Languaging: University Students Learn the Grammatical Concept of Voice in French

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In this article we explore the process and product of languaging as it concerns the learning of the grammatical concept of voice (active, passive, and middle) in French. We examine and analyze the amount and type of languaging produced by a small sample of university students as they struggle to understand the concept of voice. Students who are high languagers learn about the grammatical concept of voice in French with greater depth of understanding than low languagers. We demonstrate that there is a relationship between the quality and quantity of languaging and performance as measured by immediate and delayed posttest stages. These findings suggest that languaging is a key component in the internalization process of second language grammatical concepts. Implications of our research for pedagogy are briefly considered.

WHEN CONFRONTED WITH A COMPLEX task, we may find ourselves talking aloud or whispering to ourselves, or explaining it to someone else (all are examples of "languaging"). Why? Because as Vygotsky (1987) argued, language is one of the most important mediating tools of the mind. Languaging completes our thoughts/cognition/ideas and transforms them into artifacts that allow for further contemplation, which, in turn, transforms thought. While speaking (or writing), a new or deeper understanding may be achieved (O'Connell, 1988). In this article, we make the case that languaging is an important part of the learning process, as it transforms inner thoughts to external knowing (externalization) and, conversely, it transforms external knowing into internal cognitive activity (internalization). This is the case whether we are learning history, mathematics, or French.

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THEORETICAL FRAMEWORK

Languaging is a form of verbalization used to mediate the solution(s) to complex problems and tasks. It has been defined as "the process of making meaning and shaping knowledge and experience through language" (Swain, 2006, p. 89). It is part of the process of learning. In this article, we explore the process and product of languaging as it has to do with the learning of the grammatical concept of voice (active, passive, and middle) in French. We examine and analyze the amount and type of languaging produced by a small sample of university students as they struggle to understand the concept of voice, making their evolving understanding of the concept explicit through their talk. Suzuki and Swain (2008) reviewed the considerable evidence about the roles of verbalization in learning during various problem-solving tasks (see also Swain, 2007). They examined these roles from the perspective of cognitive psychology, in which verbalization is known as "self-explanation." The self-explanation effect has been studied in

domains such as biology, physics, and mathematics (e.g., Chi, Bassok, Lewis, Reimann, & Glaser, 1989; Chi, de Leeuw, Chiu, & LaVancher, 1994), but not in the domain of second language (L2) learning. Suzuki and Swain also examined the roles of verbalization from the perspective of a sociocultural theory of mind, which also has explored learning in domains such as mathematics (e.g., Talyzina, 1981) and in the domain of L2 learning (see, e.g., Lapkin, Swain, & Knouzi, 2008; Storch, 2002; Swain & Lapkin, 1998, 2002). Of particular interest to the current study is Negueruela's (2003) doctoral research. He focused on the teaching and learning of grammatical concepts to Spanish learners.

Working with 12 university students taking a Spanish as a foreign language class, Negueruela (2003) developed instructional units on three important grammatical concepts (aspect, mood, and tense). His data collection was integrated into regular classroom activities, but he developed his own didactic models and assigned homework consisting of verbalization activities focusing on the target concepts. In developing his models and activities, he respected Gal'perin's (1969, 1992) Systemic Theoretical Instruction (STI) and its three foundational principles: instruction organized around coherent theoretical conceptual units; materialization through didactic models (e.g., charts, diagrams) to help the learners represent the structural, procedural, functional, and content properties of the target concepts; and learner verbalization of concept-based explanation to foster understanding and internalization of the concepts. The data addressing student development in their understanding of the relevant concepts included learners' definitions of the grammatical concepts before and after STI, oral and written spontaneous performance data at the beginning and end of the 16-week course, and students' home recordings, in which they explained (verbalized/languaged) to themselves aloud (on six occasions throughout the course) grammatical concepts aided by diagrams (conceptual artifacts) developed by Negueruela.

Although Negueruela (2003) found that development in these concepts was uneven, his students did perform better at the end of the course in their production (especially written production) of the formal features associated with the target concepts. The learners began to consider the semantic aspects of those concepts after having been exposed to STI. Negueruela concluded that it was the development of conceptual understanding that allowed for the more consistent use of relevant grammatical forms. Conceptual understanding was internalized through verbalization. The internalization of the verbalized conceptual understanding mediates subsequent oral and written communicative performance.

Negueruela's (2003) study did not include a comparison group. However, we can consider that his participants' self-assessments of their understanding of the relevant grammatical concepts, as well as Negueruela's own analysis and assessment, constitute evidence of the impact of the instructional intervention. This also proves to be the case in the study we present here; however, in our case, a pretest/posttest design, in addition to an intervention that focused solely on languaging and only with respect to one grammatical concept, strengthens our claims about learning through languaging.

RESEARCH DESIGN

Research Questions

One major and two related research questions guided the study:

1. Does languaging (verbalization) of the grammatical concept of voice lead intermediate postsecondary students to a deeper understanding of that concept?[1]

The two related questions are as follows:

2. Is there a relationship between the quality of languaging and performance, as measured in the immediate and delayed posttest stages?
3. Is there a relationship between the quantity of languaging and performance, as measured in the immediate and delayed posttest stages?

Participants

We recruited 10 students from a course designed for intermediate learners of French at a major university in southern Ontario. We retained the data of nine students, eliminating the tenth, who required too much assistance from the researcher.[2] The course was designed to emphasize the development of communicative performance; limited classroom observation and consultation with an instructor of the multisectioned course suggested that there was also regular instruction in grammar.

To address the research questions raised earlier, we divided the participants into three groups based on the number of languaging units (LUs) they produced during the languaging stage (see below for study design, procedures, and definition

of LUs), and we compared their performance on tests developed for our study. Heidi and Holly are the highest languagers, Lisa and Lucy are the lowest two languagers, and Mark, Marta, Mike, Marnie, and Michelle are the middle languagers (i.e., the number of LUs they produced fell between that of the two highest and two lowest languagers).[3]

Table 1 lists the pseudonyms of the participants along with their program and language background information. The population of the university is highly diverse, and students taking the intermediate French course come from a variety of program backgrounds in elementary and secondary schools. Table 1 shows that all of the participants are English-dominant and that six of them speak a home language along with English. The two high languagers come from an immersion program background, and all of the other participants (except for Mike) come from a core French background. With relatively few participants, it is impossible to explore the impact of these different language and program backgrounds on their languaging.

Study Design

In this section we present an overview of the study design. The evolution of the design and the rationale for focusing on voice are described in detail in an account of the pilot study that preceded the study presented here (Lapkin et al., 2008). Essentially, our design consists of pretests (to assess the learner's existing knowledge of the grammatical concept of voice), an intervention (in which we examine, in depth, the *process* of learning), and posttests (in which we examine what was learned; i.e., the *product* of the intervention stage). Our methods of capturing process and product as described in this article are unique to this study because the research questions are new in the field of L2 learning.

Even though the research reported here is about learning the grammatical concept of French, the study was conducted in the first, or dominant, language of the participants, English (with the exception of the pretest and posttest). This was a decision we made after conducting pilot work (Lapkin et al., 2008) in which it became clear that the cognitive complexity of what we were asking our students to do would be best accomplished in English—that languaging in French was still a difficult task for them. However, working within a Vygotskyan framework, wherein language is seen not only as communication but as a tool that mediates cognitive activity, we see no contradiction between using English to mediate understanding of a concept that is then applied to the

TABLE 1
Participants, in Order of Performance

Participant Pseudonym	Birthplace	Language Background	Program Background
Heidi	Canada	English monolingual	Mid-immersion from Grades 4–12
Holly	Canada	Speaks Korean and English; English-dominant	French immersion from Grade 5
Mark	Canada	Speaks only English at home; has studied Latin	Core French Grades 4–12
Marta	Czechoslovakia	Speaks mostly Slovak at home; English with friends	Core French Grades 4–9; participated in Katimavik; lived in French bilingual community for 3 months; took French course in Trois-Pistoles
Mike	Canada	Speaks only English at home; has studied Greek	Immersion Grades 1–12
Marnie	Canada	Italian and English spoken at home; considers herself English-dominant	Core French Grades 9–12
Michelle	Pakistan	Speaks only English at home; before coming to Canada, spoke Urdu to her friends	Core French from Grade 7
Lisa	Canada	English and Cantonese spoken at home; considers herself English-dominant	Core French until Grade 10; extended French until end of secondary school
Lucy	Hong Kong; moved to Canada at age 4	Speaks Cantonese, English, and French; considers herself English-dominant	Core French from Grade 1

understanding of how French "works" and its subsequent use. Research suggests that the process of learning complex content can be facilitated by using the first language (L1) as a cognitive tool (see, e.g., Swain & Lapkin, 2000; Turnbull & Dailey-O'Cain, in press). Van Lier (2006) reviewed four productive functions of the L1 in L2 learning, pointing out that "knowledge of the L1 can assist in gaining L2 knowledge" (p. 101). He adopted a Vygotskyan perspective to support the use of the L1 "for cognitive work, crosslinguistic comparison and awareness raising" (p. 107), each of which our participants made use of English to do.

As shown in Table 2, data collection was distributed over two sessions, the first having several stages and lasting about 90 minutes, including a short break. The second, the delayed posttest session, consisted of only one stage and lasted 20 minutes on average. To acquaint the participants with the procedure to be used ("warm-up stage," column 1, Table 2), we developed a short explanation of French determiners. The explanation was presented, sentence by sentence, on cards in a large typeface. The participants read each sentence aloud and then explained it or commented on it aloud, as one might do for oneself. We then gave them a short text with several indefinite, definite, and partitive articles in boldface type, and the participants explained each bolded item aloud.

The pretest stage followed (pretest, column 2, Table 2). The intent of this stage was to assess the students' existing knowledge of the grammatical concept of voice. Students were given a text that they should have been familiar with, as it came from the first unit in their textbook ("Sophie Mercier" text, Part I; Jarausch & Tufts, 2006; see Appendix A). They would have been exposed to this text about 7 months prior to our data collection in their French class. Each participant read through the text, taking as much time as needed. Thirteen verbs in the text were bolded, and each student talked about the text, saying as much as the student could about the form and meaning of each bolded verb.

