, as a coupled system, to inform and alter each other (Clark, 2011).

In regards to the impact of gesture on language, when gestures are congruent with the words or phrases, they enhance memorability (Zimmer, 2001) and this has also been found to be true for foreign language learning (Macedonia & Knösche, 2011; Tellier, 2008). Consider the following research conducted by Macedonia and Klimesch (2014). They tested participants retention for vocabulary using a longitudinal study with two experimental conditions, an audiovisual condition (hearing, reading, and speaking the target words) and an enactment condition (similar to the audiovisual condition, but additionally accompanying the words with symbolic gestures). Their results convincingly show that enactment enhanced word learning, was more efficient, and was more resistant to decay compared to encoding the new words through audiovisual methods (Macedonia et al., 2014). In another study that demonstrates how gesture facilitates L2 word learning, Morett (2014) utilized an interactive word learning task. In this study, she had participants learn unfamiliar words in a foreign language (Hungarian) either accompanied or unaccompanied with gestures. Then these individuals had to instruct the words to an interlocutor. All participants were then tested for recall of these words. Results indicate that gesture facilitates communication, encoding, and recall. Unique to her study, she showed that those who taught the words to another participant using gesture most effectively learned the target vocabulary compared to the other conditions (no gesture and only viewing the gestures) (Morett, 2014). In summary, gesture and speech are deeply conjoined in the act of communication and gesture facilitates the learning of language. One possible reason for this is that it provides a greater depth of encoding than mere speech (Macedonia, Repetto, Ischebeck, & Mueller, 2019).

### *2. 2. Grounding abstract language through metaphors*

A number of behavioral and neuroimaging studies support an embodied view for language processing (for a review

of the role of the motor system in language comprehension see Fischer and Zwaan, 2008), which include studies with L2 learners (De Grauwe, Willems, Rueschemeyer, Lemhöfer, & Schriefers, 2014; Dudschig, de la Vega, & Kaup, 2014), yet how abstract concepts fit into theories of embodiment is considerably more controversial. For instance, it is relatively easy to imagine enhancing the foreign language instruction using multisensory information such as gestures, pictures/videos, and mimes for concrete concepts (e.g., tree, hospital, etc.) or action-based language (e.g., stand up, fold in half, flip the coin, etc.), but for abstract concepts (e.g., creativity, economy, etc.), this is more problematic. Therefore, some suggest that abstract concepts are disembodied and argue for a pluralistic view of language processing (Dove, 2009, 2011) while others suggest that abstract concepts are grounded in events and situations (Barsalou & Wiemer-Hastings, 2005), and still others support an embodied perspective for abstract concepts suggesting that metaphor acts as a “bridge” between the sensorimotor systems and abstract language (Jamrozik, McQuire, Cardillo & Chatterjee, 2016). This latter position derives from the well-known works of Lakoff and Johnson (1980, 1999) who formulated what is known as Conceptual Metaphor Theory (CMT). CMT proposes that there is cross domain mapping from a sensory source domain like WARMTH onto a more abstract domain like AFFECTION at the conceptual level, resulting in linguistic metaphors such as a “warm welcome” or the following example from a tweet:

- (1) **Frosty** footage just in from @ManUtd’s training session between Paul Pogba and Jose Mourinho... (Twitter – Sky Sports New Sept. 26<sup>th</sup> 2018).

In this case, “frosty” is an extreme form of cold, as in, the metaphorical sense, an unfriendly interaction between two individuals. Humans have a very unique capacity to imaginatively project from well-known structures like bodily experiences with physical warmth (or coldness) onto more complex and abstract conceptual structures like social relationships. Abstract concepts have been shown to be grounded in the sensorimotor system in a number of studies such as interpersonal relationships and physical warmth (Williams & Bargh, 2008), moral purity and cleanliness (Lee & Schwartz, 2010), and importance and physical weight (Jostmann, Lakens, & Schubert, 2009). These studies have potential implications for foreign language instruction. That is to say, in order to deepen the semantic knowledge for an abstract concept in the L2, learners may benefit from mapping it onto a concrete one. For example, economics is a highly abstract concept and also metaphorical, the question is whether or not L2 learners would benefit from coupling this concept with a common source domain for economics like a plant (see Birdsell, 2019)? Through this coupling (economy – plant) by means of physical interaction with a plant in an instructional setting, the L2 learners could explore such expressions as “green shoots” and “sprouting up” and then look at how they are commonly applied to such things as economic expansion and the emergence of new companies, respectively, as seen in the below examples:

