Articles

L2 Vocabulary Teaching with Student- and Teacher-Generated Gestures: A Classroom Perspective

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This action research project explored the use of gestures for teaching and learning French vocabulary in an upper-beginner adult classroom with 21 students from various language backgrounds. Over the course of 4 weeks, the teacher developed and used 4 sets of themed activities using both teacher- and student-generated gestures to introduce new vocabulary to the students, encouraging students to take an active role with respect to creating gestures. Detailed classroom observations and the teacher's field notes showed that students became comfortable using gestures after the first class and that the gesture activities had positive effects on student participation and the classroom interaction. Weekly quizzes and a final vocabulary test revealed benefits of gesture-based activities for word learning. Students' comments suggested that they enjoyed the gesture activities and that the gestures helped them remember words better, particularly when the word naturally evoked a gesture or when the gesture contained clues to word length or pronunciation. Several pedagogical considerations guiding the design and implementation of gesture-based vocabulary activities in a second language classroom are discussed.

Cette recherche-action action a exploré l'utilisation de gestes pour l'enseignement et l'apprentissage du vocabulaire en français dans un cours pour adultes débutants-intermédiaires. Les 21 étudiants avaient divers antécédents linguistiques. Au cours de 4 semaines, l'enseignant a développé et mis en œuvre 4 ensembles d'activités thématiques impliquant des gestes conçues par l'enseignant et d'autres par les étudiants, et visant la présentation de nouveaux éléments de vocabulaire. On encourageait les étudiants à jouer un rôle actif dans la création de gestes. Des observations détaillées des activités en classe et les notes de l'enseignant indiquent que les étudiants étaient à l'aise avec les gestes après le premier cours et que les activités avec gestes avaient des effets positifs sur la participation des étudiants et sur les interactions en classe. Des contrôles hebdomadaires et l'examen de vocabulaire final ont révélé les avantages des activités reposant sur les gestes pour l'apprentissage du vocabulaire. Les commentaires des étudiants révèlent qu'ils ont apprécié les activités et que les gestes les avaient aidés à mieux retenir le vocabulaire, notamment quand le mot évoquait naturellement un geste ou quand

le geste contenait des indices quant à la longueur ou la prononciation du mot. Plusieurs considérations pédagogiques visant la conception et la mise en œuvre d'activités de vocabulaire L2 reposant sur les gestes sont présentées.

Words are the building blocks of language, and learning vocabulary is one of the main tasks faced by second language (L2) learners. There have been numerous calls for vocabulary teaching to be given a more central role in L2 programs, as although learners can and do acquire vocabulary incidentally—for example, through communicative activities (Newton, 2013) or extensive reading (Krashen, 1989)—vocabulary is learned more effectively when supported by direct teaching (Laufer, 2005). This is especially true at lower proficiency levels, because learners need to develop a sizeable vocabulary (at least 3,000 word families) to start learning new words from context (Laufer, 1997).

Although many teachers rely on first language (L1) translations to explain word meanings (e.g., Franklin, 1990), this is not always possible—for example, in heterogeneous classrooms or if the teacher does not speak the learners' L1—nor is it necessarily ideal, because learning tends to be more effective when information is presented not only verbally, but visually as well (Mayer, 2001). Gestures and other visual aids can therefore help illustrate unknown word meanings, and research shows that words are remembered better when visual supports, including gestures, are used (Chun & Plass, 1996; Tight, 2010). However, many published pedagogical materials provide little assistance with teaching word meanings (Cook, 2003), and teachers are not given guidance on how to use gestures to teach vocabulary. Therefore, the goal of this study, addressed to classroom L2 teachers, was to both illustrate and examine ways in which gestures could be incorporated into vocabulary instruction in L2 classrooms.

Gestures in L2 Vocabulary Learning

Teachers naturally use gestures to teach the meaning of new words, and these form an important component of comprehensible input for learners (Smotrova & Lantolf, 2013). In addition to helping with meaning, a more explicit use of gestures can help learners retain the phonological form of words. Macedonia (2013) proposes a technique where the instructor says a word while performing an iconic gesture (e.g., cupping one's hand and tilting it downward for "to pour"), and the learners repeat both word and gesture. Although there are limits to when such gestures can be used—for example, gestures for similar concepts can overlap and gestures alone cannot illustrate the meanings of abstract words—studies have found that words learned in this

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manner are recalled better (Kelly, McDevitt, & Esch, 2009; Morett, 2014) and used more in writing (Macedonia & Knösche, 2011) than are words learned via L1 translations, potentially because adding gestures leaves deeper memory traces (Kelly et al., 2009). Learner involvement appears to be another factor: studies have shown that gestures lead to better word recall than do other visual supports, such as pictures, especially when learners actively repeat both word and gesture (Mayer, Yildiz, Macedonia, & von Kriegstein, 2015; Tellier, 2008).

These findings suggest that gestures could be a useful support for classroom vocabulary instruction, and studies have found this to be the case in children's classrooms (Khanukaeva, 2014; Porter, 2016). With adults, however—apart from early research investigating the effectiveness of Total Physical Response (TPR; Asher, 1969), a teacher-fronted technique where students hear commands in the target language and respond with the corresponding action (e.g., stand up, walk, sit down)—most research on gestures and vocabulary learning has been conducted in decontextualized, lab-based settings, and has often targeted artificial languages. In addition, learners have always been given a passive role in the creation and use of gestures, whereas the general trend in communicatively oriented L2 classrooms is toward giving learners a more active role in their learning. Researchers have hinted that having students invent their own gestures could be effective (Macedonia & Klimesch, 2014), but to date this has only been explored (with promising results) in a small lab-based pilot study (Mathison, in press). Further work is therefore needed to shed light on how gestures can best support vocabulary instruction in adult classrooms, especially communicative, student-centred classrooms, and on how students respond to such techniques. Such classroom-based work will provide valuable information for teachers wishing to incorporate gestures into their own teaching practices, and will be in line with cognitive theoretical frameworks, such as Dual Coding Theory (Paivio, 1986) or Cognitive Load Theory (Sweller, Ayres, & Kalyuga, 2011), that posit enhanced learning effects based on learners' exposure to and use of perceptual and motor experiences (for review, see Hald, de Nooijer, van Gog, & Bekkering, 2015).