After the students did this, we asked each participant to define the concept of voice (Conceptual Definition 1, column 2, Table 2). We prompted them by providing five key metalinguistic terms: *active voice*, *passive voice*, *middle voice*, *agent*, and *patient*. The prompts consisted of questions (e.g., "Can you define the concept of voice in French?" "What is your understanding of the concept of voice in French?" "Can you define the term agent/patient?"), intended to assess the participants' prior knowledge of these terms.

The next stage of the study is our "intervention": the languaging stage. During the languaging stage (column 3, Table 2), we presented our explanatory text (Appendix B) on voice, sentence by sentence, or chunk by chunk.[4] The instructions, read aloud by the participants, were as follows:

> The following activity is designed to teach you something about the concept of voice in French. There is research to suggest that explaining grammatical *concepts* rather than focusing on "rules of thumb" leads to a deeper understanding of the grammar of the second language. This process is more effective when learners get a chance to "think aloud" about the concept. So the attached sheets present information about the concept of voice in "chunks," allowing you time to think about each piece of information and explain it out loud.

There were 36 explanatory cards, including two diagrams. Wherever we felt the participant needed prompting, we used content-free prompts (Chi, Siler, Jeong, Yamanouchi, & Hausmann, 2001), such as "Can you explain what you are thinking?" "Could you be a little bit more specific?" "Could you elaborate on what you have just said?". In key places in the explanation, we pushed the participants to apply what they were learning; for example, after languaging about the idea that, in the passive voice, the patient occupies the subject position and is followed by the auxiliary *être* 'to be' conjugated in the same tense as the verb of the active sentence, the research assistant asked, "Can you change sentence 1 into the passive voice?" (see footnotes in Appendix B). There were four planned "pushes" in each languaging session; however, the number and timing of the content-free prompts varied depending on the languaging behavior of the participant and the style of the research assistant. We accept this variation as a natural aspect of the interactions that would take place in any learning context.

The participants were given a break after the languaging stage. From this point forward in the study, our intention was to assess what was learned (i.e., the outcomes of the intervention). The final stage of Session 1 was an immediate posttest stage in which we provided the participants with the pretest text and its bolded verbs (immediate posttest, column 5, Table 2) and asked that they identify the voice of each sentence, explaining the forms used to express the active, passive, or middle

TABLE 2
Study Design

1. Warm-up Stage	2. Pretest Stage	3. Languaging Stage	4. Break	5. Immediate Posttest Stage	6. Interview Stage	7. Delayed Posttest Stage (1 Week Later)
Participants explain aloud a short text containing several bolded determiners	Pretest: Participants talk about the form and meaning of the bolded verbs in the "Sophie Mercier" text, Part I. Conceptual Definition 1: Participants define the concept of voice (using metalinguistic terms we provide).*	Participants engage in languaging activity, card by card (we provide an advance organizer and use content-free prompts as necessary).		Immediate posttest: Participants explain the voice of sentences containing bolded verbs in the "Sophie Mercier" text, Part I (we "push" without providing feedback). Conceptual Definition 2: Participants define the concept of voice (using metalinguistic terms we provide).*	Participants talk about their backgrounds and perceptions of the activities.	Conceptual Definition 3: Participants define the concept of voice (using metalinguistic terms we provide). Delayed posttest: Participants complete a cloze test using the "Sophie Mercier" text, Part II. Stimulated recall: Participants do a stimulated recall on the cloze test.
	50–75 minutes		10 minutes	15–30 minutes		20 minutes
Session 1: The first data collection session lasts about 90 minutes, including the break.						*Session 2*: Scheduled 1 week after Session 1

*The metalinguistic terms are *active voice*, *passive voice*, *middle voice*, *agent*, and *patient*.

voice. Finally, we asked them to try to explain the concept of voice once more (Conceptual Definition 2), and again we prompted them using the five key metalinguistic terms of the explanatory text.

Following the immediate posttest stage, we interviewed each participant (column 6, Table 2), asking about their background with respect to home language, type of program in which they had studied French in the past, and their reactions to the multistage activities they had just completed.

We began the delayed posttest stage (column 7, Table 2), administered approximately 1 week later, by asking the participants to define the concept of voice (Conceptual Definition 3); we provided the five metalinguistic terms if it seemed necessary to do so. The delayed posttest, which followed, consisted of Part II of the "Sophie Mercier" text (Appendix C), taken from the participants' textbook. This time, however, certain verbs were provided in the infinitive form, and students had to fill in 11 blanks, using the verb form required by the voice of the relevant sentence.[5] Finally, we asked the participants to do a stimulated recall (Gass & Mackey, 2000) and tell us what they were thinking as they filled in each blank.

METHODS OF ANALYSIS

Our first analytic goal was to reveal the quantity and quality of languaging that took place during our intervention stage. To achieve this, we first defined and identified LUs. We did this in relationship to the conceptual units the students considered in the explanatory text. Having defined LUs, we identified their quality—that is, what processes were revealed in the LUs (e.g., inferencing, analysis). Our second analytic goal was to reveal the quantity and depth of learning resulting from the intervention stage. This meant counting correct responses to the posttests in a nuanced way (e.g., correct and correct reason for response given [CC] vs. correct with no reasons given [CN]). In the case of the immediate and delayed posttest, the counts were supplemented with counts of the LUs to explain their responses as an indication of the depth of their understanding of the concept. For the conceptual definitions, we counted the number and type (e.g., grammatical, semantic) of conceptual units our participants referred to in their definitions. Our procedures are detailed below.

Units of Analysis

Conceptual units are essential components of our description of the concept of voice; they are information "chunks" that comprised the explanatory text.[6] These 31 key pieces of information are shown in Appendix D, where they are presented in three categories: grammatical, semantic, and mixed. LUs are the cognitively complex on-task talk arising from the explanatory text. Languaging mediates the participants' understanding of the conceptual units, as they reflect aloud on each conceptual unit in turn. The participants' talk/languaging in response to each of the explanatory cards often consisted of more than one LU; we refer to these multiple units as *languaging sequences* (see Figure 1).

Warm-up and Pretest Stages

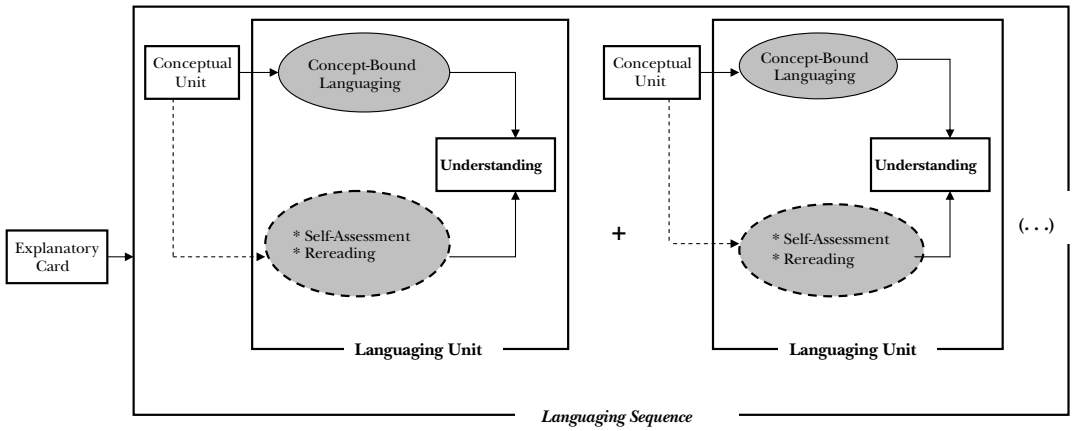
These sections of the transcripts (see columns 1 and 2, Table 2) were not coded. Rather, they were described qualitatively. We examined participants' responses at these stages to assess their prior grammatical knowledge in French. Regarding the pretest answers (explanations of the 13 verb forms highlighted in the "Sophie Mercier" text, part 1), we looked at the sentence features to which each student attended. We were especially interested in seeing whether participants noticed aspects of voice and if and how they explained them in context.

As for Conceptual Definition 1, the first time that students were asked to provide a conceptual definition of voice, we analyzed each participant's answers to determine the extent of his/her prior knowledge about the three voices, the quality of the definitions in terms of comprehensiveness and sophistication, and the participant's ability to articulate his/her understanding by using metalinguistic terms and/or subconcepts.

Languaging Stage

As stated previously, we presented an explanatory text on 36 cards; as shown in Appendix B, each card is numbered in boldface type. From this text, we identified 31 conceptual units, listed in Appendix D. We labeled each unit as "grammatical" in focus, "semantic," or "mixed" (having grammatical and semantic features). We analyzed the participants' languaging sequences in response to the explanatory cards (i.e., the participants' "in-between-cards" talk after they had

FIGURE 1
Coding of the Participants' Talk During the Languaging Stage



Note. A dotted line indicates that the relationship and/or component may or may not be present.

read the text on the card for the first time). We then segmented that talk into LUs. Using *NVivo* (NVivo 1.2, http://www.qsrinternational.com; see Table 3), each sequence could be coded for multiple conceptual (and languaging) units. The languaging directly related to each conceptual unit was further coded into three types of concept-bound languaging:

1. Paraphrasing: The participant repeats a conceptual unit expressed in the card he or she has just read.
2. Inferencing: We identified three types of inferencing.[7] (a) *Integration*: The participant uses information presented in previous cards. The most frequent instance of integration is the participant's use of the metalinguistic terms when attempting to understand the structure of sentences. The main characteristic of these LUs is that they are similar to the original conceptual units on which they draw. In other words, these are paraphrases that occur on one or several cards after the original card. (b) *Elaboration*: The participant does not only show evidence of retaining the information presented previously but also appropriates the information either by incorporating it into prior knowledge (trying to fit the new information into her language system) or by incorporating several pieces of information of the explanatory text. Unlike integration LUs, these LUs go beyond what is stated in the cards (e.g., comparing/contrasting two conceptual units). (c) *Hypothesis formation*: The participant forms a hypothesis based on what he or she has already learned or understood.
3. Analyzing: The participant applied new knowledge to a specific sentence/example, including the analysis of a sentence in terms of agent/patient/subject/object.[8]

We identified two languaging types that, although not directly related to any specific conceptual unit, also helped the students in their evolving understanding of the concept of voice. These two languaging types are explained below:

1. Self-assessment: The participant monitored his/her understanding (e.g., "I don't understand this part" "This is not clear" "I'm not sure what this means.").
2. Rereading: The participant reread part or all of a card.

