Pedagogical Gestures as Interactional Resources for Teaching and Learning Tense and Aspect in the ESL Grammar Classroom

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Pedagogical Gestures as Interactional Resources for Teaching and Learning Tense and Aspect in the ESL Grammar Classroom

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This study investigated the functions of gesture in teaching and learning grammar in the context of second language (L2) classroom interactions. The data consisted of video-recorded interactions from a beginner- and an advanced-level grammar classroom in an intensive English program at a U.S. university. The sequences of talk-in-interaction selected for sequential analysis involved gestures that are used by teachers for explaining English temporal concepts, and those by students to respond to their teacher's gesture. Our analysis revealed that teachers and students repeatedly used abstract deictic gestures and metaphoric gestures in the classroom, which can become important interactional resources for instruction as well as assessment of student learning. Furthermore, students effectively used gestural catchments to demonstrate their understanding of temporal concepts and to construct interactional alignments with their teachers. These findings suggest that gesture is an important element of interactional competence for teaching and learning in L2 grammar classrooms.

Keywords gesture; pedagogical functions; grammar; sequential analysis; gestural catchment; interactional competence for teaching and learning; microgenetic development

Introduction

Recent decades have witnessed increased interest in the roles of gesture in second language acquisition (SLA), but there is still a need for empirical work that explores how teachers and students dialogically employ gesture in second language (L2) classroom interactions. In particular, contexts of teaching and learning L2 grammar have been hitherto less investigated than vocabulary. The present study contributes to connecting conceptualization of time with gestural use in the grammar classroom and provides pedagogical implications related to teaching L2 English tense and aspect. By combining conversation analysis and Vygotskian sociocultural theory, the present study examines the interactional competence involved in both the production and uptake of gesture in teaching and learning English grammar in two university-level grammar classes. English tense and aspect is the primary focus, because it is one of the most difficult grammatical concepts for teaching and learning English, owing in part to possible crosscultural and crosslinguistic differences in the conceptions of time. And yet, this aspect of teaching remains relatively underresearched. The data analysis highlights how L2 learners appropriate their teachers' gesture as a mediational tool for facilitating their learning.

Literature Review
Interactional Competence for Teaching and Learning

The importance of investigating and understanding the dynamics of classroom interaction is well established, as it is largely through interaction that teachers convey their curriculum and instruction and students demonstrate their learning (Macbeth, 2011). For its part, conversation-analytic L2 classroom research has worked to reveal an array of subtle interactional practices that teachers and students employ to accomplish teaching and learning. Accumulating detailed descriptions of these interactional practices is essential work. As Koshik (2002) writes, "We cannot investigate pedagogical effectiveness if we do not know in some detail what the practices of teachers are and what functions they perform" (pp. 304–305). Such descriptions carry a transformative power (Richards, 2005), as they provide new pedagogical insights and foster new interactional competencies that may inform teacher actions in the classroom.

The notion of interactional competence has been discussed by many scholars in the field of conversation analysis, particularly in the context of the L2 classroom (e.g., Hall, 1999; Hall, Hellermann, & Pekarek Doehler, 2011; Markee, 2008; Young, 2009). Walsh (2006) has argued that when teachers and learners are cognizant of their classroom interactional competence, or their "ability to use interaction as a tool for mediating and assisting learning"

(p. 132), they are able to participate in more diverse and captivating classroom interactions, thereby enriching their learning. Recently, Hall (2014) has put forth the notion of interactional competence for teaching (ICT), which includes participants' abilities to engage in the context-specific, interactional activities involved in teaching as well as the knowledge regarding how to employ linguistic, prosodic, sequential, and nonverbal resources for accomplishing these activities. For example, Hall and Smotrova (2013) describe how teachers use shifts in prosody, eye gaze, and body position to produce teacher self-talk as a means for retaining student engagement and eliciting student empathy while managing brief disruptions to instruction.

It is also worth noting that interactional competence is not construed as an individual construct, but one co-constructed by participants in interaction. Thus, while we discuss ICT as a means of highlighting the influence of teachers' actions, in reality, these actions are not wholly separable from the students', and we will also consider students' interactional competence for learning (ICL). Van Compernolle (2015) offered a useful illustration of this interdependence. He showed how an English as a second language (ESL) teacher moves from a reading comprehension frame to a form-focused corrective feedback frame, marking the target form in her recast with stress and a shift in pitch, in addition to a pointing gesture. Recognizing these cues as signaling a shift in footing, the learner under focus responds, repeating the teacher's recast and use of gesture. Van Compernolle concluded that it is this interactional competence, co-constructed by both the teacher and the learner, that mediates the learner's acquisition of the target form (also see van Compernolle & Smotrova, 2014). Similarly, the present study, which investigated how gestures are employed by L2 teachers and taken up by students, or vice versa, can contribute to research both on gesture and interactional competence for L2 teaching and learning[1] (also see Sert, 2015, for effective use of gestures as part of teachers' interactional competence).

Gesture in L2 Classroom Contexts
A series of studies by McCafferty have examined L2 learners' gesture in terms of interpersonal (communicative) and intrapersonal (cognitive) functions outside of the classroom. McCafferty (2002) demonstrated that gesture enhances communication and facilitates comprehension in interactions between nonnative and native speakers of English, while McCafferty (1998, 2004) found that some types of gesture, such as representational gestures (e.g., iconic and abstract deictic gestures) and beats, seem to function in a self-regulatory manner when participants resort to the spatio-motoric channel for thinking and

externalizing the linguistic structure of the L2 (see McNeill & Duncan, 2000, for cognitive functions of gesture in detail). Several additional studies (e.g., Alibali, Heath, & Myers, 2001; Bavelas, Gerwing, Sutton, & Prevost, 2008) have shown that speakers will employ gesture both for their own internal benefit, and for communicating with their listeners; the function of the gesture is indicated by such factors as visibility and dialogue.

A variety of gestures, which serve many functions, have also been observed in L2 classroom contexts. For instance, Allen (2000) catalogued a high school Spanish teacher's nonverbal behavior, noting various emblems, illustrators or iconics, and deictics—all of which were important components of teaching. Not only are gesture and other nonverbal behaviors basic elements of teachers' pedagogical repertoire, but they are also integral to the production of comprehensible input (Lazaraton, 2004; Wang & Loewen, 2015). Students also report enhanced understanding of L2 discourse from teacher gesture and other nonverbal behavior (Allen, 2000; Sime, 2008). Experimental research has corroborated this link between teacher gesture and student comprehension. Sueyoshi and Hardison (2005), for example, reported that students exposed to lecture with gesture only and gesture plus facial cues scored higher on a listening comprehension test than students exposed only to the audio recording. Yet it should be noted that advanced-level students did not benefit from gesture, but did benefit from facial cues, suggesting that the effects of gesture depend on language proficiency.