Action Research on Novel Classroom Techniques

There have been numerous calls for more classroom-based research to test and adapt research-based ideas and techniques for use in real classrooms (e.g., Ellis, 2010). Classroom research is mutually beneficial to teachers and researchers, as teachers are more receptive to research conducted in authentic environments, and researchers gain access to the large body of knowledge accrued by teachers working in the very settings that researchers hope to impact (Lightbown, 2000). Of particular use to teachers is action research—where the teacher is the researcher, the driving force behind planning, conducting, and

assessing research outcomes. In action research, the teacher-researcher identifies a teaching area he or she would like to improve and embarks on a cyclical process of change: plan, act, observe, reflect, replan, and so on (Burns, 2013). By placing the teacher at the heart of the process, action research is an ideal way to test and adapt new techniques for authentic classrooms, and researchers have highlighted the need for more action research (Rainey, 2000).

Many teachers have used action research as a reflective approach for developing vocabulary teaching techniques. Huyen and Nga (2003), for instance, explored the use of word games in a Vietnamese ESL classroom and found that games were motivating and effective thanks to the low-stress environment and friendly competition they created. Similar investigations include the use of keywords (Benge & Robbins, 2009), vocabulary notebooks (Ralph, 2010), and supported vocabulary learning through music (Wood, 2001) and television (Kingston, 2001). Although action research has inherent limitations—for example, there are typically no control conditions and the students know they are being studied, which can affect their behaviour—one key advantage is the opportunity to assess student perceptions, which are all the more important in student-centred classrooms. By combining teachers' observations with students' perceptions, action research can yield a clear and situated picture of a technique in use, which, although context-specific, can be used to inspire and guide other teachers, as well as researchers and administrators.

The Present Study

Given the positive role of gestures in L2 vocabulary learning and the lack of classroom-based, teacher-friendly research on gesture use in L2 vocabulary teaching, this action research project explored how gestures could be incorporated into vocabulary instruction, in an upper-beginner French as a second language (FSL) classroom taught by the first author (hereafter, the teacher). Consistent with an emphasis on student-centred, communicative learning, the study blended activities in which the teacher taught gestures to the students (teacher-generated gestures) with activities where students invented their own gestures (student-generated gestures), and also explored students' perceptions of the various gesture activities. This supported the teacher's guidebook, which suggests using gestures to teach vocabulary but gives no specific guidance on how to do so, as well as the school's desire for active learning. Although the study also attempted to quantify the students' vocabulary learning over the session, the primary aim was to provide a detailed portrayal of how gestures can be used to teach vocabulary in the classroom. The following research questions guided this project:

1. What are the most important constraints to consider when designing gesture-based vocabulary activities?

2. Are the activities using teacher- and student-generated gestures, as designed, effective for teaching vocabulary in the classroom?
3. How do students perceive gesture-based vocabulary activities?

Method

Classroom Context

The target context was an upper-beginner FSL class in a community centre for recent immigrants and newcomers in Montreal, Quebec, Canada. The class (21 students, 18–52 years old) was linguistically diverse, representing Spanish (8), English (6), German (2), Polish (1), Portuguese (1), Thai (1), Korean (1), and Persian (1) language backgrounds, with students also knowing up to two additional languages (most often English). All had been assessed by the centre as having upper-beginner French ability. Students had been in Canada between two weeks and three years ($M = 9$ months), with the exception of one student raised in Canada but in an English-speaking province, and reported a range of prior experience learning French (0–5 years, $M = 10$ months) and use of French outside of school (0–70% of the time, $M = 9\%$). Students' reasons for learning French varied (employment, postsecondary education, immigration, making friends, etc.). The session lasted six weeks, with the teacher responsible for the first and second of three 3-hour classes per week. The teacher had taught the same class several times previously and had an assistant whose main tasks were to help supervise activities and answer students' questions and who also assisted with data collection for this project.

Gesture Materials

The teacher designed and used four gesture-based activities, implemented once per week for the first four weeks of the session, to help students learn vocabulary. These supplemented the existing course book, the topic for each lesson being (in order) *la cuisine* (cooking, teacher-generated gestures), *les directions* (directions, student-generated gestures), *le déménagement* (apartments and moving, teacher-generated gestures), and *la santé* (health, student-generated gestures). This sequence gave students guided practice with gestures before alternating between teacher- and student-generated gesture activities, giving them a chance to compare the two techniques. Also, more (*cuisine* and *directions*) and less (*déménagement* and *santé*) "gesturable" topics were balanced across teacher- and student-generated gesture lessons. Target words were taken from the existing course book, with no change in the amount of vocabulary targeted per lesson. Although the number of new words introduced varied from lesson to lesson, the final number was balanced across teacher- and student-generated lessons. Gesture activities were supported through other communicative activities, such as presentations, roleplays, and interactive games, while weekly quizzes (described below) allowed students to review the past week's target words and provided an incentive to study.

The *cuisine* lesson (18 students present) introduced students to the concept of learning vocabulary through gestures, in this case teacher-generated. Before the first gesture activity, the teacher briefly explained the technique, its potential benefits, and the research project to the students, discussing the goal of associating new words with nonverbal (visual) cues rather than translations or other verbal cues. Although brief (2–3 minutes), these explanations may have influenced students' disposition toward performing gestures in the class. However, such explanations were in line with the teacher's practice of introducing new activities or techniques with a few words explaining the reasoning behind these activities or techniques, both in order to motivate the students and to make them more aware of their learning process. Thus this fit with the action research format. All students were willing to participate in the study and signed a written consent form. The target words—eight action verbs, such as *couper* (to cut) and *ajouter* (to add)—and their gestures were then introduced through a recipe read aloud by the class. At each target word, the teacher repeated the word along with an iconic gesture and had the students repeat both word and gesture several times. Students then associated each verb to an image in a glossary, and finally wrote their own recipes in pairs which they presented as in a live cooking show, performing a gesture for each action verb.