- (2) So, until China becomes an advanced export power, most of the economic **green shoots** will be pushed up by the state. [Newsweek, June 29<sup>th</sup>, 2009]
- (3) New companies are even **sprouting up** to offer Web-based word processors and spreadsheets. [NY Times, Dec. 11<sup>th</sup>, 2005]

Empirical studies that have examined metaphors in FL learning have found positive results using a CMT framework. For instance, a number of studies have shown that when presenting metaphors (e.g., He was boiling with anger, You need to simmer down, etc.) in the L2, raising learners’ awareness to the conceptual structures that motivate these metaphors (ANGER IS A HOT FLUID IN A CONTAINER) aids the learners in retaining these phrases and accurately interpreting new and unfamiliar expressions (Beréñdi, Csábi, & Kövesces, 2008; Boers, 2000a, 2000b; Boers, Demecheleer & Eyckmans, 2004). These studies point out the importance of showing

learners how these abstract concepts are grounded in sensorimotor experiences and it is these experiential states that motivate and provide conceptual structure to such metaphorical expressions. To expand this idea of raising learners' awareness of these embodied source concepts, it is important to consider the learning environment and how to develop a space where learners experience the L2 through multisensory channels and have opportunities to physically enact the language. It is these concrete situations that express the content of the abstract concept. In the case of the above example, when discussing anger in English, the instructor could use a video or an actual portable stove to boil water and look at certain semantic features associated with this that might get mapped onto language about anger (e.g., boil over, steam, simmer down, etc.). Becoming more aware of the semantic features of the source domain through embodied learning activities interacting with them, the learners then could apply this knowledge to interpret other metaphors that utilize similar conceptual structure. In addition, they could also potentially extend this knowledge structure to interpreting creative metaphors since many of them use already existing conceptual structures by systematically extending them in new and unconventional ways (Lakoff & Johnson, 1999).

Again, to further illustrate the interaction between an abstract concept and the sensorimotor system, we can consider some recent studies from the field of creativity research. Opezzo and Schwartz (2014) found that simply walking enhanced the production of creative analogies and divergent thinking. In a similar study, Leung et al. (2012) found that when participants were able to walk freely around the lab, as compared to a fixed rectangular route or sitting down, they performed better on a measure for originality on two divergent thinking tasks. In another experiment in this same article, playing on the metaphorical expression "to think outside the box", they examined whether or not this metaphor, which is based on a concrete and embodied experience, would enhance responses on a Remote Association Test. In this study, one group of participants completed this test while enclosed in a large box and a second group completed it while sitting outside this box. Their results show that those physically "outside the box" generated more correct answers, which they suggest could be due to these participants embodying the metaphor of thinking outside the box and thus enhancing one's creative performance (Leung et al., 2012). Still in another study that aimed to look at the influence of physical movement on creativity, Slepian and Ambady (2012) had one group of participants trace fluid drawings and another group, rigid drawings, and then they had them complete a divergent thinking task (unusual uses for a newspaper), a cognitive flexibility task, and a Remote Association Task. Again, their results indicate that embodying fluid hand movements through the drawing tasks (as opposed to nonfluid movements) enhanced performance in all three creative tasks. In all, these studies are beginning to shed some light on the important role the body plays in higher order cognitive thinking such as being creative, which is also crucial for language development in both the L1 as well as the L2 since language, in essence, is highly creative (Carter, 2004).

In this part of this section, I reviewed how embodied learning could be applied to the learning of abstract concepts in a FL through metaphor. Metaphors commonly link an abstract concept (the topic of the metaphor) with a concrete one (the source). Semantic features are mapped from the source onto the topic and thus provide some structure to our understanding of the topic. Previous research has primarily focused on raising learners' awareness of the conceptual structure that motivates these metaphors. In this paper, I suggest extending this line of research by including sensory interaction, enactment, or some form of movement associated with the source concept in order to enrich learners' knowledge of metaphors in the L2.