The importance of investigating interactions, including gesture along with speech between teachers and students, is increasingly recognized. In a longitudinal study of an ESL composition class, Zhao (2007) found that ESL students creatively elaborated on their teacher's metaphoric gestures and that such creative imitation appears to facilitate their appropriation and internalization of academic writing conventions. The dialogic use of gesture also plays an important role in demonstrating and remediating students' understanding of L2 vocabulary (Belhiah, 2013; Smotrova & Lantolf, 2013). Smotrova's (2014) longitudinal study in a beginner-level ESL classroom reinforces these findings, emphasizing the significant instructional and interactional functions of gestural catchments (recurrent gestures that replicate similar forms and meanings)[2] among students and their instructor. In their study of Italian foreign language classrooms, Peltier and McCafferty (2010) observed that students and teachers mirror each other's emblematic gestures, mediating the embodiment of an Italian identity. In short, gesture can be an important mediational tool that functions to support L2 learners' development in addition to speech (e.g., Lantolf & Thorne, 2006).

Although much of the initial research on gesture and language learning has focused on the context of lexical explanation, there is a growing body of literature examining the use of gesture in teaching various aspects of grammar (Hudson, 2011; Nakatsukasa, 2013; Rosborough, 2011; Smotrova, 2014; van Compernolle & Smotrova, 2014; see also Gullberg, 2008, for earlier work on gesture and grammar). This research has recognized the particularly important role of metaphoric gestures in the effective portrayal of grammatical concepts, such as locative prepositions and simple past tense (Nakatsukasa, 2013); superlatives (Rosborough, 2011; Smotrova, 2014); and degrees of comparison, demonstrative pronouns, and progressive aspect (Smotrova, 2014). Additionally, as an aid in visualizing the syntactic structure of a sentence, metaphoric gestures are used to provide corrective feedback and prompt student self-correction of syntactical errors (Smotrova, 2014; Taleghani-Nikazm, 2008; van Compernolle & Smotrova, 2014).

One finding from Hudson's (2011) study of an ESL teacher's use of gesture in a university-level classroom is particularly relevant here as it relates to teaching English tense. Hudson found that the native-speaker instructor consistently referred to the past by pointing and/or stepping backward into the space behind her. In one instance, after stepping backward to indicate the past time frame, the instructor steps forward and points to the ground to indicate a shift into the present. These gestures produced from the observer perspective reflect a metaphor in which abstract time relationships are systematically mapped onto more concrete, familiar domains of space (Lakoff & Johnson, 1999; Núñez & Sweetser, 2006). In a similar vein, in Sime's (2008) study, the teacher employed metaphoric gesture to create a horizontal timeline, placing the present in front of her and the past to the far left. A student positively commented on this gestural timeline, "The present is close to you, the past is far away, and this line helps you understand that and remember it" (p. 269).

Crosscultural and Crosslinguistic Differences in Conceptions of Time
English tense and aspect may be one of the most difficult grammatical concepts for both teaching and learning due to crosscultural and crosslinguistic differences in the conceptual representation of time. It has been widely recognized that time is conceptualized spatially in a great number of languages and cultures. In fact, speakers of nearly any language—Aymara being an exception (Núñez & Sweetser, 2006)—tend to conceptualize time horizontally along a sagittal (i.e., front-to-back) axis, where future events lie in front of the individual and past events lie in back. Generally, however, speakers of a given language will employ more than one metaphorical timeline, also representing time along a

transversal (i.e., left-to-right) axis. For example, speakers of English and Spanish may conceptualize time horizontally from left to right and also from front to back (Boroditsky, 2011; Torralbo, Santiago, & Lupianez, 2006), while speakers of Mandarin may conceptualize time horizontally, along a sagittal and horizontal axis, as well as vertically, where past events are represented as *shàng*, or *up*, and future events are represented as *xià*, or *down* (e.g., Boroditsky, Fuhrman, & McCormick, 2011). Thus, in the case when conceptualizations of time between learners' first language (L1) and their L2 are distinctive, they might need to reconceptualize the way they think about time in order to manage the different space-time metaphors integral to the L2, which can be cognitively challenging. It should be noted that compared to crosslinguistic research on conceptions of time in terms of tense, research on expression of time in terms of aspect remains underresearched.

Furthermore, the direction of writing in a language appears to play an important role in structuring the direction along a lateral timeline in the mind (Casasanto & Jasmin, 2012). For example, people who read and write text arranged from right to left (e.g., Arabic and Hebrew) also arrange the direction of time from right to left along the lateral mental timeline (Boroditsky, 2011), which is opposite from people with an English L1 and many other language backgrounds, who arrange time from left to right. In fact, such cultural differences in conceptions of time might influence how L2 learners use gesture for explaining or thinking about time while learning English tense and aspect, because gestures can be intimately related to how the speaker conceptualizes time in the mind, and this conceptualization might not be available in the verbal modality (Núñez & Sweester, 2006). Many argue that linguistic metaphoric mappings are paralleled systematically in gesture (e.g., Cienki, 1998; McNeill, 1992), and several studies demonstrate that directionality of temporal gestures varies crossculturally (e.g., Casasanto & Jasmin, 2012; Kita, Danziger, & Stolz, 2001), which might interfere with students' learning of temporal concepts in the L2.

The Present Study

To summarize, the potential of gesture for teaching and learning L2 grammar is promising, yet still needs to be explored. Most of the gesture studies in language learning contexts have hitherto focused either only on learners' use of gesture for thinking (e.g., Lantolf, 2010; van Compernolle & Williams, 2011) or only on teachers' employment of gesture in instructional interactions (e.g., Hudson, 2011; Lazaraton, 2004). Much less research has addressed how students respond to teachers' gestures, or vice versa, and how teachers and students align with one another in classrooms. The present study therefore explored the dynamic,

reciprocal, and dialogic uses of gesture in student–teacher interaction in order to broaden current understandings of gesture in the classroom setting and to relate these findings to the notions of interactional competence for teaching and learning. The aim of this study was to contribute to the fields of gesture, crosscultural differences in the conceptualizations of time and metaphor, and teaching and learning of L2 tense and aspect by investigating the moments when L2 teachers and students dialogically employ gesture while dealing with English temporal concepts. The following research questions were addressed:

1. What are the roles of teacher gesture in teaching English temporal concepts (tense and aspect)?
2. What are the roles of student gesture in classroom discussions of English temporal concepts?
3. How does the teacher's gesture contribute to students' developing conceptual understanding of English tense and aspect?

Method
Participants and Procedure
Derived from a digitized video corpus supported by the Center for Research on English Language Learning and Teaching at the Pennsylvania State University, the interactional data for this study consisted of approximately 56 hours of video-recorded, naturally occurring classroom interactions from two different-level grammar classes in the intensive English program of a U.S. university, one high beginner and one advanced level. The program is designed to enhance international students' English proficiency in preparation for admittance to and academic success in American colleges and universities. We were both involved in data collection for the subcorpus, and we observed and recorded one 2-hour class session at each level on a weekly basis for the entire spring semester in 2013 (15 weeks). A minimum of two video cameras were used in each class to capture both teacher and student actions simultaneously.[3]

The instructors of the course at each level were both native speakers of English and were considered to be experienced teachers as they have taught ESL courses for at least 5 years. Julie taught the advanced-level grammar course, and Lisa taught the beginner-level course.[4] Julie's class included 10 international students; 8 of these students shared an Arabic L1 background, and the 2 other students had Portuguese and Spanish as L1s. Lisa's class also included 10 students; 9 of these students shared an Arabic L1 background, and the remaining student's L1 was Spanish. In relation to conceptual time metaphors, the students' L1s (Arabic, Spanish, and Portuguese) seem to use a linear conceptualization of time similar to English. However, one difference in Arabic culture

is that the direction of time is from right to left in comparison to left to right in English; this could potentially contribute to difficulty in Arabic students' understanding of English tense. Because the data for this study consisted of naturally occurring classroom interaction and related field notes, it was impossible to report individual students' language proficiencies beyond the level of their course. However, it could be assumed, based on program requirements and goals, that the students in the high-beginner class would have total scores on the Test of English as a Foreign Language Internet-Based Test of at least 34 and the students in the advanced class would have scores approaching or exceeding 80.