Table 3 illustrates how we coded two languaging sequences. Appendix E presents all the codes used with examples from the project data.

To establish intercoder agreement, a second coder coded 10% of the languaging sequences independently and then met with the principal coder. We kept a tally of the total number of coding decisions, noting those decisions on which there was agreement. To agree, both the conceptual unit and languaging type (i.e., paraphrase, inference, analysis, self-assessment, rereading) had to match. Out of a total of 80 coding decisions, there was agreement in 72 of the cases, for an intercoder agreement rate of 90%.

TABLE 3
Sample Coding of Two Languaging Sequences

Languaging Sequences and Units	Coding
"The noun *la balle* [ball] is the grammatical object; its semantic role is that of patient, the 'undergoer' of the action of throwing." . . . Okay so . . . [silence <6>] Okay uh, so we at first described that //we have someone . . . that is doing, is about to do something// and now we're saying that they're going to perform this action by using the, which is, uh, by using //this object the ball uh and they are re-, the ball is referred to therefore as the undergoer//. Okay. (Marta)	Conceptual unit [S4]: first reading (not coded) [S3] Inference/Elaboration [S4] Paraphrase

"Another way of expressing a passive-like meaning without using the type of structure illustrated in Diagram A is through what is known as the middle voice." //Okay so uh, I don't take much from this card. I just take that I'm going to learn about the middle voice now. It's ba- it's not teaching me anything. It's not showing me like uh, it's not, it's not showing me anything, it's not saying, it's not referring to an example or explaining what the middle voice is but I guess it just tells me to get out of the mind frame of the passive voice now because we're moving on// because it's saying
//"Another way of expressing a passive-**like** meaning without using the type of structure illustrated in Diagram A is through what is known as the middle voice.//" So I suppose I take, well,
//I get the sense that the middle voice will be similar to the passive voice?//
//So you might assume that the patient will take on the role of the direct object [*sic*, should be subject] in the middle voice as well because that's similar to what the passive voice does?// (Heidi)
	Conceptual unit [S18]: first reading (not coded)
	Self-assessment
	Rereading
	[S18] Paraphrase
	[M9] Inference/hypothesis

Note. Each segment within //constitutes one languaging unit. [words] = commentary; . . . = pause shorter than 5 seconds; hyphen = incomplete utterance; "words" = utterance read from a text; **words** = emphasis; *words* = French; words = overlapped speech.

Tests

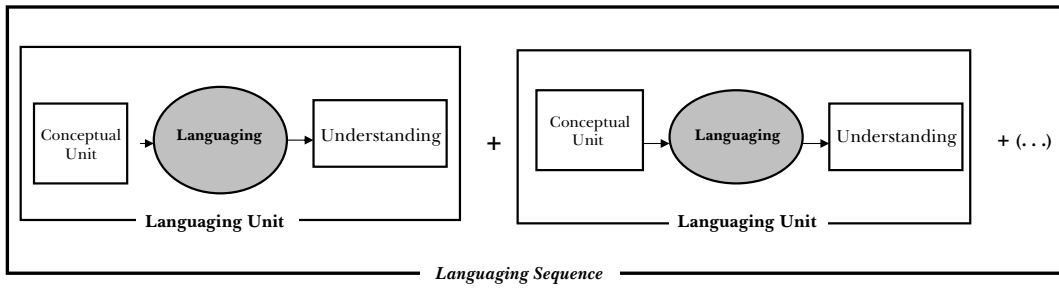
Coding and Scoring of the Immediate Posttest and the Stimulated Recall. The basic unit of analysis was student talk in response to each test item. We characterized this talk in terms of languaging sequences; each languaging sequence is made up of a series of LUs. (See Figure 2.) We counted the number of conceptual units that participants referred to in justifying their answers as they languaged in response to each test item. Participants' talk referring to a conceptual unit was considered an LU, in that the participants were producing cognitively complex on-task talk as they thought of the answer to each test item. These LUs were not coded for type of languaging.

For each test answer, we assigned a total score that reflected the accuracy of the answer (i.e., whether the participant identified the voice of the test item sentence correctly or not) and the complexity of the explanation (number of LUs) that was used to justify the answer. We used four codes and calculated the total test scores as follows (see Table 4 for examples of each code):

1. Correct answer with no explanation (CN): assigned to test answers in which the participant correctly identified the voice of a sentence but did not explain why and/or did not identify the sentence constituents. CN answers were assigned 2 points.

2. Correct answer with a correct explanation (CC): assigned when the participant correctly identified the voice of a given sentence and justified the answer by drawing on relevant conceptual units from the explanatory text. To distinguish between participants who gave minimal justifications and those who provided an elaborate analysis of the sentences, we counted the number of LUs used in each explanation. Thus, CC answers were given 2 points for the correct identification of the voice plus 1 extra point for each LU used in the explanation. For instance, a correct test answer that includes three LUs was given a score

FIGURE 2
Coding of Participants' Talk in the Immediate Posttest and the Stimulated Recall



of 5, whereas a correct answer with five LUs was assigned a score of 7.

3. Correct answer with a wrong explanation (CW): assigned when participants identified the correct voice of a sentence but provided explanations that showed a misunderstanding of the relations between agent/subject and patient/object and the overall organization of the sentence. CW answers were assigned 1 point.

4. Wrong answers (W): assigned when the participant failed to identify the voice of a sentence. These answers were coded as wrong and assigned no points.[9]

Scoring of the Delayed Posttest. To score the written responses of the delayed posttest (Appendix C), we assigned 1 point to each correct answer, ignoring spelling mistakes and minor inflectional errors.

TABLE 4
Test Answer Codes With Examples From the Data

CN Correct Answer Without Explanation

And then you have *Je ne me suis pas encore présentée* 'I have not yet introduced myself.' And that is still active sentence because you're talking about yourself and you have the *me suis* (reflexive form of *être* 'to be' used with first person singular). (Lucy, immediate posttest)

CC Correct Answer With a Correct Explanation

Okay uh . . . *Rien n'a changé, ni les visages, ni ma chambre aux bibelots épou- époussetés avec soin pendant mon absence, ni la voisine qui passe l'aspirateur à deux heures du matin* 'Nothing has changed, not the faces, not the room with its trinkets dusted with care during my absence, nor the neighbor who vacuums at 2:00 in the morning.' Uh I put that as active voice. Uh, the a-, and I put it in the present. The agent is *la voisine qui passe* 'the neighbor who vacuums' And the patient is *l'aspirateur* 'the vacuum.' (Marnie, stimulated recall)

CW Correct Answer With an Incorrect Explanation

Uh, *Le jour de la rentrée scolaire s'annonce* 'The first day of school dawns,' uh, *chargé avec de nombreuses conférences de présentation de l'université* 'full of numerous lectures about the university.' Okay . . . So . . . just start off with the easy, it's first person singular, uh, present tense. I don't believe it's active . . . [silence <6>] I guess, I believe it is middle . . . Yeah, because it would be . . . the day on which et cetera, et cetera is, in translation it's announcing itself, even. So, somebody is not announcing about this, and it's *le jour* which is the subject of the verb itself. And so it's, it has *se annoncer* as the verb. Uh, so there was reflexive, intrinsically verbs and, oh, I can't remember the third one that was used for it, uhh. . .

Researcher: Reciprocal.

Mike: Reciprocal, right. So I guess that this one would be a reciprocal verb I think. Might be reflexive. I'm sorry, I'm so terrible. Uh the middle voice.

(Mike, immediate posttest)

Wrong Wrong Answer

Uh *Les professeurs se succèdent sur l'estrade de l'amphithéâtre* 'The professors follow each other onto the stage of the amphitheatre' and uh . . . . . that I think that's the middle voice. And then it's talking about *les professeurs* and, which is the . . . uh patient? . . . And then it's a pronominal verb and then uh . . . [silence <8>] Uh . . . *sur l'estrade de* [whispers to self] I don't, I think the agents . . . both are missing? I'm not sure. Or it might be *sur l'estrade de l'amphithéâtre* but uh (Lisa, immediate posttest)

Note. Translations are provided here for the reader. They were not actually spoken by study participants at the time.

Correlational Analyses. We conducted correlational analyses to explore the magnitude of the relationship between LUs and total scores on the immediate posttest, stimulated recall, and the number of correct items on the written delayed posttest. Because our data set is small, with ties, we used nonparametric Kendall's tau for our analyses (Field, 2005). As our theoretical framework claims that languaging is the source of learning, we have used one-tailed tests of significance.

Conceptual Definitions 2 and 3. For the conceptual definitions provided by the participants at the end of Session 1 (column 5, Table 2) and the beginning of Session 2 (column 7, Table 2), we coded the participants' responses in terms of the number and type (grammatical, semantic, and/or mixed) of conceptual units to which they referred.