The *directions* lesson (18 students present) was the students' first opportunity to invent their own gestures. The 11 target words included nouns (e.g., *coin*, corner), verbs (e.g., *traverser*, to cross), and prepositions (e.g., *en face*, in front of), and the teacher had prepared cards showing a target word along with an illustration. In pairs, the students first went through the cards, deciding on a gesture for each word, and then played a guessing game where one student drew a card and performed the corresponding gesture, and the partner guessed the word. Students then repeated the guessing game with a new partner, and further practiced the new vocabulary by using a map to give each other directions (with no gestures required).

In the *déménagement* lesson (19 students present), the teacher used a dialogue between a landlord and a prospective tenant to introduce the lesson's target vocabulary: eight words pertaining to apartments and moving, including verbs (e.g., *déménager*, to move), nouns (e.g., électroménager, home appliance), and adjectives (e.g., *disponible*, available). As in the *cuisine* lesson, the class read the dialogue aloud and the teacher had them repeat each target word several times along with a (teacher-generated) gesture. The students had previously been exposed to part of the vocabulary through an association exercise featuring a picture of an apartment building. Finally, students wrote landlord-tenant roleplays using the new vocabulary.

The final gesture lesson (16 students present) targeted health and was the students' second time inventing gestures. Pairs received one of two dialogues between a doctor and a patient, each containing five target words and illustrations to indicate their meaning. They read through their dialogue and in-

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vented and practiced a gesture for each target word. Students then met with someone who had received the other dialogue and taught each other their word-gesture combinations so that each student learned all 10 words. Finally, they practiced the vocabulary through an interactive game in which student "patients" were assigned symptoms and consulted student "doctors."

Assessment

To answer the first research question, which asked what constraints are important to consider when designing gesture-based vocabulary activities, the teacher kept a journal of his lesson development process as it evolved over the session. Specifically, the teacher noted any constraints in planning the gesture activities and recorded how each gesture lesson went, what questions or concerns were brought up by students, and how these could be planned for.

The second research question, which asked whether the activities using teacher- and student-generated gestures were effective for teaching vocabulary in the classroom, was explored in relation to students' participation and their success in word learning. To assess how well the students participated using word-gesture combinations, the teacher and his assistant completed in-class observation checklists modelled after the COLT observation scheme (Spada & Fröhlich, 1995). Specifically, the observer recorded and judged students' use of target words (*correct* = correct and comprehensible or *incorrect* = incorrect or incomprehensible) and the quality of their gestures (*good* = iconic and congruent or *bad* = incongruent or minimal/none). A word was considered comprehensible if understood by the observer, and a congruent iconic gesture had to illustrate the target word without being ambiguous with respect to another target word. The teacher also took notes during and after each lesson on how the gesture activities unfolded: student participation, issues, and on-the-spot changes to classroom management.

Students' word learning was assessed by means of four weekly quizzes, each taking place one week after the in-class lesson, and a final vocabulary test. Students completed a pretest before each gesture lesson, in which they checked known and unknown words from a list of the target words. The quizzes took the form of fill-in-the-blank exercises based on the recipe, dialogue, or other material used to learn the words the week before. The teacher read the text, performing an iconic gesture for each target word, and students were required to write the appropriate word. The final vocabulary test, based on the Vocabulary Knowledge Scale (Wesche & Paribakht, 1996), was completed in the last week of class, one week after the last quiz. Students received a list of all target words and indicated their knowledge of each on a 1–4 scale (1 = *I don't remember this word*, 2 = *I recognize this word but I don't know what it means*, 3 = *I recognize this word. I think it means…* [correct synonym, translation or use in sentence], 4 = *I know this word. It means…* [correct synonym, translation or use in sentence]).[1]

Two research instruments administered during the final gesture-based lesson (*santé*, in Week 4) were used to answer the last research question, namely, how students perceived the gesture-based vocabulary activities. First, the students completed a questionnaire featuring 12 questions to be rated on a 5-point Likert scale (1 = *not well* to 5 = *very well*), targeting the students' experience carrying out the gesture activities, their perceived learning, their preference for teacher- versus student-generated gestures, and their enjoyment using gestures, as well as one open-ended question asking them which words they learned especially well through gestures. After completing the questionnaire, pairs of students engaged in brief (3–8 minutes) audio-recorded discussions of their experience with gesture-based vocabulary learning using a set of open-ended questions that targeted the same broad themes as the questionnaire. To minimize language-related difficulties, the questionnaire and discussion questions were available in Spanish and English, and the students chose to conduct their discussions in Spanish (3 pairs), English (4 pairs), or Portuguese (1 student).

Data Analysis

The vocabulary pretests served to establish each student's prior knowledge of the target vocabulary. To ensure a consistent dataset, quiz results were compiled per lesson, only including students who had attended the corresponding lesson. This yielded a total of 15 students for the analyses of the *cuisine* and *directions* lessons and 12 for the *déménagement* and *santé* lessons. The final vocabulary test results were compiled per lesson and averaged across students, for students present for both the lesson and its corresponding quiz and only including words marked as "not known" on the pretest.

The questionnaire results were averaged across students for each question. The discussion recordings were transcribed by the teacher, who is fluent in Spanish and English, with assistance from a colleague for one discussion in Portuguese. The teacher used a holistic, bottom-up technique to code the transcripts, first highlighting salient comments, then grouping these into categories, and finally grouping categories into broad themes (Duff, 2008).

Results

Teacher's Notes

The teacher's notes, which documented the process of preparing gesture-based activities, revealed that gestures naturally lent themselves to oral and interactive activities, such as dialogues and guessing games, but less so to activities involving writing. Even though the target vocabulary was always provided in writing (e.g., dialogues, glossaries), practice was mostly oral.