### *2. 3. The challenge of phrasal verbs: An enactment and multisensory approach*

In the final part of this section, I consider the use of an enactment and multisensory approach to teaching phrasal verbs (PVs). Phrasal verbs are notoriously difficult for L2 learners of English since they are numerous, highly polysemous, and often metaphorical. On the surface, they seem random or unsystematic, which has led many

researchers over the past decade to explore a cognitive linguistic (CL) approach to teaching them (see Condon, 2008; White, 2012; Yasuda, 2010 for some examples). Similar to the above subsection on metaphors, these studies primarily aimed to raise learners' awareness of the underlying systematicity of PVs. In one study, Condon (2008) used a CL approach to teaching PVs by explaining to the learners the motivations behind the particles. For example, "in/out" has a number of different conceptual motivations that can be categorized from "movement of an object in and out of a container" to "change from not knowing to knowing about something". Results from this study indicate that using a CL approach can enhance the learning of PVs and explicitly learning the motivations that underly the PVs assists the learners in retaining this knowledge, as assessed in a delayed post-test (Condon, 2008).

This "in/out" orientation is an essential part of CONTAINER metaphors, which derives from our bodily experiences as a bound entity (Lakoff & Johnson, 1980, 1999). This "in/out" orientation is then projected onto other physical objects like a room and a house that similarly are bounded by physical surfaces. Furthermore, this conceptual structure of containment also gets projected onto more abstract entities like states, resulting in the ontological metaphor, STATES ARE CONTAINERS. Take for example the PV, "break out". According to the Corpus of Contemporary American English (<http://corpus.byu.edu/coca/>), this PV frequently collocates with words like war, fighting, hostilities, clashes, and conflicts. This can also include other negative outcome events like an epidemic or plague, hives, and influenza. This PV is motivated by the metaphor, STATES ARE CONTAINERS, and the particle "out" is the movement from one state to another. In this sense, before a war "breaks out", there is peace, so there is change from one contained state to another. In regards to influenza "breaking out", there is a change from one state, "health", to another state of "sickness". A common dictionary meaning of this PV is "to start suddenly", yet this overlooks the encyclopedic knowledge we have of clashes and epidemics, namely that they are transformative, as in the fact that influenza only breaks out if it is preceded by a state of health and war only breaks out if it is preceded by a state of peace. The second dictionary definition of "break out" is to "escape", as in an inmate from prison. This is very literally the physical outward movement from a confined contained space, but can be applied metaphorically in a number of ways. For instance, the corpus shows a number of examples of the PV "break out" with the following collocations: mold (as in the frame or template and not the furry fungi), slump (a state of downwardness), and rut (a deep track, often impeding movement forward and metaphorically, a habit or pattern that often results in unproductive behavior). In these cases, "break out" is used as a positive outcome event, allowing the individual to move from an unproductive and unrewarding state to a new and more meaningful state. In this sense, the initial state is confining (stuck in a rut, fallen into a slump, etc.) and moving out of this state results in a liberating feeling. The point here is to show how abstract ideas expressed through PVs are highly physical and having FL learners enact their meaning may facilitate and enrich their vocabulary knowledge.

In regards to empirical research on enactment and vocabulary learning, Lindstromberg and Boers (2005) had participants in their experimental group convey the meaning of a manner of motion verb (e.g., hurl) by enacting or miming it to the other members within the group. In the control group, the participants conveyed the meaning of the word simply by verbally explaining it. Results suggest that vocabulary retention improves when the language is conveyed through enactment. This supports the view that enacted phrases are better recalled than phrases learned only verbally (Engelkamp & Jahn, 2003). They interpreted these results from a dual coding perspective (Paivio, 2007) or similarly to a multimodal approach to human memory (Engelkamp & Zimmer, 1994). In other words, the storage and retrieval of lexical meaning improves when the word is coupled with motoric imagery. In sum, Lindstromberg and Boers (2005) concluded that "enacting or miming a verb resulted in better retention than explaining it" (p. 249).

The question is, how would this work with PVs since the above study used manner of motion verbs? As a practical example, we can take the verb "back out of", which in the literal sense means someone physically moving

out of some contained space (e.g., garage, room), as in the below example:

- (4) They saw a car **back out of** the house's garage ... (Saturday Evening Post Jul/Aug 2015, Vol. 287 Iss. 4, p. 62–80. 6p.)

This phrasal verb is also metaphorical, but instead of moving outward from some physically contained space like a garage, the contained space is instead some social or political contract or agreement between two entities. In example (5), the United States is personified as an individual who has the potential to make decisions and one such decision is to renege on an international agreement, in this case, the Paris climate accord.