Analytical Framework: Combining Conversation Analysis and Sociocultural Theory

In line with a strong socio-interactionist approach to SLA (Mondada & Pekarek Doehler, 2004), which views L2 learning as mediated in and through social interaction, this study combines the tenets and analytic methods of conversation analysis (CA; Sacks, Schegloff, & Jefferson, 1974) with Vygotskian sociocultural theory (SCT; Vygotsky, 1978) as it has been applied to understand SLA (e.g., Lantolf & Thorne, 2006). One of the core arguments in Vygotskian SCT is that the human mind is mediated by socially constructed cultural artifacts including language (Lantolf, 2000). In other words, culturally constructed mediations, such as participation in social activities, in which cultural artifacts and concepts are embedded, are essential for higher forms of human mental activities. As Vygotsky argued, higher forms of cognition always move from external (mediated by other people) to internal (inside the individual) in a process of internalization. In order to better understand this process, Vygotsky advocated tracing the qualitative changes in a learner's psychological functioning, or microgenetic development. Microgenesis is defined as "development of mental functions and processes over shorter periods of time" (Lantolf & Thorne, 2006, p. 19). The goal of analyzing such microgenetic development is to "grasp the process in flight" (Vygotsky, 1978, p. 68), to capture the moment-to-moment qualitative changes in activity as a means of understanding the development of higher psychological processes.

CA can contribute further to our understandings of this development with its aim to reveal how social actions (e.g., learning) are jointly organized and accomplished through talk-in-interaction. CA accommodates an emic perspective of learning processes, revealing how participants display their own understandings of the current activity as they orient and contribute to the unfolding talk. These understandings are made apparent to the analyst by the shape and

sequential positioning of participants' turns-at-talk, as well as other markers like in-breath or laughter. With a convergence of CA and SCT, the present study developed an in-depth empirical basis for understanding microgenetic development, as it emerges during teacher–learner talk-in-interaction, tracing how learning is accomplished in classroom interactions.

In this study, we were struck by the potential significance of gesture in teaching tense and aspect during our initial observations of the classrooms, and we noted in our field notes key episodes of gesture use, where students appeared to take up, or mirror, the teacher's gesture in some way. As this was an initial exploratory study, we focused only on these key episodes of gesture use (10 in total). Various functions of gesture were featured in these episodes, where the teachers seemingly used gesture for instructional purposes while explaining English temporal concepts, and the students used gesture to respond to the teachers' questions, to engage in self-talk, and to demonstrate and explain understandings of temporal concepts. With the goals of a single case analysis in mind, namely developing a richer, deeper understanding of the phenomenon of interest (Schegloff, 1987), five of these episodes were then selected for further analysis here. By focusing on these selected episodes in as much detail as possible, this study could showcase actual cases where instructors and students dialogically employed gestures during teaching and learning activities and could trace students' microgenetic development. The selected excerpts were transcribed in detail based on CA conventions (ten Have, 2007). McNeill's (2005) notation system was also used to transcribe gesture and other nonverbal elements such as body orientation, eye gaze, facial expression, and the position of participants in the classroom. Transcription conventions and descriptions of important features of gesture employed in the analysis can be found in Appendixes S1 and S2 in the Supporting Information online.

Data Analysis

Five selected excerpts from the two different grammar classrooms were analyzed addressing the research questions. The data analysis was divided into three sections. The first focused on how the teachers used different types of abstract deictic gestures[5] as part of their teaching repertoire. The second dealt with teacher and student use of metaphoric gestures, focusing on gestural catchments between instructors and students for interactional alignment. The final analysis explored one student's conceptual understanding or his "in flight" microgenetic development, exhibited by his appropriation of the teacher's gesture in a new interactional context.

Abstract Deictic Gestures for Teaching and Learning Tense

In this section, we examine how the two teachers used abstract deictic gestures for instructional purposes—specifically to contrast tenses along two different metaphorical timelines, one on the sagittal axis, and the other on the transversal axis. Excerpt 1 and Figure 1 showcase Lisa's use of abstract deictic gestures in the beginner-level grammar course to introduce time expressions associated with the future tense. Previously in the semester, Lisa had covered grammar of the (simple) past tense, so the students were already familiar with the time expressions for the past tense.

Excerpt 1. *I'M GONNA study::*

```
 1. L:    then, for the longer periods of time
 2.       {like week, month, yea:r?}
 3.       {points to the words on the PowerPoint slide with RH}
 4.       instead of saying
 5.       {I studied last week,}
 6.       {waves RH backward over her right shoulder with palm
 7.        facing upward and holds}
 8.       (.) I can say I'M
 9.       {GONNA study::}
10.       {moves LH toward space in front of chest, palm facing
11.        downward; still maintains RH pointing backward as in lines
12.        6-7}
```


Figure 1 *GONNA study::*

```
13. Ss: next week.=
14. L:   ={next [week.}
15.       {holds LH pointing downward as in lines 10-11;
16.        holds RH pointing backward as in lines 6-7}
17. Ss:        [next week.
```

```
18.      (1.0)
19. L:   instead of saying
20.      {I went to:: Italy last summer,}
21.      {waves RH backward over her right shoulder with
22.       palm facing upward and holds}
23.      I could say:
24.      {I'M GONNA go to Italy::}
25.      {moves LH toward space in front at chest level with
26.       palm facing downward; still maintains RH pointing backward
27.       as in lines 21-22}
28. Ss:  next,=
29. L:   ={next summer.}
30.       {quickly moves LH closer to chest with palm facing it}
```

Here, Lisa repeatedly and consistently uses the sagittal axis to contrast past and future tenses. She gestures backward for the past tense (lines 6–7 and 21–22) and forward for the future tense (lines 10–11 and 25–26). Lisa's past tense gesture is synchronized with the phrases *last week* and *last summer*, while her future tense gesture precedes the phrases *next week* and *next summer*. In coordination with this pointing-forward gesture, Lisa simultaneously employs a designedly incomplete utterance (DIU; Koshik, 2002), elongating her speech (*study::* and *Italy::*) and leaving her statement incomplete so as to elicit the responses from students (lines 13 and 28). In addition, at lines 10–12, Lisa gestures forward with her left hand while her right hand holds pointing backward (see Figure 1). Here, the teacher's gestures, maintained in the students' view, mark comparison and contrast, thus enhancing learners' comprehension of the instructional content, specifically the relationship between the two tenses (Alibali et al., 2013; Sime, 2008).