Teacher-generated gesture activities were simple to prepare and implement. In this study, a text or dialogue would be read aloud as a class, and

the teacher would briefly get the students' attention at each target word and have them repeat the word-gesture combination 3–5 times. After the entire text was read, target words would be revisited with the teacher performing a gesture and students supplying the word. For abstract words, the teacher had the time to prepare gestures that were somehow related to the word—for example, using a common Mexican gesture meaning "yes" (raising and curling the index finger) to illustrate *disponible* (available). By planning gestures beforehand, the teacher could also build in elements such as word length and pronunciation. For example, the gesture for *déménager* (to move out; two one-handed strokes as if closing a box, then two strokes pointing thumbs over shoulders) had the same number of movements as syllables, and the gesture for *rez-de-chaussée* (ground floor; three side-to-side strokes with hand palm-downwards, below waist-height) had three movements for four (written) syllables to show how the "e" in *de* is not pronounced. Although the teacher improvised new gestures on the spot if students did not fully understand a word's meaning, he reverted to a single gesture afterwards so that there would be one memorable word-gesture pairing.

Student-generated gesture activities took more careful planning. First, students needed to learn word meanings without any assistance with gestures from the teacher in order to invent their own gestures. L1 translations were not an option given the class's diverse language backgrounds, and students were not proficient enough for French L2 glosses. The teacher therefore opted for images, creating "visual glossaries" for each set of target vocabulary that, although adding to preparation time, provided students with a handy reference. Also, because the teacher could not prompt each individual student to repeat word-gesture combinations, repetition had to be built into the activity. This took the form of a guessing game played with cards in the *directions* lesson, and a pair-teaching task in the *santé* lesson.

The structure and ordering of gesture-based activities evolved over the course of the session. Although the teacher initially ensured that students' first exposure to words occurred alongside gestures, this turned out to be rather restrictive; for example, it precluded beginning a lesson with pair or group discussions, or other activities in which repeating word-gesture combinations seemed out of place. Thus, in the third and fourth gesture-based lessons, students were exposed to part of the target vocabulary through association exercises and discussions before beginning the gesture activities. This did not appear to detract from the students' willingness to pair the words with gestures afterwards. It even seemed helpful for the *déménagement* lesson, which contained a number of difficult, multisyllabic target words, as students could focus purely on pronunciation before adding the gesture component. Finally, it became apparent during the first student-generated gesture activity (*directions*) that the teacher should go over the target words' pronunciation before students started inventing and using word-gesture combinations.

Classroom Observations

The teacher's classroom notes and journal entries, as well as the checklists completed during the gesture-based activities, served to assess how effectively these activities got students to use word-gesture combinations. Students used various strategies to invent gestures for the *directions* and *santé* activities. They would use their hands to act out action words like *marcher* (to walk) and *tousser* (to cough), or facial expressions to act out words relating to body states, such as *fatigué* (tired) and *rhume* (common cold). When the accompanying image suggested a gesture, such as a man pressing his fingers against his temples for *mal de tête* (headache), many students would base their gesture on that image. However, student-generated gestures did not all fit neatly into the "iconic" category used by Macedonia (2013) and other researchers. Notably, when a word did not suggest an obvious iconic gesture, students resorted to creative solutions such as using objects to indicate *près* (near) versus *loin* (far) and *à côté* (next to) versus *en face* (in front of), or different intensities of a facial expression to differentiate *mal de tête* from *migraine*. Students also invented understandable gestures for abstract words in the *santé* lesson (e.g., *stress*, commonly gestured as waving one's hands on either side of one's head with a wide-eyed expression), albeit with more difficulty and uncertainty than in the *directions* lesson.

Gestures also tended to be more natural and varied with context for concrete and gesturable words, and were more constant for abstract words. For example, when students performed the recipe in the *cuisine* lesson, the gestures they produced resembled spontaneous co-speech gestures more than the exact gestures taught to them by the teacher. Students often adapted their gestures to the context, for example using different gestures for *ajouter* (to add) depending on whether the ingredient added was liquid ("pouring" gesture) or solid ("sliding off a plate" gesture), and spontaneously invented gestures for verbs not taught by the teacher. In contrast, the gestures performed by students when reviewing the *déménagement* vocabulary were typically the same ones the teacher had taught them three weeks earlier and were performed much more deliberately (at times theatrically), especially when they involved multiple movements. Thus, gestures varied from fluid to fixed depending on how naturally gesturable the word was.

The teacher's journal relates how students became increasingly comfortable and easier to motivate regarding gestures over the four weeks of gesture-based vocabulary learning. During the first gesture lesson (*cuisine*, teacher-generated), students were receptive to the idea of using gestures, and several students shared positive previous experiences about teachers who had used gestures to practice pronunciation and communication. However, during the learning phase of this lesson, students required lots of encouragement to repeat the word-gesture combinations; all students repeated the word-gesture combination once or twice, but many were more willing to

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repeat gestures than words, continuing to perform the gesture without saying the word. In the final activity, when students presented recipes and were instructed (though not reminded) to use gestures, two thirds produced no gestures at all.

After the initial class, it was easier to motivate students to perform word-gesture combinations. Maintaining a positive, playful environment helped with students' willingness to use gestures in both teacher-fronted and paired gesture activities. Table 1 summarizes the occurrence of words and gestures produced in each lesson as counted by the teacher and assistant during certain activities (indicated underneath the table). These show that in the latter three lessons, students produced good gestures in at least 86% of the given opportunities, compared to good gestures produced 38% of the time in the first lesson (the balance being either omitted or incorrect gestures). Student participation and enjoyment was especially high during the *directions* (student-generated) lesson, where students enjoyed the "guessing game" aspect as well as seeing the differences between their gestures and those of their second partner, and during the *déménagement* (teacher-generated) lesson, where the class was high-energy and every student enthusiastically repeated both gestures and words. The journal entry from the *santé* lesson noted that the students were low-energy for the first part of the class, but their engagement picked up when they started the gesture activity. Nonetheless, when students were teaching each other their gesture-word combinations, they often repeated gestures without saying the corresponding words, even though the teacher reminded them several times to repeat both. This issue was also noted during teacher-generated gesture lessons, with the teacher continually encouraging students to repeat words. No clear distinction is seen in Table 1 between teacher- and student-generated gesture activities; both techniques worked well in certain activities and less well in others. Specifically, the *déménagement* teacher-generated gesture activity worked better than the *cuisine*