- (5) America's decision to **back out of** the Paris climate accord ... (Fox: Fox Sunday News July 9<sup>th</sup>, 2017)  
 (6) The rest of the world -- would understand if she wanted to **back out of** the wedding. (Golf Magazine Oct. 2003, Vol. 45, Iss. 10; p. 30)

Example (6) is slightly different. In this example, there is a social agreement in the form of a marriage proposal and subsequent wedding arrangements between a bride or groom. In this case, there is a suggestion of the possibility that the bride might be having some thoughts of withdrawing from this agreement. Both of these metaphorical examples illustrate the embodied nature for the image schema of CONTAINMENT. When you make an oral agreement or sign a contract, you are confining yourself within an abstract contained space, as if, you are physically enclosed or bound by it. If you are having doubts about the agreement and consider renegeing on it, you look for a way to null and void this agreement and consequently move in a backward motion in order to escape from this contained space.

In short, enacting metaphorical PVs by grounding them in their experiential states has the potential to facilitate memorability and recall similar to gestures. So, when teaching the PV “back out of”, it is important to consider raising learners' awareness of the image schema for CONTAINMENT and then listing possible social, political, and other form of contracts or agreements that act as this container in an abstract sense. Finally, learners could discuss possible reasons why someone would want to escape from such a containment (e.g., marriage – cheating, financial trouble, etc.; Paris climate accord – disbelief in global warming, bad for the economy, etc.). Then enacting this out, one student could be France, another student could be Japan, and another one the USA. Then confine them in a contained part of the room and show how this contained space is the Paris climate accord. Then have USA slowly back out of this contained space to illustrate this outward movement of escape from a verbal (or possibly signed) agreement between two or more entities. The point here is that such an exercise could be done through enactment in order to bridge the abstract to the concrete. In this way, the vocabulary leaves behind experiential traces that strengthen the depth of encoding of the PVs as well as providing liveliness to the class.

### 3. Conclusion

In this article, I set out to explore some specific questions about the nature of embodied cognition and ways to adapt it for embodied learning and more specifically embodied learning in the foreign language classroom. As outlined in the previous section, the body has the potential to facilitate language learning through coupling the language to the physical by way of symbolic gestures or movements that enact the meaning. This can also occur for abstract language by way of metaphors. I conclude by reviewing the three key points in this paper.

First, the overt use of gesture has potential to facilitate foreign language learning, especially when the learners produce the gestures themselves. In fact, in a recent meta-analysis, Dargue, Sweller, and Jones (2019) explored how beneficial gestures are to verbal information and found that gestures do indeed benefit language comprehension. Moreover, they found that producing gestures compared to observing them had a significantly larger effect size

on language comprehension. Therefore, further research needs to (1) examine the amount of spontaneous gesture production within the controlled environment of a classroom by L2 learners and possible interventions that aim to increase gesture production and (2) replicate existing studies that provide evidence for the enactment effect of gesture for different learner levels and linguistic and cultural backgrounds.

Secondly, metaphoric language, which often links an abstract entity to a concrete one, is commonplace in natural language. Raising learners' awareness of the underlying conceptual structure that motivates linguistic metaphors assists learners in comprehending and interpreting them. In addition, I considered how embodied learning can further be applied to abstract concepts by way of metaphor, but questions still remain about how enacting or using multisensory teaching materials that highlight the embodied features of the source domain might facilitate comprehension and retention of the metaphor.

Finally, the third key point, teaching PVs through embodied learning, emphasizes the growing interest of applying a cognitive linguistic approach to FL instruction. Previous research organizes the PVs according to the particle in order to raise learners' awareness of the conceptual structure that motivates them. This often entails having learners visualize image schemas like CONTAINMENT, which provides some structure to understanding PVs that use the "in/out" particles (e.g., break out, back out of). These can be both literal, as in the physical sense, or more abstract, but these abstract meanings are usually extensions of the physical and therefore can also be enacted.

Embodied cognition provides an explanatory framework for the positive effects of enactment and gesture on learning. It asserts that cognitive processes like language are grounded in perception and action (Barsalou, 1999, 2008; Glenberg & Kaschak, 2002) and therefore it is important to explore instructional techniques in the classroom that take full advantage of the sensorimotor systems for teaching a foreign language.

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