FINDINGS

Students' Prior Grammatical Knowledge: The Pretest and Conceptual Definition 1

We examined the students' answers in the pretest stage to determine the level of their grammatical knowledge, how familiar they were with the concept of voice, and whether they would be able to identify the voice of the sentences in the "Sophie Mercier" text, Part I. In the pretest, most students focused on the tense, gender agreement, and verb endings; some of them recited the agreement rules they knew by heart. However, none of them seemed to have a consistent or systematic approach to the task at hand. They focused on the verb without much attention to the meaning of the sentence or the nuances of meaning expressed by the different voices. The closest thing to attention to meaning came in the form of attempts at translation, mostly word-level translations:

EXCERPT 1

> And . . . *me* is uh the reflective, it's a pronoun uh, prono- personal pronoun uh reflective I guess. And *suis* is part of uh *être* uh the first because it corresponds with *je* and it's also present, indicative form. And *ne pas* is the . . . I think *ne pas encore* would be not again, I guess. And that's negative. And *présentée* is part of present . . . oh sorry, *suis* and *présentée* it corresponds because uh that is the past tense, the *passé composé* and *présentée* has an extra 'e' so I'm assuming the person talking is a girl, yeah feminine. (Lisa, pretest, Item 2, turn 102)

The results of a qualitative analysis of students' first conceptual definition of voice, which was elicited before the intervention, showed that most participants were not familiar with the concept of voice, did not know the metalinguistic terms, and/or simply could not articulate the little understanding they had of the concepts. Consequently, there was nothing to code. Marta, for instance, was unable to define any of the five metalinguistic terms. Lisa, Lucy, Heidi, Holly, Mike, and Marnie said they never heard of the terms *agent*, *patient*, and *middle voice* but tried to define *active* and *passive*. Their definitions were wrong, confused, or incomplete at best. Lisa gave sentences in the present progressive and simple past to illustrate the active and passive respectively, and Marnie illustrated the active with a present tense sentence and the passive with a past tense sentence. Lucy could not define or illustrate the passive but said that the active is used to "talk about something explicitly or directly." Michelle said that "active is you're involved. Passive is sort of . . . uh, you're not doing the action yourself," and she gave the sentence "I'm running" to illustrate the active and "he saw that I had run" to illustrate the passive.

Other participants also seemed to have an incomplete understanding of the concept of voice. Heidi, for instance, gave the following conceptual definition:

EXCERPT 2[10]

> Okay so uh the active voice is when I think, when it's directly relating to what you're doing and the passive voice is when it's uh indirect? [. . .] Like for example say active would be like, I uh, I go to, I, [. . .] when you don't use inversion or anything, when it's [. . .] when you don't invert anything, when it's very direct like uh, I go to the store but then or no . . . John would say something like, John goes to the store and then if it was passive, it would be something like, the store is where John went to because you're making it so it's not direct, he's not directly going there. The focus isn't on the, the sub-, directly on the subject anymore. (Heidi, Conceptual Definition 1, turn 64)

The definitions provided by Mark and Mike were the best in the group. Mark gave accurate examples of active and passive sentences and explained the structural modifications (inserting *être* and agreement of the past participle) that take place when an active sentence is changed into passive. He was also able to define agent and patient:

EXCERPT 3

> Such as picking up the pen, or I'm picking up the pen. I'm the agent, because, because I'm the one actually doing the action and the pen would be the patient

> because it's the one who the action is being performed upon. (Mark, Conceptual Definition 1, turn 94)

Mike seemed to have a fairly good understanding of the difference between passive and active even though he could not articulate it very well:

EXCERPT 4

> So like active would be like uh, like uh *je marche*, like I am walking. And passive would uh, describe more something that was done to you, in a tense, I probably couldn't give an example [says quietly] like uh . . . *la forme passive* yeah, *la forme passive* is a tense in itself, I think [says quietly to self]. Yeah so passive would just be more, if, something is being done to you as opposed to you're doing the action itself. (Mike, Conceptual Definition 1, turn 144)

He also drew on his knowledge of Greek to define the middle voice:

EXCERPT 5

> In Greek, it's when something I believe is active in form but passive in meaning. I believe that's what it is. (Mike, Conceptual Definition 1, turn 157)

It is important to note that the participants' prior knowledge was not predictive of their subsequent performance at the languaging and test stages. Heidi, who started with an incomplete understanding of the concepts, was one of the high languagers and best performers in the immediate and delayed posttest stages, whereas Mark and Mike, who provided the best conceptual definitions at the pretest stage, were among the middle languagers and middle achievers on the tests. Our low languagers' (Lisa and Lucy) first conceptual definitions were comparable in length and content to those provided by the rest of the participants. These patterns exclude prior knowledge as a possible explanation for the differential behavior and performances of the participants in the languaging and test stages.

Languaging Stage: Quantity and Quality of Languaging Units

The participants differed considerably in terms of the number and type of languaging units they produced during the languaging stage. Based on the number of languaging units, we were able to distinguish three distinct groups of participants. Heidi and Holly were the highest languagers, producing 135 and 116 LUs, respectively (125.5 LUs on average). Lisa and Lucy were unquestionably the lowest languagers, producing 37 and 42 LUs, respectively (39.5 LUs on average), whereas the other five participants, the middle languagers (Mark, Marta, Mike, Marnie, and Michelle), produced between 70 and 80 LUs (76.8 LUs on average; see Figure 3).

Figure 4 presents the average number of LUs according to types. For all types of LUs, the high languagers produced a considerably higher number than the low languagers; for example, in the category of Analysis, Heidi and Holly produced an average of 31 such units, about three times Lisa and Lucy's average of 11.5. However, for the middle languagers, the results were more mixed and inconsistent. In two categories, Analysis and Rereading, they had similar averages to the high languagers, whereas in the categories of Inference and Self-Assessment, their averages were close to those of the low languagers. The only category in which the middle languagers had an average that was close to the midpoint was in the Paraphrase category, in which they had an average of 20.2 LUs, falling between the average of 25 for the high languagers and the average of 12 for the low languagers.

Figure 5 presents the distribution of LUs as a percentage of total LUs produced, according to type, by each of the three languaging groups. For the high languagers, Heidi and Holly, the Paraphrase, Inference, Analysis, and Self-Assessment categories ranged between 19.2% and 24.7% of the total LUs. Rereading was less frequent, accounting for only 8.4% of the LUs. Unlike that of the high languagers, the distribution of LU types for the middle languagers was uneven. Analysis-related LUs were the most frequent, accounting for 38% of the total, whereas Paraphrase and Inference were 26.3% and 17.4%, respectively. Whereas for the high languagers 22.3% of their LUs were of the Self-Assessment type, the middle languagers self-assessed only in 6.3% of their languaging. Most of the LUs for Lisa and Lucy, the low languagers, fell into three categories: 30.4% were of the Paraphrase type, whereas the Inference and Analysis categories each comprised 29.1% of the total. The low languagers had a higher percentage of Self-Assessment LUs (10.1%) than the middle languagers and a much lower percentage of Rereading LUs than either of the two other groups.

In previous self-explanation studies (e.g., Chi, 2000; Chi et al., 1989, 1994), inferencing had been shown to be an important category in relation to performance. Thus, to tease out possible differences among high, middle, and low languagers, we subcategorized the Inference category into three types: integration, elaboration,

FIGURE 3
Average Number of LUs for the High, Middle, and Low Languagers

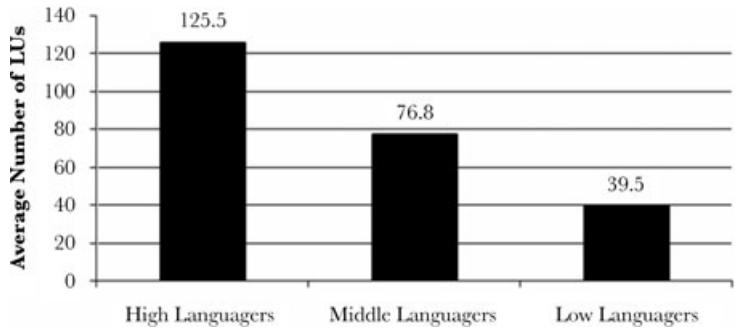


FIGURE 4
Average Number of LUs by Type for the High, Middle, and Low Languagers

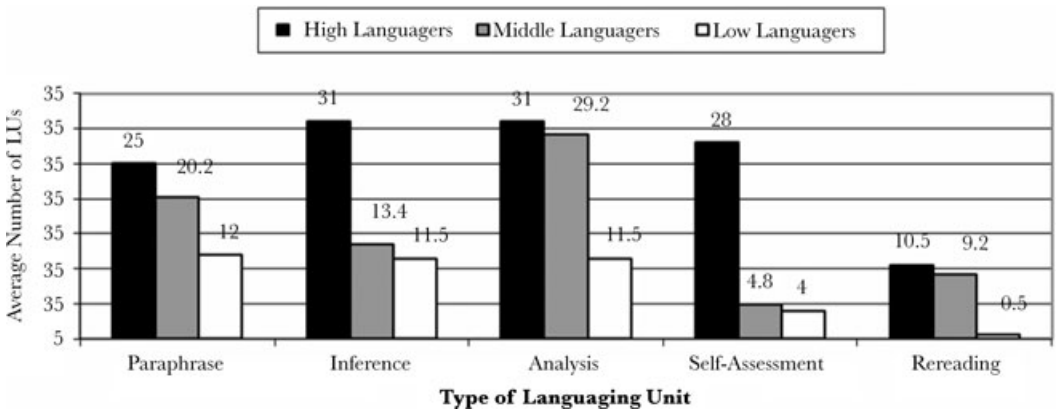
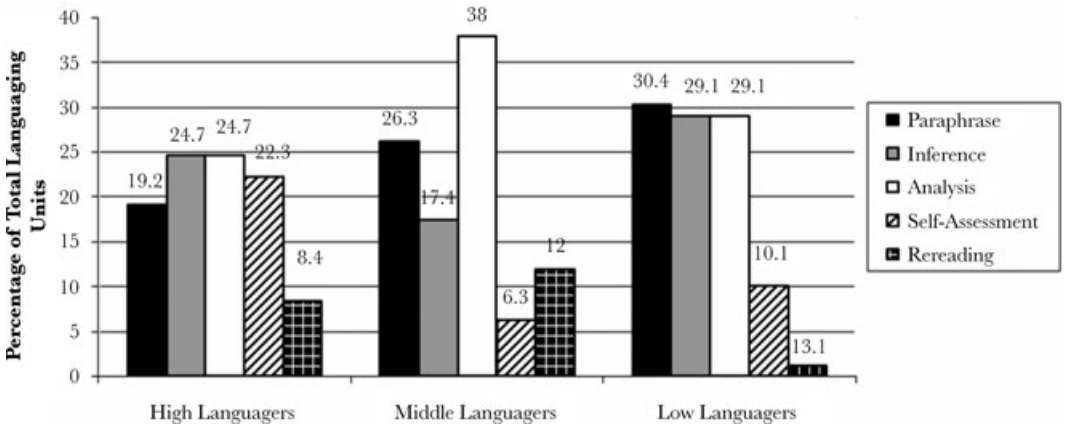


FIGURE 5
Percentage of LUs by Type for the High, Middle, and Low Languagers



and hypothesis formation (see Figure 6). The distributions of the types of inferencing of the high and middle languagers were similar. The pattern of distribution for the low languagers differed, in that Lisa and Lucy, like the middle and high languagers, also favored the integration type but had limited instances of elaboration and a somewhat higher percentage of hypothesis formation than the other two groups. Furthermore, it should be noted that only Lucy had any instances of elaboration or hypothesis formation; all of Lisa's inferences were of the integration type.