Table 1
Summary of Classroom Observation Checklists

Lesson	Correct words used	Good gestures used
Cuisine[a]	34/40 (85%)	15/40 (38%)
Directions[b]	48/53 (91%)	53/53 (100%)
Déménagement[c]	8/8 (100%)	8/8 (100%)
Santé[d]	14/22 (64%)	19/22 (86%)

Note. Numbers are based on the opportunities for gesture-word pairing that were observed in each lesson.
[a]Final practice activity (cooking show); [b]learning activity and practice activity together (card game); [c]learning activity (initial landlord-tenant dialogue); [d]learning activity (patient-doctor dialogues).

activity, and the *directions* student-generated gesture activity worked better than the *santé* activity.

Vocabulary Tests

The students' weekly quizzes and the final vocabulary test were analyzed to compare the different gesture activities in terms of word learning. Figure 1 categorizes the weekly quiz results into words known (recognized) before-hand, words learned between the pretest and the quiz, and words not learned, with results only for students who completed both the relevant pretest and the quiz. Across topics, students did not know between zero and seven words beforehand ($M = 3.6$) and learned up to seven words ($M = 2.2$). There was large individual variation across students for all three categories, and the estimates of the numbers of words learned are likely conservative because the quizzes (requiring word production) tested a higher level of word knowledge than the pretests (requiring word recognition).
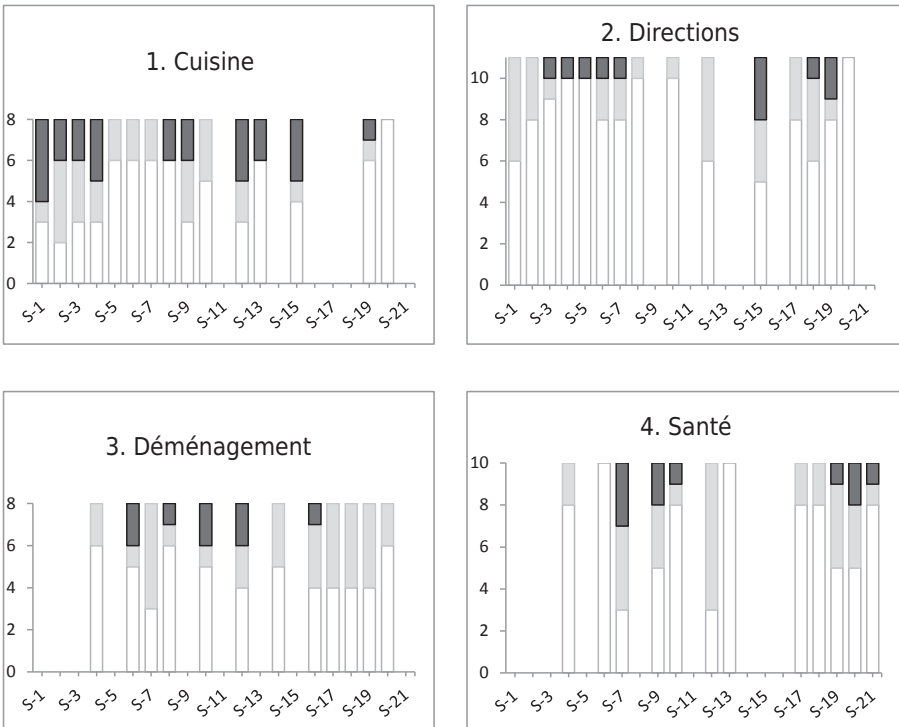

Figure 1. Results of the four weekly vocabulary quizzes. White = number of words already known (based on pretest); light grey = number of words learned through the lesson; dark grey = number of words left unlearned. S = student.

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In all lessons, students learned more than half of words they initially didn't know, although the *cuisine* lesson showed smaller learning gains (students learned 52% of words that were initially not known, versus 74–80% for the other lessons). There was no clear difference in word learning between lessons featuring teacher- and student-generated gestures. Finally, students all scored high on the final vocabulary test (summarized in Table 2), with scores ranging from 2–4 for all topics and little variation between topics or students.

Table 2
Results of the Final Vocabulary Test

Theme	Mean	SD	Sum of words learned[a]
Cuisine (n = 11)	3.85	0.24	39/41 (95%)
Directions (n = 11)	3.76	0.23	31/34 (91%)
Déménagement (n = 8)	3.88	0.20	24/25 (96%)
Santé (n = 9)	3.84	0.36	30/32 (94%)

Note. n = number of students included in the analysis of each vocabulary theme.

[a]The numerator indicates the sum across students of words not known during the pretest and given a score of 3 or 4 on the final vocabulary test. (The denominator indicates the sum of words not known during the pretest.)

Student Perceptions

The questionnaire provided a quantitative description of students' perceptions of the gesture-based vocabulary activities, revealing broad tendencies across students. Descriptive statistics for selected questionnaire items are given in Table 3 (with complete results presented in the Appendix). As shown in Table 3, students believed that gestures had helped them learn vocabulary (M = 4.3), and they enjoyed the activities (M = 4.8). Nearly all said that they would like to continue using gesture-based vocabulary activities (M = 4.8). Also, 35% of students reported preferring teacher-generated gestures (Likert numbers 1–2) compared to 24% for student-generated gestures (numbers 4–5), the remainder (41%) reporting no preference (number 3).