The teacher's gestures along the sagittal timeline reflect directionality in the space-time mapping consistent with the conceptual and linguistic metaphorization of time in English. Because most languages appear to share this spatial metaphor when mapping future, past, and present events in front of, behind, and onto the speaker self, Lisa's gesture would appear to be accessible to all learners, potentially facilitating their learning. In fact, Lisa's repeated use of pointing gesture for past tense bears great resemblance to the teacher's gesture observed in Hudson's (2011) study discussed above. Thus, these abstract deictic gestures associated with past and future tenses may be conventionalized in the classroom and readily employed by instructors, serving as important interactional resources for teaching tenses.

Excerpt 2 comes from a homework-checking activity in the advanced-level grammar class where the teacher, Julie, reiterates an explanation of the past perfect tense with respect to the simple past tense. Unlike Lisa, Julie gestures on
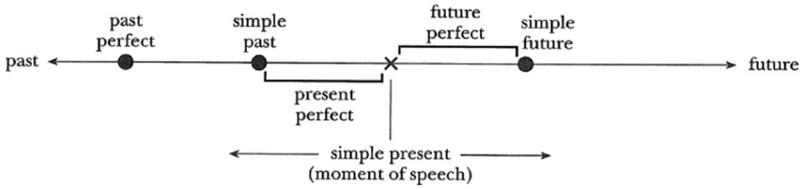
Figure 2 Timeline for English tenses (based on Celce-Murcia & Larsen-Freeman, 1999).

the lateral axis, similar to the participating teacher in Sime (2008). In previous class sessions, Julie had introduced a single lateral timeline as shown in Figure 2 to illustrate the English tense-aspect forms that the students are expected to know. It seems this instructional artifact affected Julie's gesture as she embodied the pedagogic timeline from the students' perspective to review the temporal concept of the past perfect tense.

Excerpt 2. *the **past** of the **past**?*

```
 1. J:    {number six agree?}
 2.       {extends left arm and holds @ chest with palm facing
 3.        up until line 14}
 4.       had just finished?=
 5. S1:   ={yeah,}
 6.       {looks downward at handout}
 7. J:    why?
 8.       (0.5)
 9. S1:   {because}
10.       {looks up and gazes at J}
11.       it's {the past of}
12.            {points backward with LH index finger near shoulder}
```


Figure 3 *the **past** of*

```
13.        {(.) the past?}=
14.        {moves LH further backward, pointing behind shoulder}
```


Figure 4 *(.) the **past**?*

```
15. J:  ={right, right.}
16.        {nods and gazes at S1}
17.     {so, we moved into the past frame of mind,}
18.     {raises both arms from her waist level to head level and
19.      holds, and then moves her whole body to the space on
20.      her right side}
21.     right?
22.     {and had just finis-}
23.     {points downwards with RH in the space to her right side
24.      at waist with the fingers held together}
```


Figure 5 *and **had** just finis-*

```
25.     {finished,}
26.     {walks towards the blackboard}
```

At the beginning of Excerpt 2, Julie confirms with the students that the answer to item six is *had just finished* and elicits their reasoning by asking *why?* at line 7. Following a 0.5 second gap, one of the students (S1) shifts her gaze to Julie and responds to this display question, drawing on the concept of the past perfect tense, *because it's the past of (.) the past*? She reinforces her meaning with two deictic gestures (whose strokes are on *past* for each), moving backward along the sagittal axis (see Figures 3 and 4). However, she also hesitates mid-turn and try-marks her response with rising intonation indicating some uncertainty and a need for confirmation (lines 9–14). Julie responds to S1's call for help by confirming her answer verbally (line 15) and nonverbally (line 16) and then provides additional explanation, elaborating on the temporal reference point involved in the choice of past perfect tense with another set of gestures, described in more detail below.

The interaction between S1 and Julie's gestures is important. S1's use of the sagittal axis is similar to Lisa's, observed in Excerpt 1. S1's two gestures parallel each other in terms of their spatial orientation in that they both assign past-ward direction to backward movements. However, they differ in terms of spatial extent. The student's arm moves further backward for the second gesture, indicating the differences in temporal distance from the reference point (i.e., the current time of speaking). Namely, the first gesture refers to the simple past tense, while the second one refers to the past perfect. These gestures appear to bolster S1's explanation of the temporal aspects from her own character viewpoint. With the use of the sagittal axis, S1's body is construed as a major deictic locus of movement through space and time, such that the present is where she currently stands. Her use of sagittal gestures to explain this abstract temporal concept is probably motivated and grounded by her bodily experiences in space (Lakoff & Jonhson, 1999).

Perhaps in recognition of S1's uncertainty, Julie reformulates the student's talk and gesture. She invokes an imaginary lateral timeline by raising both arms to head level and moving her body to the space at her far right (i.e., to students' left), embodying the shift of reference point from the present to the past along the timeline. This left-to-right timeline also reflects English speakers' tendency to use metaphoric gestures for sequencing events (Cienki, 1998). Furthermore, at lines 22–24, Julie produces an abstract deictic gesture (see Figure 5) synchronized with *and had just finis-*, whose stroke is on *had*, pointing downwards in the space to her right (to students' left) to show that the past perfect tense means *the past of the past*. It can be argued that Julie's body here symbolically depicts the tense (i.e., past) as a larger time frame, while her hand depicts a specific aspect (i.e., perfective) by using finger-bunch, which is

considered as Kendon's (2004) *grappolo* and indicates *specificity*. With these actions, Julie mirrors S1's gestures but projects them from the sagittal onto the transverse plane, which does not incorporate a deictic center in relation to the present tense of her body and allows her to represent tense from the observer, or student viewpoint.

Although S1 and Julie are referring to the temporal concept of the past time along different axes, we argue that the gestures can constitute a catchment (see Arnold, 2012, for the detailed criteria for identifying catchments). S1's and Julie's gestures both reflect the core meaning of *past time* and the distance between the two past tenses. This gestural catchment plays a significant role in achieving intersubjectivity (i.e., a shared understanding) and alignment between Julie and S1, as well as the other students. In addition to accepting S1's verbal response as *right* (line 15), Julie also appears to use the catchment to elaborate upon S1's explanation for the benefit of the whole class, given the expressiveness and considerable amplitude of her gesture synchronized with movement of her entire body.

Excerpt 2 demonstrates that while explaining tenses associated with past time, Julie gestured on the lateral axis in a systematic manner.[6] She likely projected S1's gesture onto the lateral axis for instructional purposes—to be consistent with the diagram (Figure 2) she had introduced previously. This resonates with Casasanto and Jasmin's (2012) claim that laterally oriented mental metaphors for time correspond to conventions in representations of cultural artifacts, such as calendars and graphs. Such consistency may facilitate the process of learning the two tenses related to the past. Moreover, Julie's preference for lateral over sagittal gestures may be motivated by pragmatic reasons. The kinematics of lateral hand movements allows for a greater number of intervals and more precision of time than ones along a sagittal axis, which enables the instructor to make productive use of an analog spatial continuum on the lateral axis (Casasanto & Jasmin, 2012). By comparison, a change in depth or temporal distance on the sagittal axis is more difficult for students to perceive than a change in lateral position of the same size. However, for S1, who attempted to explicate temporal concepts mainly to her teacher, the gestures on the sagittal axis appeared to function adequately. In short, although both sagittal and transversal temporal gestures appear to be common among English speakers based on both extant research and our data, English teachers may opt for lateral gestures for contrasting multiple and more complex temporal concepts for learners because of the greater information value involved.