Tests

Immediate Posttest. The students talked about the bolded items in the "Sophie Mercier," Part I text after having languaged their way through our explanatory text. As shown in Table 5, there was only about a 1-point difference between the high and middle languagers and between the middle and low languagers with respect to correct identification (column 3). However, the LUs produced by the high, middle, and low languagers were qualitatively different (column 4). Furthermore, the number of LUs produced by the three groups (column 6)—another measure of quality—was also different: Heidi and Holly produced an average of 31.5 LUs as they identified the voice of sentences containing bolded verbs; Mark, Marta, Mike, Marnie, and Michelle produced an average of 23.2; Lisa and Lucy's average was 16.5. The total scores take account of these qualitative and quantitative differences. As shown in the last column of Table 5, the average total score is 56.5 for the high languagers, 44.8 for the middle languagers, and 36.5 for the low languagers.[11]

Delayed Posttest and Stimulated Recall. In Table 6 we present an overview of the delayed posttest and stimulated recall results. As in the case of the results from the immediate posttest, the results for the delayed posttest and stimulated recall suggest that there is a connection between the number of LUs produced during the languaging stage and test performance. On the delayed posttest and subsequent stimulated recall (in which the participants first had to write the correct form of a verb provided in the infinitive form and then justify their answers), Heidi and Holly wrote the correct form for an average of 8.5 out of 11 test items, the middle languagers had an average of 8 items correct, and the low languagers, Lisa and Lucy, filled in an average of 5.5 forms correctly (column 2, Table 6). However, when the participants were asked to orally identify the voice they used to complete each of the 11 test sentences, Heidi and Holly averaged 8 correct answers; the performance of the middle languagers ranged from 2 to 9 correct responses, with an average of 5.4; and Lisa and Lucy averaged 3. Overall, in the written part of the test, five of the nine students were able to produce correct forms which they subsequently could not label correctly as passive, middle, or active. These students were spread across the three groups.

In addition to the differences in the number of correct responses, the depth and quality of the explanations differed considerably, as evidenced by the number of conceptual units participants drew

FIGURE 6
Distribution of the Inference LUs for the High, Middle, and Low Languagers

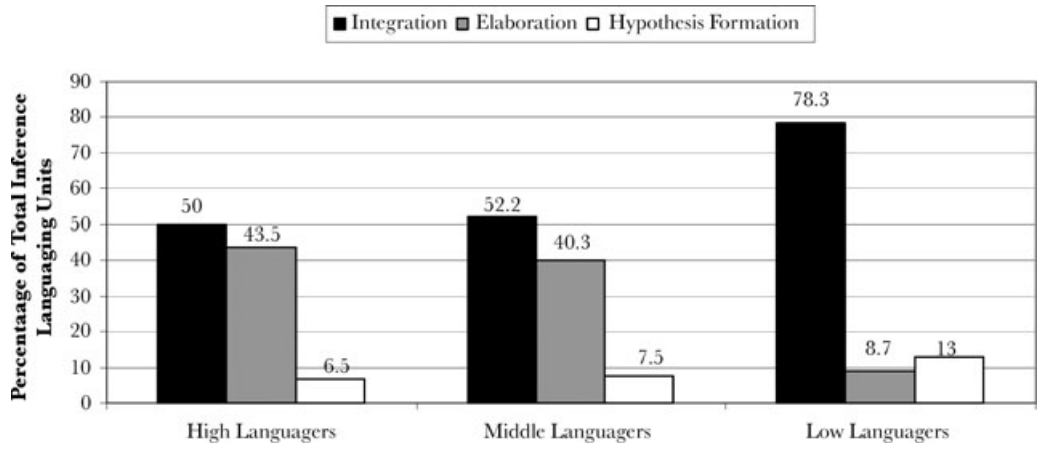


TABLE 5
Immediate Posttest Results

Participants	Number of Languaging Units During Languaging Stage	Immediate Posttest, 13 Test Items: Correct Identification of Voice: Number Correct[a]	Calculation of Code Points	Code Points	Number of LUs Used to Justify Responses	Total Score[b]
Heidi	135	13	(13 CC)	26	29	55
Holly	116	12	(12 CC + 1 W)	24	34	58
Average of High Languagers	125.5	12.5			31.5	56.5
Mark	80	12	(11 CC + 1 CW + 1 W)	23	28	51
Marta	80	10	(10 CC + 3 W)	20	24	44
Mike	77	12	(11 CC + 1 CN + 1 W)	24	26	50
Marnie	77	11	(11 CC + 2 W)	22	31	53
Michelle	70	11	(3 CC + 5 CN + 3 CW + 2 W)	19	7	26
Average of Middle Languagers	76.8	11.2			23.2	44.8
Lisa	37	10	(10 CC + 3 W)	20	21	41
Lucy	42	10	(7 CC + 3 CN +3 W)	20	12	32
Average of Low Languagers	39.5	10			16.5	36.5

Note. CC = correct and correct reason for response given; CN = correct with no reasons given; CW = correct answer with a wrong explanation; W = wrong answer.
[a]This number is based on the ability to identify the voice of the sentences containing each bolded verb.
[b]"Total score" = "Code points" + "Number of languaging units used to justify responses." Refer to the Methods of Analysis section in the text for an explanation of the scoring system.

on to explain their written responses in the stimulated recall (see Table 6). The high languagers, Heidi and Holly, produced an average of 14.5 LUs during the stimulated recall. The middle languagers had an average of 6.6 LUs, and the low languagers had an average of 3.

The scores presented in the last column of Table 6 reflect marked differences among the high, middle, and low languagers, who had average scores of 30.5, 17.4, and 9 respectively. However, two of the middle languagers (Marnie and Michelle) obtained anomalously low scores of 6 each. Although Marnie and Michelle were in the middle group based on the number of LUs they produced in the languaging stage, their ability to name correctly the voice of the sentences during the stimulated recall (2 correct for both students) contrasted with their high performance in producing the correct written forms in the delayed posttest (11 and 9, respectively). A detailed analysis of Marnie and Michelle's performance is the topic of a separate article (Brooks, Swain, Lapkin, & Knouzi, 2008). In essence, in that article, we suggested that Marnie and Michelle are transitioning between scientific and everyday conceptual development in a manner that is more marked than that experienced by the other students.

Correlational Analyses. As shown in Table 7, the correlations between the number of LUs and the immediate posttest total score ($\tau = .572$) and the total score on the stimulated recall ($\tau = .529$) are significant at the $p < .05$ level. The correlation between the immediate posttest total score and the stimulated recall total score ($\tau = .514$, $p < .05$) is also significant.

Conceptual Definitions 2 and 3. The conceptual definitions that the participants provided at the end of the first session (Conceptual Definition 2) and the beginning of the second data collection session (Conceptual Definition 3) were coded in terms of the total number of conceptual units included in their definitions, as well as the proportion of grammatical, semantic, and mixed-focus units that the participants recalled. Holly and Mark were the only two participants who recalled more conceptual units in Conceptual Definition 3 than in Conceptual Definition 2; most participants referred to more conceptual units in the earlier posttest. It is to be noted, however, that

TABLE 6
Delayed Posttest and Stimulated Recall Results

	Delayed Posttest and Stimulated Recall (11 Items)					
	Delayed Posttest (Written)	Stimulated Recall (Oral)				
Participants	Number of Correct Written Items[a]	Number of Correct Oral Items[b]	Calculation of Code Points	Code Points	Number of LUs Used to Justify Answers	Total Score[c]
Heidi	9	10	(10 CC + 1 W)	20	14	34
Holly	8	6	(6 CC + 5 W)	12	15	27
Average of High Languagers	8.5	8			14.5	30.5
Mark	7	8	(6 CC + 2 CN + 3 W)	16	9	25
Marta	5	6	(6 CC + 5 W)	12	10	22
Mike	8	9	(7 CC + 2 CN + 2 W)	18	10	28
Marnie	11	2	(2 CC + 9 W)	4	2	6
Michelle	9	2	(2 CC + 9 W)	4	2	6
Average of Middle Languagers	8	5.4			6.6	17.4
Lisa	5	3	(2 CC + 1 CN + 8 W)	6	3	9
Lucy	6	3	(2 CC + 1 CN + 8 W)	6	3	9
Average of Low Languagers	5.5	3			3	9

Note. CC = correct and correct reason for response given; CN = correct with no reasons given; CW = correct answer with a wrong explanation; W = wrong answer.
[a]This number is based on the ability to write the correct form of the verb required by the voice of each sentence. One point was given for each correct response.
[b]This may or may not be identical to the number of correct forms produced in the written delayed posttest.
[c]"Total score" = "Code points" + "Number of languaging units to justify answers" (correct responses received 2 points each as they were all either CC or CN). Please refer to the Methods of Analysis section for a more detailed explanation of the scoring system.

TABLE 7
Correlations Among Performance Measures

	Languaging Units (No.)	Immediate Posttest (Total Score)	Delayed Posttest (No. Correct)	Stimulated Recall (Total Score)
Languaging Units (No.)	1.000			
Immediate Posttest (Total Score)	.572*	1.000		
Delayed Posttest (No. Correct)	.269	.261	1.000	
Stimulated Recall (Total Score)	.529*	.514*	.090	1.000

Note. Kendall's tau, $N = 9$
*Correlation is significant at $p < .05$ (one-tailed).

the average loss between Conceptual Definition 2 and Conceptual Definition 3 is about one unit ($M = 8.33$ vs. 7.22) for all the participants, with the exception of Lisa, who could not define any of the metalinguistic terms in Conceptual Definition 3. Table 8 shows the differences in the performance of the high, middle, and low languagers. Heidi and Holly, the high languagers, gave the most elaborate conceptual definitions; for example, in Conceptual Definition 2, Heidi provided an extended definition in which she used both grammatical and semantic terms to define the three concepts (see Excerpt 6). She highlighted both the structural and semantic differences and similarities between the passive and middle voices, which seemed to indicate that she saw them as related concepts that serve specific rhetorical functions, not as two separate concepts.