Table 3
Selected Results from the Student Perception Questionnaire (18 Students)

Question	Range	Mean	SD
In general, how well did you learn the new words in the gesture activities? (*1 = not well, 5 = very well*)	3-5	4.3	0.8
How much did you enjoy using gestures in learning activities? (*1 = did not enjoy, 5 = enjoyed very much*)	4-5	4.8	0.4
Would you like to continue using gestures in the classroom to learn vocabulary? (*1 = no, 5 = yes*)	3-5	4.8	0.5

Three broad themes emerged from the transcripts of students' comments, each a constellation of related subthemes. The most frequent comments revolved around the gestures' role in helping memorize the target vocabulary. Many students hinted at the common frustration of memorizing lists of written words:

> It's like in school … when I read a textbook and I have to read all the stuff, I have to memorize all the stuff, but since I'm just reading it and I'm not actually seeing it or I'm not seeing any pictures of it, I just forget about it. A year later, it's gone.

In contrast to these feelings, the majority of students present (9/15) reported feeling that learning words through gestures made memorization more effective and often linked this to repeating the word-gesture combinations themselves. Students described such learning as "sticky," "easy to remember," and "faster." Some students felt that gestures helped them because they matched their visual learning style. Others spoke of the general importance of nonverbal elements in word memorization: "I think it makes you remember them better because you're, like, recalling a memory rather than just a word … it's better, sort of more association." Several students (6/15) reported that when they couldn't think of a word, seeing or thinking of its gesture brought the word to mind: "Automatically, you remember the gesture and the word comes to you, it pops into your head." This is supported by several entries in the teacher's journal relating to how students would perform gestures when recalling words during the quizzes.

However, many students (7/15) felt that gestures were not appropriate for learning all words. There was general agreement that gestures are most apt for clearly gesturable words, such as action verbs and easily depicted nouns and adjectives. Students especially reported difficulty using gestures with the *déménagement* vocabulary, for which many gestures were abstract. Nonetheless, one student reported learning these words and gestures exceptionally well: "Never, never will I forget that this [raises and curls index finger] is *disponible* … [a]nd *rez-de-chaussée* and *électroménager*, this I will never forget." Some students (4/15) highlighted the fact that although the gesture activities used in the course were effective for learning the words for speaking, students did not learn well how to write them. This was felt all the more strongly because the quizzes were written whereas the learning activities had focused on oral interaction. All in all, however, students felt that the gestures helped them form deeper knowledge of the words. In the words of one student, "Once you use the words with body language, you more understanding because you're not understanding by your brain but by your heart too."

The second theme that emerged concerned the differences between teacher- and student-generated gestures. Students were in broad agreement as to the advantages and disadvantages of each. A number of students com-

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pared the learning outcomes, with a slight majority (5 vs. 3) feeling that generating their own gestures led to better learning, as it made them work harder and let them find a gesture that was meaningful to them and hence more memorable:

> The advantage of students inventing it themselves is there is that connection, there's a reason why they come up with that action. If it's the teacher, the teacher might come up with it based on his understanding, like where he comes from, the culture. Like for example the action for *disponible*, that action in Asia it means to die.

Six students felt that using student-generated gestures could lead to problems when students had different gestures for a particular word, and some also reported feeling less adept than the teacher at generating and teaching gestures. Overall, although the same advantages and disadvantages were cited by many students, no general consensus emerged: five preferred teacher-generated gestures better, one preferred student-generated gestures, and six liked both equally.

The final theme in students' comments related to enjoyment and classroom dynamic. Five of the 15 students reported that the gesture-based vocabulary activities changed this dynamic in a positive way, especially when students were tasked with inventing their own gestures. Many also reported enjoying the gesture activities, which in turn helped their learning. Students liked how gesture activities placed an emphasis on vocabulary in the classroom, with one student noting how gestures serve as a framework for direct vocabulary instruction: "The gestures make it activities rather than just learning a list of vocab, so I definitely think I've learned more that I would have [thanks to] the gestures." Finally, a number of students voiced a desire to continue using gestures to learn vocabulary: "In fact I liked it a lot, I believe they should always use [gestures] and not just right now during this experiment."

Discussion

This action research project set out to explore how gestures could be incorporated into classroom vocabulary instruction, what potential effect this would have on learning, and how students perceived the gesture activities. Overall, students' responses to the gesture activities were highly positive, and the activities gave rise to strong student participation and learning.

Designing Gesture-Based Vocabulary Activities

The first research question asked what constraints might be important when designing gesture-based vocabulary activities. The structure of gesture-based lessons evolved over the session, showing how gestures can promote student participation and learning equally well in initial exposure or later practice.

Gestures seem to lend themselves better to oral activities than activities involving writing, thus leading students to acquire good oral knowledge of the words but not necessarily spelling. It would thus be important to complement the gesture activities with writing-focused activities to help students complete their word knowledge.

Teacher- and student-generated gesture activities require different types of planning. Teacher-generated gesture activities can simply involve adding gestures to whatever dialogue, text, or other material is normally used to introduce vocabulary. Although not explored in this study, activities such as guessing games and pair-teaching could also be incorporated into teacher-generated gesture activities. The latter, for example, could be achieved if half the class faced away from the teacher during the demonstration and then had a partner teach them the word-gesture combination. Although gestures can be improvised, teacher-generated gesture activities allow the teacher to prepare gestures in advance and build in extra elements. Teachers could also adapt gestures from any sign language, as many signs are transparent in meaning (see Elix, 2012). In this study, a number of gestures—namely for abstract words—contained clues for word length and pronunciation, where the number of movements equalled the number of syllables pronounced. This raised students' awareness of the silent "e" in French. Such clues could just as easily be incorporated into gestures for concrete words and would be equally relevant to assist with pronunciation in other languages (such as English, for example) by using different hand heights to indicate word stress (e.g., raising and lowering the hand in an upside-down "V" for the word "mountain").

Teachers who wish to give their students an active role in generating gestures will need to plan a way to provide students with word meanings without supplying them with gestures *a priori*. This was accomplished in this project by creating one-page glossaries with an image for each target word, which could be preferable to translations or L2 glosses: images strengthen the nonverbal component of the input, a desirable trait mentioned frequently by the students in this study as well as researchers (Plass et al., 1998). However, the added preparation time does make student-generated gesture activities less accessible to teachers in classes without a shared L1.