Put simply, the teachers' uses of gesture serve both interactional and pedagogical purposes and therefore can be considered important elements of their

ICT. The two teachers had been observed to resort to different space-time mappings in their use of abstract deictic gestures for teaching English tenses. Yet tense was treated as inherently deictic in both cases. In the beginner-level grammar class, Lisa used sagittal gestures to contrast the past and future tenses, mapping the past and the future to backward and frontward movements, respectively. Her use of pedagogical gestures was consistent with the temporal metaphors found in English and many other languages and thus could facilitate the learning of linguistic expressions about time in English. In contrast, in the advanced-level grammar class, Julie gestured laterally to contrast the past tense with the past perfect, using the space to her right and to the students' left to demonstrate the temporal distance between the two past-related tense-aspect combinations. Her use of pedagogic gestures was most likely motivated by the previously introduced instructional artifact and by the greater information value conveyed by the lateral gestures. Julie's gesture use also reflected English writing direction, which is potentially problematic for learners with an Arabic L1 background owing to their opposite writing direction; however, the students in her class did not discernibly display such difficulty during the interactions we observed.

We claim that the difference in Julie's and Lisa's gesture use may have been motivated by and adjusted to their students' levels of proficiency or the complexity of grammatical knowledge being taught. Lisa's major purpose was to contrast two tenses, while Julie had to deal with tense and aspect simultaneously. Despite such different uses of gesture, based on the analysis, abstract deictic gestures seem to be effective components of the gestural repertoire of teacher talk, especially in the context of teaching English tenses.

Metaphoric Gesture for Teaching and Learning Aspect

This section addresses the use of metaphoric gestures in two excerpts. The first excerpt comes from Julie's advanced-level grammar class. It is related to grammatical aspect (i.e., present progressive). Julie and the students were reviewing two characteristics of progressive verbs already discussed during the previous class. Prior to this sequence of talk, S1[7] correctly answered Julie's question about the first characteristic of progressive verbs, namely, that the subject controls the action. Julie then moved on to the second characteristic of present progressive.

Excerpt 3. *u:h, extended **period.***

```
1. J:   {what's the}
2.      {RH index and middle fingers extended upward,
3.       indicating ''two''}
```

```
 4.        second (0.5) characteristic that we want?
 5.        (1.0)
 6. S1:    u:h, (0.5) extended
 7.        {period.}=
 8.        {raises BH in front of his body with palms facing each
 9.         other at chest, as if holding something between them,
10.         moves BH apart laterally with all fingers spread
11.         out, then moves BH downward with palms facing downward}
```


Figure 6 *period.*

```
12. J:     =goo:d, goo:d,
13.        °it° happens over an extended period of time.
14.        {(0.5) okay?}
15.        {walks toward desk while gazing at PowerPoint slide}
16.        {so even if it's}
17.        {quickly shifts gaze toward class, and extends RH
18.         thumb and index finger with a small gap between them}
19.        {a little (.) short period of time,}
20.        {raises BH in parallel in front of body at chest
21.         with palms facing each other with a small gap
22.         between them}
```


Figure 7 *a little (.)* **short** *period of time,*

```
23.        (.) like, {are you joking,}=
24.                  {suddenly drops both arms and tilts her
25.                   head to her right side}
26. S?:    =hahah,
27. J:     (1.0) right? (0.5) u:hn,
28.        °it°{means right now.}=
29.            {has RH's index finger straightened out, points
30.             down at chest level and circulates a few times
31.             with reduced amplitude}
```


Figure 8 *means **right now***.

```
32. S1:    =uh-huh,
33. J:     {it's happening right now.}
34.        {body and gaze orient to PowerPoint slide, makes same
35.         circular motion with RH as in lines 29-31}
```

At lines 1–4, Julie asks students to supply the second characteristic of the present progressive, and S1 answers, *extended period*. S1 employs a series of gestural movements along with speech as an interactional resource for explaining the grammatical concept. When he utters *period*, he simultaneously employs the metaphoric gesture (see Figure 6) depicting a period of time in the form of a container. This container gesture (McNeill, 1992) can be interpreted as representing a bounded action or event related to progressive verbs. Furthermore, S1's gesture entails the process of expanding by moving his hands apart laterally. The gesture stroke is on the word *period*, which exhibits the focused energy and highlights his intended meaning. At line 12, responding to S1's answer, Julie provides acknowledgement by saying, *goo:d, goo:d*. Next,

she elaborates on S1's response and expands it into a fully grammatical sentence: °*It*° *happens over an* <u>*extended*</u> *period of time*, emphasizing *extended*. This serves as confirming S1's answer. Then, the teacher's tag question, *okay?* (line 14) functions as a comprehension check.

From line 16, Julie initiates an additional explanation by saying, *So* <u>*even*</u> *if it's* <u>*a little*</u> *(.) short period of time*. She concurrently employs a metaphoric container gesture (see Figure 7) that depicts the period of time by extending her hands in parallel in front of her body with a small gap between them (lines 19–22). By producing a smaller container with the stroke of her gesture falling on *short*, Julie's gesture highlights that the progressive may be used even in reference to a limited period of time. This is in contrast to S1's speech and gesture, which emphasized an extended period of time with outward movement of his hands. Nevertheless, S1's and Julie's gestures constitute a catchment, because both entail the key element of a period of time or boundedness. With this dialogic catchment, Julie displays alignment with S1, but with slight variations in its production, she is able to creatively emphasize the new information she provides in her additional explanation. This turn demonstrates the high level of ICT required for the construction of such dialogic catchment in the contingency of classroom interaction. Julie must attend to S1's talk and gesture and then spontaneously shape her own talk and gesture into an effective reformulation of his response for the class, potentially mediating learning for S1 and the whole class.

At lines 23–25, Julie gives the example, *like, are you joking*, and embodies the person who is saying the phrase by suddenly dropping both arms and tilting her head. Following the confirmation check *right?* Julie summarizes the major characteristic of progressive aspect by utilizing gesture synchronized with the speech, *means right now*. The metaphoric circular motion of the gesture indicates a state of continuous action, while the deictic aspect of the gesture, pointing downward in front of the body, indicates the immediate present time frame. Thus, Julie's gesture (see Figure 8) demonstrates a synthesis of the two elements, tense and aspect—present and progressive. The stroke is on *right now*, which highlights the interaction between tense and aspect in her use of the present progressive. Here, again it exhibits Julie's active use of gesture for explaining the grammatical concepts. In response, S1 claims understanding with an acknowledgement token *uh-huh* (line 32), potentially indicating his interactional competence for learning and his uptake of Julie's use of gesture synchronized with speech. Julie then reemphasizes the key point verbally and gesturally, saying *it's happening right now* while producing a gestural catchment of her previous turn. The use of this monologic catchment might show evidence

that Julie employs a series of gestures for pedagogical purposes as part of her ICT, and such strategic, consistent use of gesture can facilitate her students' learning of abstract concepts related to tense and aspect.