TABLE 8
Number of Conceptual Units in the Conceptual Definitions

	Number of Conceptual Units in Conceptual Definition 2	Number of Conceptual Units in Conceptual Definition 3	Total Conceptual Units in Conceptual Definitions
Heidi	16	14	30
Holly	12	15	27
Average of High Languagers	14	14.5	28.5
Mark	8	11	19
Marta	8	6	14
Mike	6	4	10
Marnie	7	4	11
Michelle	7	5	12
Average of Middle Languagers	7.2	6	13.2
Lisa	7	0	7
Lucy	7	7	14
Average of Low Languagers	7	3.5	10.5

EXCERPT 6

> Uh active voice is what I just said, . . . it'll be like we said the . . . the, the patient is directly, the emphasis is on the agent [. . .] In the active voice, the emphasis is on the agent doing something to the patient, it's the baseball player throws the ball. The emphasis is on the baseball player [. . .] Passive voice is when you ma-, you, you make the . . . uh patient become the agent to put the emphasis on the patient like the ball was thrown by the baseball player and you also have to change uh the verb so you add the auxiliary *être*, *été* and then you put the verb into the past participle [. . .] Uh the middle voice is when there's, the agent is entirely eliminated, unlike in the passive voice where it's optional. It also uses . . . I'm, I don't really know what it's, I don't know what it's called but the pronominal verb as long as it isn't uh reflexive uh intrinsical [*sic*] or the other one which unfortunately even though I just read it, I forgot, which relates to the each, each other. At least I know that. And that is the one that's more typically used in French and it, are direct statements where the patient, where, what's happening to the, the pa-, the emphasis is still on the patient similar to the passive voice. It's a passive-like voice. (Heidi, Conceptual Definition 2, turns 237–262)

In Conceptual Definition 3, Holly also used the metalinguistic terms to define the concepts and integrated the grammatical and semantic aspects of each concept. The low languagers, however, gave less elaborate definitions. Lisa focused only on the fact that both passive and middle voices involve moving the patient to the subject position and made no attempt to relate the two voices. The middle languagers performed more similarly to the low languagers than to the high languagers in both Conceptual Definitions 2 and 3.

In terms of conceptual unit type, Figures 7 and 8 show that all the participants attended more to the semantic units than to the grammatical units in both Conceptual Definition 2 and Conceptual Definition 3. This represents an important development given that none of the students focused on the semantic aspect of voice in the pretest stage. Both the middle and low languagers made less use of grammatical units in Conceptual Definition 3; the low languagers used none.

DISCUSSION

A review of the findings from our data set yields preliminary responses to our research questions concerning the relationship between the quantity and quality of languaging about an L2 grammatical concept and learners' understanding and use of it.

First, our findings indicate that all students learned something about the concept of voice. They started from limited or no knowledge of the concept of voice in French, and following the intervention, their knowledge of it and ability to apply it had improved. Second, when we contrast the high and low languagers, the findings demonstrate a more accurate and a greater depth of understanding of the concept of voice among the high languagers. Among the middle languagers, there are some anomalous results that are explored in Brooks et al. (2008). However, the overall pattern suggests that there is a positive relationship between the quantity of students' languaging and their ability to correctly identify the voice of a sentence and provide reasons for their identification. Third, this relationship is convincingly

FIGURE 7
Percentage of Grammatical, Semantic, and Mixed Conceptual Units Used by High, Middle, and Low Languagers in Conceptual Definition 2

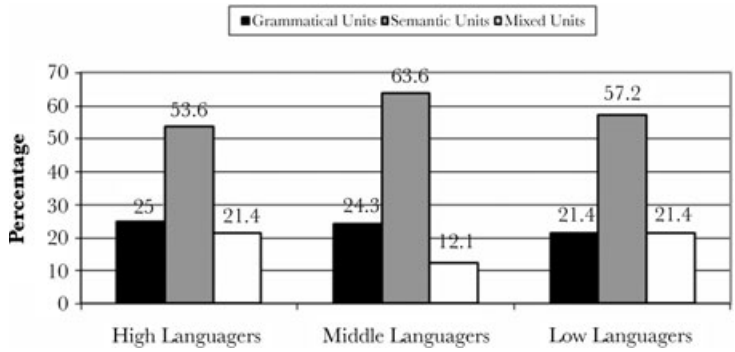
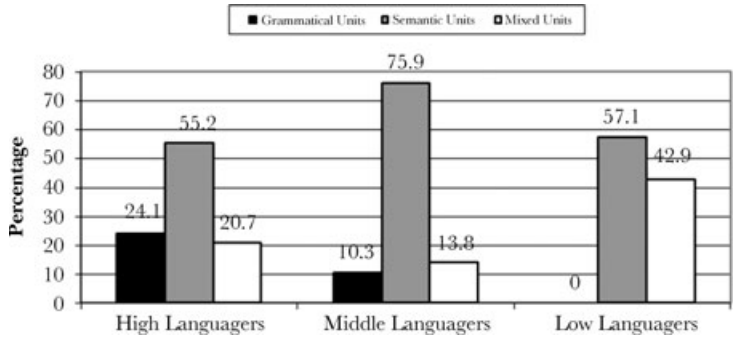


FIGURE 8
Percentage of Grammatical, Semantic, and Mixed Conceptual Units Used by High, Middle, and Low Languagers in Conceptual Definition 3



shown in the conceptual definitions given by the students: The quantity of students' languaging is strongly related to the number of conceptual units that students provide in their conceptual definitions.

These findings are consistent with those of researchers working in domains other than language (e.g., Chi et al., 1989, 1994) who document the positive effects of verbalization on learning concepts (e.g., in biology and physics). These results are also consistent with those of Swain and her colleagues, which have demonstrated that languaging about language is one of the ways that L2 learning occurs. They have demonstrated the positive impact of languaging on learners' writing (e.g., Qi & Lapkin, 2001; Swain & Lapkin, 1998, 2002) and speaking (e.g., Tocalli-Beller & Swain, 2005, 2007).

Based on a Vygotskyan interpretation of the data, we would like to suggest that by externalizing their thoughts (i.e., by using language to mediate their cognitive processes), students came to understand what they did and did not know, what information they had to seek out to complete their understanding, and what inferences they needed to make to have a coherent conceptual understanding. The more they externalized their thoughts, the more able they were to monitor and self-assess them, transforming them from a surface understanding to a deeper conceptual one. This deeper understanding, internalized through languaging, provides a strong basis for its application.

Two of the identifying characteristics of the high languagers were that their rate of self-assessment was approximately six times greater and their rate of inferencing was at least two times higher than those of the other two groups (Figure 4). Additionally, the high languagers used a balance of languaging types relative to the other

groups (Figure 5). We therefore suggest that it is not just that high languagers language more, but that they use language in qualitatively different ways, ways that mediate those processes important to the understanding of cognitively complex ideas. This suggestion is further supported by the fact that in defining the metalinguistic concepts of voice, high languagers continued to make use of grammatical conceptual units (as well as semantic and mixed units), whereas a week following the intervention, the middle and low languagers used practically none (10.3% and 0%, respectively); that is, the greater depth of understanding of the concept of voice exhibited by the high languagers was manifested in their attention to function and meaning of voice as well as the structural forms it took.

Aside from these main findings, our study has implications for both testing and pedagogy. We first consider the implications for testing, followed by implications for the teaching of second and foreign languages.

IMPLICATIONS AND CONCLUSION

With respect to testing, our results suggest that our different measures are reflecting different aspects of language learning. This is indicated in two quite unique ways. First, the positive relationships between the quantity of languaging and the total scores in the immediate posttest and stimulated recall are significant (Table 7), in contrast to the relationship between the quantity of languaging and the number of correct items in the written delayed posttest.

Second, it is noteworthy that students were, in general, differently able to write the correct form of the verb and identify orally the correct voice in the stimulated recall in the second testing session. Five students were better able to write the correct form than identify orally the correct voice (strikingly so for Marnie and Michelle; see Brooks et al., 2008). For four students, the reverse was true. We think that this difference is more than just random variation, but rather it reflects how each test activity draws on different knowledge sources and abilities that vary across students and it reflects the different language learning histories experienced by our learners. In the delayed posttest stage, whereas the written responses tap into the ability to produce the verb form required by the voice of the sentence, the languaging in the stimulated recall taps into the depth of understanding. An implication for testing is that these findings highlight the need to obtain multiple measures when assessing grammatical and semantic knowledge and that accurate production is not necessarily concomitant with the level of understanding.

With respect to pedagogy, given that our participants had no opportunities for communicative practice, we consider their progress to be encouraging, particularly for application in the L2 classroom context. Like Gal'perin (1969, 1992) and Negueruela (2003), we suggest that learners should be provided with (a) coherent knowledge about the concepts underlying the use of the target language; (b) appropriate mediational tools (e.g., explanatory texts, diagrams) to support the internalization of these concepts; (c) opportunities to engage in languaging, so that conceptual understanding mediates their subsequent linguistic performance; and (d) opportunities to put to use the conceptual knowledge that has been internalized. In our study, this fourth provision was not available, yet some students (the high languagers in particular), were able to apply the conceptual knowledge they had internalized in their posttest language use.

Languaging (whether in the L1 or L2) is a key component of the learning process and we believe it can usefully be introduced into classroom practice. Negueruela (2003) assigned his verbalization/languaging activities as homework, but they could be incorporated into group or pair work in the classroom in activities for which the final product (language knowledge or use) would be in the target language.

The evidence from cognitive psychology is strong concerning the relationship between verbalization and learning in such domains as mathematics, biology, and physics. The present study contributes to that body of knowledge within a sociocultural theory of mind—a theory that highlights the critical role language plays in mediating cognition and cognitive development.