Effectiveness of Activities

The second research question asked whether the gesture-based vocabulary activities, as designed, were effective for teaching vocabulary in the classroom and, by extension, how they might be improved. Given the different requirements of the pretests (word recognition), quizzes (word production), and final vocabulary test (word recognition with translation), it was difficult to precisely quantify word learning. A comparison of the pretests and the final vocabulary test (both assessing word recognition) suggested that students learned the meanings of more than 91% of initially unknown words,

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but that their ability to produce word forms, as assessed by the quizzes, was not as high (52–80%). These results are to be taken with caution, however, as each lesson had a low number of eligible participants along with considerable variability in how many words students initially did not know.

The action research design used does allow for a rough quantitative comparison, in terms of student participation and word learning, of the four gesture lessons used, although the lack of a control condition precludes comparing the use of gestures with other methods. In the current study, it appears that both student- and teacher-generated gesture activities were equally effective: Each technique had one particularly good lesson in terms of student participation (*directions* and *déménagement*), and all lessons showed good word learning, especially after the first week. It is safe to assume that the first (*cuisine*) lesson involved less gesture production because it was many students' first time using gestures in the classroom, and showed poorer quiz results because students didn't know what to expect. Two factors stood out from the teacher's notes and observations of the remaining lessons as being especially important for engaging students and getting them to use word-gesture combinations.

First, students repeated the word-gesture combinations multiple times in the *directions* and *déménagement* lessons, but less so in the *santé* lesson. The *directions* activity had repetition built into the task: After generating gestures, students used cards to play a guessing game, performing each gesture or guessing the word up to four times. In the *déménagement* activity, the teacher was able to prompt students to repeat each word-gesture combination several times. However, the peer teaching task in the *santé* lesson did not bring about much repetition—many students repeated the gestures just once or twice, and repeated the words only two thirds of the time. Given that prior research has shown it is best for learners to repeat both words and gestures (Mayer et al., 2015) and that students themselves felt they learned best by repeating word-gesture combinations multiple times, student-generated gesture activities should be designed to ensure sufficient repetition.

The second factor that stood out as helping students use gestures pertained to teaching and learning abstract gestures, specifically in the *déménagement* lesson. For one, the abstract gestures brought a fun and comical dynamic to the class, which may have made the students more attentive and the whole experience more memorable. This explanation was also suggested by Macedonia and Klimesch (2014) for their success with gesture-based instruction in a classroom context (albeit using an artificial language). Because the meanings of most gestures were not transparent, the teacher also explained them, which helped the students understand the gestures and engage more deeply with the words. In retrospect, the peer-teaching activity in the *santé* lesson might have been more effective if students had had to explain their gestures to their partners. Finally, the gestures for the three longest words contained

built-in clues for word length and pronunciation. Thus, explaining the meanings of, and extra clues contained within, the gestures could help students create nonverbal mnemonic "keywords," a proven technique in verbal word learning (Levin, 1981).

Student Perceptions

The final research question focused on how students themselves felt about gesture-based vocabulary learning. The discussion and questionnaire results show that students' responses were highly positive. Students enjoyed the gesture activities and reported that this enjoyment helped them learn. Many students appreciated the focus on vocabulary in general, and one indicated that using gestures in such a way transformed otherwise rote vocabulary practice into interactive activities that increased motivation to learn vocabulary, echoing Huyen and Nga's (2003) findings for vocabulary games. Furthermore, most students felt that pairing new words with gestures helped them remember the words better. In the discussion, words learned with gestures were described, for example, as being more "sticky" and that thinking or seeing the gesture made the word "pop into your head." Although these student perceptions cannot be definitively supported within the current action research design, they lend support to the experimental research cited previously, which showed that words learned with gestures are recalled better, especially in the long term (Macedonia & Klimesch, 2014; Mayer et al., 2015; Tellier, 2008), and are in line with theoretical frameworks that posit learning benefits when perceptual and motor cues are used, such as Dual Coding Theory (Paivio, 1986) and Cognitive Load Theory (Sweller et al., 2011).

On the whole, students felt that gestures were most appropriate for learning vocabulary that is intrinsically gesturable, such as directions and cooking, where true iconic gestures were possible. Students reported having difficulty using gestures for the *déménagement* vocabulary because it does not naturally evoke iconic gestures. This was not evident from the teacher's journal, however, and as discussed previously, this lesson had good student participation and learning. Furthermore, two of the four word-gesture combinations that students reported as being most memorable were from this lesson: *électroménager* (home appliance) and *rez-de-chaussée* (ground floor). The gestures for both words included clues as to the number of syllables, which students reported being useful. This adds a layer to Macedonia and Knösche's (2011) claim that gestures are a valuable tool for learning both abstract and concrete words; it suggests that students themselves find gestures useful for abstract words only if the gestures contain extra clues.

Students were divided as to whether they preferred teacher- or student-generated gestures. Some enjoyed the creative freedom that came with inventing gestures and reported that these gestures were more personally meaningful. Others also reported that they learned the words better when

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they invented gestures themselves. On the other hand, the two most commonly cited reasons for preferring teacher-generated gestures were that (a) all students have a consistent gesture for each word and (b) the teacher is more knowledgeable and thus more adept at generating gestures. These reasons are at odds with the goals of using student-generated gestures, which are to allow students to create personally meaningful gestures and give them a more active role in their learning.