The next excerpt is from the beginner-level course. It is related to the simple present tense. Lisa was introducing the concept of simple present as it is associated with the concepts of habit or routine. Immediately prior to this sequence of talk, she wrote down these key words on the blackboard.

Excerpt 4. *rou**tine,***

```
 1. L:    ((turns back to class after writing on board))
 2.       habit or routine,
 3.       {a habit or routine is}
 4.       {moves closer to students}
 5.       something that you do:,
 6.       {(0.5)}
 7.       {((holds BH @ waist, palms facing up, moves BH inward to
 8.          center of body and then returns to right or left,
 9.          which creates circles))
10. S1:   every day,=
11. S?:   =°every time,°
12. S1:   [>every day?<
13. L:    [almost,{yea:h!}
14.               {nods several times}
15.       (1.0) over and {over and over again.}
16.                      {holds BH at chest, palms facing her body,
17.                       and moves them in circular manner and
18.                       continues the same motion until line 22}
```


Figure 9 *over and over again.*

```
19. S1:  {routine,}
20.        {quickly rotates RH forward twice @ chest with a pen
21.         pointed inward}
```


Figure 10 *routine*,

```
22. L:   (0.5) yea:h!
23.        {okay?}
24.        {body orients toward PowerPoint slide and shifts gaze to
25.         it}
```

After Lisa oriented to the class and stated *habit or routine*, she produced a DIU (*something that you do:*) and the ensuing nonverbal behavior (lines 7–9) also appeared to invite the students' completion of her turn at lines 10–12 (*every day*, *every time*, and *every day?*). In response to the students' completion, Lisa provided feedback, saying *almost, yea:h!* while nodding. Subsequently, Lisa initiated her explanation of the concept of habit or routine by saying *over and over and over again*, to which she synchronized a circular-motion gesture (see Figure 9) with emphasis and strokes on *over*. This turn appeared to be Lisa's clarification of the students' responses. With this metaphoric gesture, she illustrated the meaning of over, targeting her beginner-level class. Even if the students did not know what over meant, they probably understood her meaning due to the metaphoric circular gesture. Lisa conveyed the repetitive nature of habit or routine to students via both verbal and gestural channels and highlighted her focused meaning by continuing this circular motion even after the next turn was taken by S1 (line 19). Her gesture may have enhanced the

semantics of the speech that it accompanied and had the potential to promote learning (Olsher, 2008), especially in the context of beginner-level class interactions where it served a clear instructional purpose —to illustrate the notion of routine or habit, which was probably new to most of the students. Such strategic use of gesture is indicative of Lisa's ICT.

In examining ICT as it relates to teachers' use of gesture, it is equally important to consider whether and how students take up teacher's gesture so as to ascertain its pedagogical value in classrooms (Goldin-Meadow & Alibali, 2013). At lines 19–21, S1 states *routine* and at the same time quickly rotates his right hand forward twice (see Figure 10). S1's gesture, with the stroke on the second syllable (-*tine*) can be considered a gestural catchment of Lisa's metaphoric gesture because it embodied the element of repetition with its circular motion. S1's catchment is evidence of his attending to both the teacher's talk and gesture as relevant resources for learning and clearly demonstrates his ICL. He appeared to imitate the gesture that Lisa originally employed to support his own linguistic performance. He demonstrated his understanding of the instruction by mirroring Lisa's gesture and mapping its meaning of *over and over* onto the official language describing the present tense: routine. Furthermore, his imitation of Lisa's gesture might have been beneficial in internalizing (Lantolf & Thorne, 2006) the abstract temporal concept by enacting his cognition in spatio-motor modality. S1's use of dialogic catchment may also have served important relational functions as he was able to achieve interactional alignment with Lisa (McNeill, 2005), perhaps he was even able to build interpersonal rapport with the teacher (McCafferty, 2002).

At line 22, Lisa oriented to S1's response as a demonstration of his refined understanding and indicated her approval by saying *yea:h!* It follows that the teacher recognized the student's gesture as a resource for monitoring and assessing student understanding in interaction. Notice that the student's verbal utterance (*routine*) in and of itself did not include any signs of how he understood the concept. Rather, the definition of routine was only expressed in his gesture. As McNeill (2000) states, speech and gesture form a dialectical unit that either co-expresses or complements meanings expressed via speech and must be analyzed as a whole, which he calls the "growth point." Furthermore, Goldin-Meadow and Alibali (2013) argue that learners express some aspects of knowledge only through gesture, often employing gesture for exploring how to solve problems and generate new ideas. We argue that S1's gesture was actively employed for demonstrating the meaning of routine, which serves as a mediational tool and might index the transitionary state of his knowledge in the learning process.

In summary, the two excerpts above illustrated gestural interactions between students and instructors in the L2 classrooms. Both students and instructors closely monitored each other's gesture as well as speech and made use of gestural resources for establishing intersubjectivity. It can be argued that gestural catchments constructed by the teachers and students are displays of interactional alignments. Additionally, variation in teacher catchment of a student gesture may serve significant pedagogical functions. As observed in Excerpt 3, teachers can build on students' gestures and flexibly and creatively adjust them for specific pedagogical purposes. The dialogic process in which teachers use gesture for explaining temporal concepts and students take up this gesture for demonstrating understanding can be beneficial for students' learning about grammatical concepts, and therefore reflects high interactional competence for teaching and learning. This analysis further demonstrated that interactional competence for teaching and learning are inseparable and co-constructed by participants in interaction.

Appropriation of Gesture as an Indication of Developing Conceptual Understanding

Teachers must tailor their instruction to suit students' existing levels of understanding. This understanding is not just measured through formal assessments, but also through constant monitoring and looking for displays of understanding, or lack thereof, during classroom instruction. This monitoring requires a high level of ICT as these displays may be provided through gestural and/or verbal means. Thus, teachers' ICT is not just comprised of their ability to effectively deploy gestures for instructional purposes, but also to attend to student gesture as a means for monitoring understanding. Likewise, as demonstrated in Excerpt 4, learners' ICL is not just comprised of their ability to notice teacher gesture for the purposes of comprehension, but also involves the ability to display their understandings to the teacher via gestural and verbal means. This final analysis section provides a preliminary discussion of possible evidence of one student's developing conceptual understanding, which is exhibited by his appropriation of the teacher's gesture in a new interactional context. Excerpt 5 occurred a week after the lesson containing Excerpt 4. Lisa was reviewing the grammar covered during the previous class, the present tense in relation to the concept of routine or habit.