ACKNOWLEDGMENTS

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NOTES

[1]In this article we sometimes use the verb "verbalize" in place of "language" because it may function better syntactically. However, theoretically, verbalization also includes "nonlanguaging" as in the case of language used in social routines (e.g., "Hi, how are you? How's it going?").

[2]The student was unable to work independently and needed encouragement and substantive support from the research assistant.

[3]All names are pseudonyms.

[4]The text of the explanation is in Appendix B. We have numbered each "chunk" in bold so that readers will know what appeared on each card. Students read these cards after they completed Conceptual Definition 1. As we handed the cards to the students, the script was: "Now I'm giving you a text that explains the active, passive and middle voices in French. Please read this text aloud. Stop at the end of each card and say aloud what your understanding of the sentence(s) on the card is."

[5]In our pilot study (Lapkin, Swain, & Knouzi, 2008), we experimented with different types of tests requiring production of voiced sentences. We settled on this test involving the production of verb forms consistent with the voice of the sentences in the text because other types of tests involving free production did not prove viable.

[6]Conceptual units are idea units (see Chafe, 1980; Qi, 2003); the reason we have relabeled them using the word "conceptual" is that, in this study, we are considering the learner's development of his/her understanding of a "concept" (i.e., voice), so using the term "conceptual unit" seems more appropriate. In this study, the overriding concept of voice has been "turned into" a text, which consists of a number of conceptual units (as indicated in Appendix D).

[7]It is to be noted that our definitions of languaging and inferencing are different from those of Chi et al. (1994), who operationalized *self-explanation* as "any utterance that went beyond the information given, namely, an inference of new knowledge" (p. 454). Although they seem to equate self-explanation and inferencing, we consider languaging as an indication of the participant's engagement with the text, which can occur at several levels, each of which can involve *transformation* of existing knowledge. This transformation can take the form of paraphrasing, inferencing (integration, elaboration, hypothesis formation), and analysis.

[8]We consider all of the information presented to the students in the explanatory text as new information: At the pretest stage, because the students had so little understanding of the concept and so little knowledge of the metalinguistic terms, we consider all information provided in the explanatory text and used while languaging as new—that is, as learned through the reading and prior languaging while doing the activity.

[9]We initially distinguished among wrong answers that were not explained (WN), wrong answers that were followed by a correct explanation (WC), and wrong answers that were followed by a wrong explanation (WW), but as we compared the three answer types we found no support for this distinction. In fact, the explanations of wrong answers, unlike CW answers, showed nothing but a fragmented understanding of the concept of voice whereby the participants recalled isolated conceptual units but failed to use them to guide their reasoning/thinking about the test answer.

[10]An unbracketed ellipsis indicates a pause shorter than 5 seconds; a bracketed ellipsis indicates that text has been deleted.

[11]To determine if the voice of the test sentences had an effect on the participants' accuracy rate in the immediate posttest, we examined the number of correct answers per voice (i.e., the number of correct answers when the test sentence was in active, passive, or middle voice). We did not find much difference. For instance, there were six sentences in the active voice. Each sentence was correctly identified by five to nine participants. The four middle voice sentences were accurately identified by six to eight participants, and the three passive voice sentences were identified correctly by eight to nine students.

There was more variation in the stimulated recall results. We found that when the sentences called for the use of regular verbs in the active, eight students out of nine gave the correct answers. This rate dropped to between four and five correct answers when the sentences were in the active voice but necessitated the use of a pronominal verb. We observed a similar pattern for the middle and passive sentences, where the accuracy rate was between two and five responses.

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APPENDIX A
"Sophie Mercier" Text, Part I

The text below was taken from your textbook for FSL 200 and slightly adapted for this research project. Please read it and then look at the highlighted verbs. Tell us about the meaning and grammatical form of these verbs.

Sophie Mercier arrive à Londres après des mois de préparation

En ce moment, je **prépare** une maîtrise d'histoire à Londres . . . Oh, j'oubliais . . . je **ne me suis pas encore présentée**. J'ai 20 ans, je m'appelle Sophie, j'ai un caractère de cochon—certains disent de pitbull—j'**aime** le chocolat, Indiana Jones et Bob Dylan. C'est surtout pour cette raison (l'aventure) que je suis arrivée à la cité londonienne.

Octobre 2002. Le jour de la rentrée scolaire **s'annonce** chargé avec de nombreuses conférences de présentation de l'université. Les professeurs **se succèdent** sur l'estrade de l'amphithéâtre pour nous expliquer l'histoire de l'université. Avec mon niveau d'anglais remarquable, je **comprends** un mot sur dix . . .

La fac est impressionnante. Le jour de mon arrivée, j'ai d'abord cru l'avoir confondue avec le Printemps! Des magasins, des librairies, bordent les couloirs, et les cafétérias **se comptent** sur les doigts des deux mains. Drôle d'infrastructure pour une université. Et dire qu'à la Sorbonne, l'unique point de ralliement possible des étudiants qui **se situe** près de la machine à café au milieu des toilettes et des mauvaises odeurs . . .

Ma vie en résidence universitaire est digne d'un feuilleton télé. Je **me souviens** encore que dans la brochure l'appartement **a été décrit** comme: ≪chambre équipée d'un lavabo, placards, grande cuisine, deux salles de bain, salle d'ordinateurs et salle télé commune, machines à laver . . . ≫ En résumé, un ≪hôtel étudiant≫ idéal et luxueux, à un prix avantageux.

L'arrivée à l'intérieur de la résidence me fait découvrir le vrai sens des mots; ≪l'appartement≫ est en réalité un corridor dont les murs **ont été abîmés*** et jaunis par l'humidité. La ≪chambre équipée≫ est une pièce aussi large qu'un placard dont la moquette **est usée** par le temps.

Cerise sur le gâteau: juste en face de notre résidence, un chantier sert de panorama. Le bruit des marteaux-piqueurs rythme la journée qui commence à 7 heures et demie du matin. L'agitation **s'observe** jusqu'à 19 heures! Plus besoin de réveil!

Je critique, je critique, mais partager sa vie avec deux Japonaises, un Polonais, une Californienne, un Africain et un Indien est quand même très enrichissant. Dommage que cette belle salade exotique soit si bruyante!

*abîmer = to ruin

APPENDIX B
Explanatory Text

Note: Each "chunk" is numbered in bold so that the reader will know what appeared on each card. Translations are provided here for cards 34 through 36 for the reader's benefit and did not appear in the original activity.

The following activity is designed to teach you something about the concept of voice in French. There is research to suggest that explaining grammatical *concepts* rather than focusing on "rules of thumb" leads to a deeper understanding of the grammar of the second language. This process is more effective when learners get a chance to "think aloud" about the concept. So the attached sheets present information about the concept of voice in "chunks," allowing you time to think about each piece of information and explain it out loud.

The concept of voice in French

1 Most sentences in French consist of a subject, a verb and an object; these are grammatical categories. **2** The subject and object also have semantic roles (i.e., they contribute to the meaning of the sentence). **3** So in (1) below, *le joueur de baseball* is the grammatical subject of the sentence and its semantic role is that of agent, the "doer" of the action. **4** The noun *la balle* is the grammatical object; its semantic role is that of patient, the "undergoer" of the action of throwing.

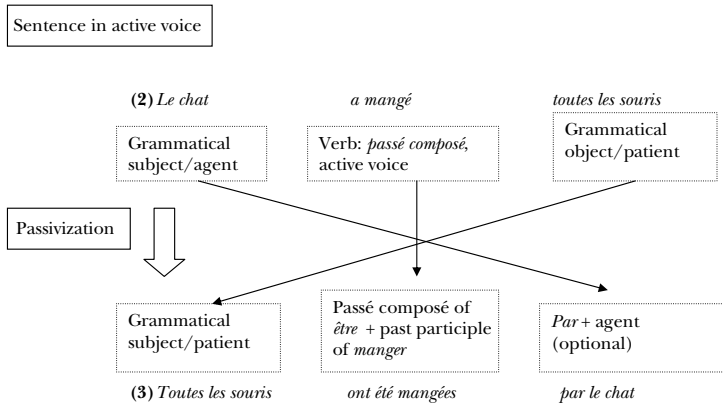
5 In French, most of the sentences we write or the utterances we speak are in the active voice, like examples (1) and (2).

1. *Le joueur de baseball lance la balle.*
2. *Le chat a mangé toutes les souris.*[1]

6 In the case of sentences like (1) and (2), there is an agent (the "doer" of the action) that serves as the grammatical subject, a verb, and a "patient" that is the grammatical object. **7** The initial noun or noun phrase is the subject; the main verb follows; and the patient (the "undergoer" of the action) is the grammatical object.

8 Using the passive voice enables us to put the emphasis on the patient, in order to focus on it, as illustrated in Diagram A:

Diagram A (see sentence 2 above):



9 Another way of explaining sentences like (3) is that the passive allows the direct object, i.e., the patient (*toutes les souris*), to occupy the subject position; the subject (*le chat*) appears optionally in the agent phrase (*par* + agent). **10** That is, in (3) the phrase *par le chat* could have been omitted. **11** In other words, the passive voice does not require the agent to be mentioned: In (4) we assume that members of parliament voted in a particular law, but the agent is not specified.[2]

12 In (5), the person who stole the bicycle is unknown and therefore not specified.

4. *La loi a été votée.*
5. *Sa bicyclette a été volée (on ne sait pas par qui).*

13 We obtain the passive by moving the object (patient) to the subject position and inserting the auxiliary *être*. **14** The auxiliary takes the tense of the main verb of the active sentence, followed by the past participle of that verb.[3]

15 Another way of expressing a passive-like meaning without using the type of structure illustrated in Diagram A is through what is known as the middle voice. **16** Even though the agent is not expressed, we understand that an agent is the doer of the action. **17** In the middle voice, we do not insert the auxiliary *être*, but the meaning is passive-like. **18** Sentence (6) below is in the active voice; sentence (7) has a passive meaning, expressed in the middle voice, using a pronominal verb.

6. *Les filles portent des jupes courtes (cette année).*
7. *Les jupes se portent courtes cette année.*

[1]The first prompt is inserted here:

Can you tell me about sentence (2) in terms of semantic roles?