Two factors seem to underlie some students' reluctance to invent gestures. First was the issue of gesture consistency, typically discussed in relation to the quizzes: Students were sometimes unsure which word was targeted when the teacher's gesture for a word did not match the gesture generated for it by students. This could be resolved by leaving gestures out of the evaluation of these words, or by having students generate the gestures together as a class. The latter option could be achieved by all students providing suggestions and perhaps voting on the final gesture, and would also allow the teacher to help with pronunciation. Second, students' preference for teacher-generated gestures might reflect the common view that teachers are "transmitters of knowledge," implying that the teacher's goal of fostering active learning through student-generated gesture activities was not shared by all students, a common dynamic (Garrett & Shortall, 2002). In the future, it may be helpful for teachers to raise the topic of active learning to help students understand the potential benefits, and teachers might need to motivate students, encouraging them to feel comfortable generating their own gestures. Creating a positive and playful learning environment is very helpful here, as well as favouring student-centred activities in general. Thus, although student-generated gestures yield superior results in lab settings (Mathison, in press), external factors affect learning outcomes in real classrooms. As shown in this study, students eagerly participated in both teacher- and student-generated gesture activities and found that both helped support vocabulary learning. It appears reasonable to suggest that a balance between teacher- and student-generated gestures in vocabulary learning tasks is ideal as long as the issues of how this vocabulary is tested and how students perceive active learning are addressed.

Overall, these findings extend previous research on the use of gestures for teaching vocabulary by targeting a real language in a communicative, student-centred environment. In doing so, many of the confounding variables that experimental researchers sought to avoid—learner characteristics, peculiarities of the target language, environmental factors—were embraced as being fundamental characteristics of an authentic context. Many of these characteristics were shown to affect students' participation, engagement, and perception of the gesture activities, thus further building upon prior research by highlighting external factors that come into play in actual classrooms and providing a clearer and more teacher-oriented picture of the pedagogical potential of gestures for teaching vocabulary.

Conclusion

This action research project explored the use of gestures for vocabulary instruction over one brief session (4 weeks) and in only one setting, aiming to describe what forms gesture-based vocabulary instruction can take and assess students' participation and perception of the gesture activities. Results showed that students find both teacher- and student-generated activities helpful for learning vocabulary and that repetition and meaningful student engagement with the gestures are most important for student participation and learning. Teachers working in other contexts will judge for themselves how applicable these findings may be to their situation. Nonetheless, these results suggest that gestures can be used to support vocabulary instruction in various ways and that students find gestures helpful and fun, but that students might need extra practice with writing and to be reminded of the value of active learning techniques. Gestures are particularly useful for teaching vocabulary in settings with limited access to multimedia and technology, as they can be used to provide visual support for a range of vocabulary while being easy to do and free of cost.

Clearly, teachers could modify and adapt the materials and techniques implemented here in a number of creative ways to further enhance their students' learning. Teachers could use teacher-generated gestures whenever explaining a gesturable word, noting these words as they go along and reviewing the words and gestures with the students at the end of class. Similarly, different elements could be built into student-generated gesture activities to make students engage more deeply with the words. For example, students could be tasked with creating gestures that include clues for word length and pronunciation, getting them to actively explore the relationship between spelling and pronunciation. Students could also explain their gestures to a partner and, in so doing, link the target word to a broader semantic field. Finally, it would be interesting to help students—especially visual learners—become more autonomous with gestures by encouraging them to develop gestures on their own for self-study. In the future, it could be beneficial to develop more detailed methods for measuring individual students' participation, engagement, and learning in gesture-based vocabulary activities, and relate these to specific learner characteristics. All in all, it is hoped that this initial foray into the use of gestures in classroom-based vocabulary instruction will inspire other teachers to explore what gesture-based vocabulary instruction might look like in their classrooms.

Note

1   Although the original scale employs a fifth level for words used correctly in a sentence, this is often of little use because students who know the meaning of a word can typically use it in a sentence (Milton, 2009); therefore, the test combined levels 4 and 5.

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Acknowledgements

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Appendix
Student Perception Questionnaire (with Results) and Discussion Questions

Question	Range	Mean	SD
1. Did gesture-based activities seem very different or similar to other language learning activities? *(1 = very similar; 5 = very different)*	1-5	2.6	1.2
2. How well did you understand the teacher's explanations during the gesture-based activities? *(1 = not well; 5 = very well)*	3-5	4.8	0.5
3. How difficult was it to invent gestures for words (for *Directions* and *Santé* topics)? *(1 = difficult; 5 = easy)*	3-5	4.3	0.7
4. How difficult was it to perform the gestures during the activities? *(1 = difficult; 5 = easy)*	2-5	4.7	0.8
5. In general, how well did you learn the new words in the gesture activities? *(1 = not well; 5 = very well)*	3-5	4.3	0.8
6. Compared to using images to learn words, how well did you learn using gestures? *(1 = not well; 5 = very well)*	3-5	4.1	0.8
7. Compared to using verbal explanations (in French) to learn words, how well did you learn using gestures? *(1 = not well; 5 = very well)*	3-5	4.6	0.6
8. Did you prefer when the teacher showed you a gesture for a word, or when the students got to invent the gesture? *(1 = teacher; 5 = students)*	1-5	2.8	1.4
9. How well did you learn the words where you invented the gesture (for *Directions* and your dialogue in today's *Santé* class)? *(1 = not well; 5 = very well)*	1-5	3.9	1.1
10. How well did you learn the words where other students invented the gesture and taught you the gesture (for your second partner's dialogue in today's *Santé* class)? *(1 = not well; 5 = very well)*	3-5	3.9	0.9

11. How much did you enjoy using gestures in learning activities? *(1 = did not enjoy; 5 = enjoyed very much)*	4-5	4.8	0.4
12. Would you like to continue using gestures in the classroom to learn vocabulary? *(1 = no; 5 = yes)*	3-5	4.8	0.5
13. What words were especially good to learn with gestures?			

Discussion questions

1. In general, what did you like about gesture-based activities?

2. In general, what did you not like about gesture-based activities?

3. Did you prefer when the teacher invents the gesture, or when you get to invent it? What are the advantages and disadvantages of each?

4. What vocabulary topics were the best to learn with gestures (*la nourriture, les directions, le déménagement, la santé*)? Why?

5. What vocabulary topics were the worst to learn with gestures (*la nourriture, les directions, le déménagement, la santé*)? Why?

6. Do you think that gestures helped you learn vocabulary? Why or why not?

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