Excerpt 5. *every **day**.*

```
1. L:   ((looks at PowerPoint slide))
2.      a:nd, we a:lso talk about
3.      ((points in the direction of PowerPoint with BH))
```

```
 4.        >one of the times<
 5.        ((shifts gaze toward class))
 6.        we use this (.) is for habit o::r?
 7.        (1.5)
 8. S2:    routine.
 9.        (0.5)
10. L.     [{routine.}
11.         {points in S2's direction with LH, palm facing her body}
12. Ss:    [routine.
13. L:     what do these words mean?
14.        (1.5)
15. S2:    every {day.}
16.              {raises BH at face, palms half-cupped and facing
17.               each other, and fingers curved, makes small gap
18.               between BH, and rotates BH forward once with
19.               small amplitude}
```


Figure 11 *day*.

```
20. L:     {something,}
21.        {starts rotating BH}
22.        {uh:?}
23.        {stops rotating BH and holds; positions RH near right
24.         shoulder and LH at chest in the center of her body
25.         until 34}
26.        ((tilts head to her right side))
27.        does it have to be every day?
28.        (0.5)
29. S2:    No!{(u:h ter,)}
30.            {quickly rotates BH once in same manner as lines 16-19
31.             while gazing at hands}
32.        ((very briefly looks up leftward and then gazes back
```

```
33.        to L))
34.     {usually,}                        {always.}=
35.     {rotates BH twice very quickly} {rotates BH once}
36. L:  =yeah!
37.     [{again and again and again.}
38.      {rotates BH three times forward @ chest level with greater
39.       amplitude than S2's}
```


Figure 12 *again* and *again* and *again*.

```
40. S2: [((nods a few times))
41. L:  ((shifts gaze at PowerPoint slide)) alright?
```

The excerpt begins with Lisa using another DIU: *we use this is for habit o::r?* A 1.5-second silence follows, where no one takes up the next turn, and Lisa waits for a student response, which S2 provides (line 8). In conjunction with the whole class, Lisa repeats the response (*routine*), confirming his answer. Next, Lisa asks students to provide the meanings for the words, habit and routine (line 13), and S2 answers, *every day*. He quickly rotates both hands forward once in front of his face (see Figure 11). S2's gesture is very similar to Lisa's gesture synchronized with her utterance *over and over again* in Excerpt 4 (see also Figure 9). In other words, S2 dialogically reproduces Lisa's gesture. Thus, S2's gesture constitutes a catchment, and this gesture synchronized with speech becomes an interactional resource for him to demonstrate his current understanding of the simple present tense and evidence of his microgenetic development, albeit over a short time span (Vygotsky, 1978; also see Lantolf & Thorne, 2006). The fact that S2 himself initiated this gesture and utilized it in a new contextual environment strengthens this argument. Lisa's gesture,

which had been available between teacher and learners before, was probably integrated into S2's psychological system as a mediational means that can function as thinking about and explaining the meaning of routine.[8]

At lines 20–27, Lisa initially mirrors S2's circular gesture, but stops and says *uh:?*, indicating a problem with the response. Shifting to initiate repair of S2's utterance, Lisa signals the trouble by tilting her head and asking, *does it have to be every day?* In the previous class, Lisa explained the concept of habit or routine as follows: *And all of the things are habit or routine. Again and again. That doesn't have to be every day*, with the same metaphoric circular-motion gesture observed in Excerpt 4. Based on this contextual information, S2's understanding of the simple present is not completely accurate at this moment. Although he uses a circular motion gesture similar to the teacher's for demonstrating his understanding that the concept of habit or routine involves repetitive actions/events, S2's speech (*every day*) is not expansive enough to explain this same understanding, and there appears to be a slight gap between S2's synchronized gesture and speech. This gap may have resulted from a discrepancy between the teacher's circular motion gesture, which relates habitual action to continuous motion, and her distinction between *every day* and *almost every day*, as seen in Excerpt 4. This leaves the learner with the task of reconciling the conflicting visual and verbal representations.

This reconciliation is perhaps visible in the subsequent sequence, which exhibits additional intrapersonal or self-regulatory gestural functions that mediate S2's learning in the L2. At lines 29–31, corresponding to Lisa's repair initiation, first S2 briefly responds *No!* Noticeably, while S2 is saying something like *u:h ter*, he employs a metaphoric gesture while gazing at his hands. This shift in gaze to his hands potentially indicates a shift to the mode of self-talk. Then at line 32, he quickly looks left and upward, indicating that he has encountered some problem and needs time for thinking in his L2. Use of gesture may compensate for difficulties with speaking in the L2 (Gullberg, 1998) as it can provide learners with a means for regaining control over verbal performance, externalizing their internal thinking process and mediating their thinking and learning (Lantolf, 2010; van Compernolle & Williams, 2011). Accordingly, it appears that S2, as a beginner-level learner, used gesture as a compensatory strategy to self-regulate his thinking and to search for appropriate verbal expressions. At lines 32–33, S2 looks back to Lisa, signaling that he is now engaged in communication with her. He again employs the metaphoric circular-motion gesture along with the repaired verbal expressions, *usually* and

always in order to show Lisa the image of repetitiveness in relation to the meaning of habit or routine. Here, S2's repeated use of gesture seems to be effective so that Lisa is able to confirm his current understanding of the concept through "a gesture-based window" (McNeill, 2005, p. 117).

Lisa accepts S2's alternative answers as correct by saying *yeah!* At this point, the repair sequence initiated by Lisa is resolved successfully. She then mirrors S2's gesture with greater amplitude (see Figure 12), producing each stroke on each repetition of *again*. This gesture constitutes a catchment and serves the pedagogical function of recapping the major concept, repetitiveness for the whole class. Finally, during Lisa's gesture synchronized with speech, S2 nods a few times, which may demonstrate his attention to his teacher's gesture and show agreement with the utterance. Thus, this gesture can be considered pedagogical, and the analysis here lends support for the argument that both teachers and students need to be aware of their use of gesture as interactional resources for teaching and learning in the L2 classroom.

In summary, S2's use of a metaphoric gesture, appropriated from Lisa the previous week and applied in a new context, provided some evidence of his developing, albeit incomplete, conceptual understanding of the present tense. Excerpt 5 may mark an important moment in the process of his learning English temporal concepts, where "in flight" qualitative changes in his thinking are made visible through his gesture-talk-in interaction. The appropriation of his teacher's gesture in the new context illustrated the student's L2 conceptual understanding or development in the gestural mode, while his verbal mode of explanation was not as expansive as the gestural one. In other words, S2's gesture synchronized with speech exhibited his ongoing process of conceptual understanding, which still needs to progress. This instance correlates with the finding that learners' understanding often appears in the gestural mode before the verbal expression of thinking emerges (McCafferty, 1998; Lantolf, 2010; van Compernolle & Williams, 2011) and supports Gullberg's (2006) argument that learners' gestures in the L2 may provide valuable information about their mental language acquisition processes. This analysis also lends support to the arguments that learners' gestures help externalize their internal thinking processes (usually obscured in speech, especially among beginner-level L2 learners), reduce their cognitive effort, and render their thinking visible to the public for inspection (see also Goodwin, 2007). Thus, if L2 teachers pay enough attention to learners' gestures in relation to abstract concepts, such gestures become important interactional resources for tailoring instructions to learners' current states of conceptual understanding.

Discussion

In response to our first question regarding the functions of teacher gesture in teaching English temporal concepts, the teachers in the two grammar courses used abstract deictic gestures to contrast tenses (Excerpts 1–2) and metaphoric gestures to represent such aspectual concepts as progressive (Excerpt 3) and habitual (Excerpts 4–5) as part of their gestural teaching repertoire. The gestures employed by the teachers helped make abstract grammatical concepts concrete and visible to students in the classroom. More importantly, the teachers appeared to use these gestures as pedagogical tools in a consistent manner, in particular, by employing monologic gestural catchment. Furthermore, the teachers also employed dialogic catchments to show their agreement with students and even highlight specific meanings of the concepts for the entire class by gesturing with increased amplitude (in Excerpt 5) or with slight reformulations of the students' original gesture (in Excerpt 3). We argue that all of these pedagogical gestural practices for teaching grammar reflect the teachers' high ICT.