If participant does not understand the question, or gives a brief (or wrong) answer, prompt further.

Can you tell me about sentence (2) in terms of object, subject, agent, patient?

[2]The second prompt occurs at this point:

Can you tell me about sentence (2) in terms of semantic roles?

If participant does not understand the question, or gives a brief (or wrong) answer, prompt further.

Can you tell me about sentence (2) in terms of object, subject, agent, patient?

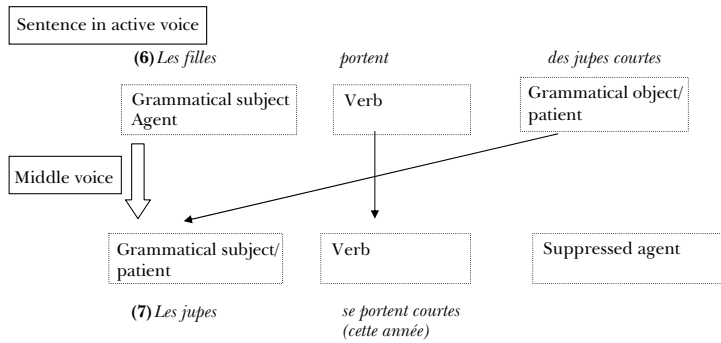
[3]The third prompt is inserted here:

Can you change sentence (1) into the passive voice?

If participant does not understand the question, or gives a brief (or wrong) answer, prompt further.

19 In middle-voice sentence (7), the pronominal verb *se porter* would be translated into English as 'are worn': Skirts are worn short this year. **20** Again, the agent is not expressed. **21** Rather, the grammatical object (the patient) *les jupes* is highlighted or emphasized and becomes the subject. **22** This is illustrated in Diagram B.

Diagram B



23 Consider examples (8) and (9).

8. *On mange le saumon froid.*
9. *Le saumon se mange froid.*

24 Sentence (8) is in the active voice; sentence (9) is in the middle voice, which gives the sentence a passive-like meaning.[4]

25 For (9), English uses the passive: 'salmon is eaten cold.' **26** Some grammars refer to this as the agent-less passive. **27** French prefers the middle voice in sentences like (9).

28 Sentence (10) may be seen as a passive counterpart of active voice sentences (11) and (12). **29** In the case of passive AND middle voice sentences, it is important to remember that they allow us to place emphasis on the element of the sentence that we want to highlight by putting it in the subject position.

10. *Les tomates se sont bien vendues cette année. 'Tomatoes sold well this year.'*
11. *La vente de tomates a été bonne cette année.*
12. *On a bien vendu les tomates cette année.*

30 It is important to note that not all pronominal verbs in French are used in middle voice sentences. **31** There are four main types of pronominal verbs. **32** One is the type we have been discussing, those used to form sentences in the middle voice. **33** Here are the three others:

34 (a) reflexive pronominal verbs such as *s'habiller* 'to dress oneself' or 'to get dressed,' *se laver* 'to wash oneself,' *se peigner* 'to comb one's hair.' Example: *Je me lave les mains*. 'I wash my hands.'
35 (b) reciprocal pronominal verbs such as *se rencontrer* 'to meet each other' or simply 'to meet,' *se parler* 'to speak with each other.' Example: *Nous nous parlons chaque soir*. 'We speak with each other every night.'
36 (c) inherently or intrinsically pronominal verbs that never appear without the pronoun *se*, for example *s'évanouir* 'to faint,' *se souvenir* 'to remember.' Example: *Il se souvient fréquemment de son premier voyage à Paris*. 'He frequently remembers his first trip to Paris.'

[4]The fourth prompt occurs here:

Please explain sentence (9)

If participant does not understand the question, or gives a brief (or wrong) answer, prompt further.

APPENDIX C
"Sophie Mercier" Text, Part II

Note: We have supplied the answers in italics in the text below.

This is the second part of the Sophie Mercier text that you saw last time. Please read through the text and then for each infinitive in parentheses, write the correct form of that verb, paying attention to the voice (active, passive, middle) of the sentence containing each verb. Example: La tour Eiffel (**situer**) _*se situe*_ à Paris.

"Merry Christmas and happy new year!" A Londres les vitrines (**décorer**) ***_sont décorées_*** d'étoiles filantes et de sapins de Noël. L'ambiance me rappelle sans arrêt le retour à Paris pour célébrer ces fêtes de fin d'année. Le cœur un peu lourd, je prépare ma valise oubliée dans mon armoire. La date de retour arrive. La peur de redécouvrir l'univers intact du passé que j'ai fui trois mois plus tôt se mêle à l'angoisse du retour aux petites habitudes, aux horaires imposés que j'avais oubliés depuis mon départ.

Lorsque j'arrive sur le quai de la gare j'ai le sentiment de faire le premier pas sur la lune, de poser mon pied sur une autre planète: je (**entourer**) ***_suis entourée_*** d'extra-terrestres aux coutumes étranges. Je me sens étrangère dans le pays où j'ai grandi. Voilà Paris—le vin (**boire**) ***_se boit_*** à toutes les heures, l'amour est dans l'air, et la Tour Eiffel (**voir**) ***_se voit_*** de partout.

Le premier à me reconnaître est mon chien. Puis viennent les silhouettes familiales et familières qui m'accueillent. Je (**trembler**) ***_tremble_*** de joie! Rien n'a changé, ni les visages, ni ma chambres aux bibelots époussetés avec soin pendant mon absence, ni la voisine qui (**passer**) ***_passe_*** l'aspirateur à deux heures du matin.

Je (**bombarder**) ***_suis bombardée_*** de questions, entrecoupées d'interjections: oh! ah! eh! On s'interrompt, on (**renseigner**) ***_se renseigne_***, on se dévisage, on se touche les mains, on (**embrasser**)***_s'embrasse_***, on rit ensemble, et à travers ces moments chargés d'émotion, on se redécouvre comme si l'on ne s'était jamais quitté.

Mais le temps passe vite ... Les jours (**précipiter**) ***_se précipitent_***. L'aube* de la nouvelle année (**annoncer**) ***_s'annonce_*** et le train à la gare m'appelle en sifflant.

*aube = dawn

APPENDIX D
Conceptual Units in the Explanatory Text

Grammatical	
G1	Sentences have grammatical categories (subject/verb/object).
G7	Active sentences have subjects/verbs/objects.
G8	The initial noun phrase is the subject.
G11	Passive allows the direct object to occupy the subject position.
G15	Passive involves inserting the auxiliary *être*.
G16	The auxiliary takes the tense of the main verb of the active sentence.
G17	The auxiliary is followed by the past participle of the main verb.
G20	In middle voice sentences we do not insert the auxiliary *être*.
G21	In middle voice sentences we use a pronominal verb.
Semantic	
S2	Subjects and objects have semantic roles.
S3	Subjects may be agents/doers.
S4	Objects may be patients/undergoers.
S6	Active sentences have agents, verbs, and patients.
S10	Passive voice allows emphasis on the patient.
S12	In the passive, agents appear optionally in the agent phrase *par* ...
S13	Passive voice allows for an unspecified agent (i.e., when one does not know who did the action).
S18	Another way of expressing passive meaning is through the middle voice.
S19	The agent (doer) is not expressed in middle voice sentences.
S22	Middle voice sentences are often translated into English passives. (e.g., *Les jupes se portent courtes cette année.* 'skirts are worn short this year.')
S25	Where English uses the passive in sentences like "Salmon is eaten cold," French prefers the middle voice (*Le saumon se mange froid*).
S29	The other types of pronominal verbs are reflexives (*Je m'habille* 'I get dressed').
S30	Reciprocals (*Nous nous parlons chaque soir* 'We talk [to each other] each evening')
S31	Inherently pronominal verbs that never appear without the pronoun *se* (*Je m'évanouis* 'I faint')

Mixed: Grammatical & Semantic

M5	Most sentences are in active voice.
M9	The patient is the grammatical object.
M14	Passive is formed by moving the object (patient) to the subject position.
M23	The grammatical object (the patient) is highlighted or emphasized.
M24	The grammatical object/patient becomes the subject.
M26	Both passive and middle voice sentences allow us to place emphasis on the element of the sentence we want to highlight by putting it in the subject position.
M27	Not all pronominal verbs in French are used in middle voice sentences.
M28	One type of pronominal verb is the type in middle voice sentences.

APPENDIX E
Languaging Types

Paraphrase

"So uh another way of phrasing the subject of the sentence is the agent or the doer of the action." (Michelle, languaging about conceptual unit S3)

"By placing specific words in different parts of the sentence will form different, will resonate differently for whoever's listening to what you are saying." (Marta, languaging about conceptual unit M23)

Inferencing

Integration

"So you don't have to say by, par le*, the members of the parliament."* (Marnie)

"The patient uh . . . or what was receiving the action." (Mark)

Elaboration

"The patient doesn't change. Just the s- position of it changes, from object to subject." (Marnie)

"If I don't want to emphasize the tomatoes, I don't have to use the middle voice." (Heidi)

Hypothesis Formation

"So you might assume that the patient will take on the role of the direct object in the middle voice as well because that's similar to what the passive voice does?" (Heidi)

Analysis

"Okay uh sa bicyclette *is the object, but in this case it's the subject uh,* a été volée *is the verb."* (Holly, languaging about conceptual unit G11)

"The les souris *is the undergoer of the action, so they're the grammatical object."* (Marnie, languaging about conceptual unit S4)

Self-Assessment

"But now it's still not explaining to me why they're switching it and why they're using the pronominal verb instead so I'm not exactly taking that from this but I'm taking what a pronominal verb is." (Heidi)

"Oookay, I see how that works, okay." (Mike)

Rereading

"Okay, it is important to note that not all pronominal verbs in French are used in middle voice sentences. It is important to note that not all pronominal." (Marta)

"Marnie: "The auxiliary takes the tense of the main verb of the active sentence, followed by the past participle of that verb." . . . [silence <31>]
Research Assistant: Can you sa- say out loud what you're thinking?
Marnie: Uh, oh okay. Uh . . . "The auxiliary takes the tense of the main verb of the active sentence, followed by the past participle of that verb." (Marnie)