In relation to our second research question with regards to the roles of student gesture in classroom discussions of English temporal concepts, students in two different-level grammar classrooms effectively used gestural catchments in order to display alignment with their teachers and demonstrate understanding of temporal concepts. This use of gesture reflects their attention to their teachers' gestural behaviors and demonstrates their high ICL. Dialogic catchments seem to be crucial in an interactional context like an ESL classroom where mutual understanding is essential for learning in the L2. Perhaps, most importantly, students also appropriated the teachers' gesture as a mediational tool for explaining and learning grammatical concepts, as observed in Excerpt 5. Furthermore, also observed in Excerpt 5, gesture seemingly enabled learners to self-regulate their own thinking and speaking in the L2, especially when they encountered some problems to repair. This function is closely related to Slobin's (1996) notion of "thinking for speaking," namely, how learners organize their thinking to meet the demands of linguistic encoding online during the act of speaking. We argue that recurrent teacher gestures may become an effective mediational means for student thinking and facilitate their understanding and learning of L2 grammar. This study suggests that close examination of students' reactions to teachers' gestures (i.e., gestural interactions between teachers and students) is indeed necessary to fully understand their use in the classroom and their pedagogical impact on students' learning and development.

With respect to the third research question, which asked how teachers' gestures impact students' L2 conceptual understanding of English tense and

aspect, we cannot make strong arguments about the effects of gestures on students' learning based on current analyses, because our data were limited. Nonetheless, we can claim from Excerpt 5 that S2's gesture synchronized with speech indicates his conceptual understanding in progress since this student appropriated his teacher's gesture and employed it in a new context. This shows evidence of his adoption of the teacher's gesture as his own explanatory and learning tool. Thus, the analysis of the speech and gesture interface can provide "an enhanced window" (McNeill & Duncan, 2000, p. 144) into L2 learners' thinking and such a window would not have been apparent if only the speech aspect had been considered. Simply put, verbal and gestural elements need to be examined together when considering L2 learners' developmental processes of grammatical concepts, as Smotrova (2014) similarly argued. This study has demonstrated that the two L2 teachers do make use of learners' gesture as a resource for better understanding their current knowledge states, predicting their cognitive changes, and customizing input that can scaffold their developing understanding. Teacher attention to student gesture then can serve to further facilitate learners' conceptual understanding of L2 grammar.

With regards to conceptual metaphor theory related to time and space, the data analysis generally supported existing research on conceptualization of time and its mapping between space and time in English. Both teachers in this study repeatedly and consistently employed abstract deictic and metaphoric gestures for teaching tenses that reflect a linear theory of time, consistent with the conceptual and linguistic metaphorization of time in English and most other languages (cf. Lakoff & Johnson, 1999; Núñez & Sweetser, 2006). Also, students used or mimicked these gestures for explaining and learning L2 tense and aspect meaningfully. This imitation through gesture might be advantageous for learners' understanding complicated time-related concepts as they use embodied action to ground abstract concepts onto their bodily experiences. We also argue that L2 teachers may benefit from greater awareness of how students' linguistic and cultural backgrounds may influence their conceptualizations of time (e.g., the direction of time from right to left in Arabic culture). This might enable teachers to customize mediations appropriate for learners based on their L1s.

Pedagogical Implications

Finally, we would like to discuss pedagogical implications of our findings. Since L2 learners seem to pay attention to teachers' gestures and appropriate them to facilitate their learning processes, it can be argued that L2 teachers should be aware of the impact of their own gestural usage in terms of "regulating and supporting appropriate learning behavior among students" (Sime, 2008,

p. 228). The present study provided additional empirical evidence to support this claim, illustrating L2 learners' awareness and use of teachers' gestures as relevant interactional resources for learning. Clearly, gestures that L2 teachers produce during their lessons matter for students' learning and development, but teachers' pedagogical use of gestures has been so far considered less frequently than verbal aspects of teacher talk in teacher education. As Smotrova (2014) suggests, "intentional instructional gestures" (p. 297) can be an important component for L2 teacher education programs. Empirical research is crucial, however, for composing specific recommendations regarding how L2 teachers can most effectively use gesture in their classrooms. The findings of this study thus contribute to our understanding of the gestural repertoire of teacher talk, especially in the context of grammar pedagogy. Furthermore, L2 teachers need to pay attention to student gestures for explaining and demonstrating their understandings of grammatical concepts, because student gestures may be invaluable resources for evaluating and assessing their ongoing learning processes and for reformulating instructions according to these evaluations. In short, we argue that gesture should be construed as an important element of ICT and ICL, and gesture thus warrants additional study in a variety of L2 classroom contexts in order to more fully understand its impact on teaching and learning of L2 grammar.

Limitations and Conclusion

One limitation of this study is related to a need for further longitudinal research that can link microgenetic development to ontogenetic development. While the present study considers only one student's appropriation of teacher gesture for use in a new context (Excerpt 5), evidence of ontogenetic development, or L2 learners' internalization (i.e., transformation of thinking and acting to make them one's own) of temporal concepts, also needs to be examined in a wider range of interactional contexts. As Lantolf and Thorne (2006) argue, internalization can be observed in the learner's appropriation of a mediational means as one's own in a variety of new contexts. It would thus be beneficial to observe L2 learners' self-initiated use of gesture within a longer timeframe in order to show stronger evidence of learning and development of L2 grammar in relation to the language-gesture links. Similarly, another limitation is that videotaping occurred only once a week, which missed two other weekly class sessions, so we were not able to track individual developmental processes transpiring on those days.

In order to overcome these limitations, future studies could possibly employ pretesting and posttesting for assessment of learners' L2 grammatical knowledge and tracking learners' ontogenetic development. Such quantitative

measures can complement the qualitative analysis of classroom interactions. Another possible approach is to conduct stimulated recall interviews with individual learners to more closely examine the link between learners' gestural usage and development of conceptual understanding. This could lead to valuable insights regarding the difficulties L2 learners face in learning English tense and aspect owing to possible crosscultural differences in the conceptualizations of time and metaphor caused by their L1s.

Finally, based on the present study, we propose two important future research endeavors. The first would be to explore the question of whether and how crosscultural differences in conceptualizations of time might interfere with learning and teaching tense and aspect, which was not clearly answered in this study. Integrating stimulated recall interviews with students and instructors can be a promising approach. Second, conceptual metaphor of aspect in relation to teaching and learning needs further investigation since such research remains scarce in comparison to that investigating tense. For example, discovering whether L2 learners and teachers in different instructional contexts employ similar container and metaphorical circular-motion gestures to those observed in the present study would lend greater insight into their pedagogical use and effectiveness. In sum, we anticipate future empirical work that illustrates gestural interactions between teachers and students in the classroom and illuminates the impact of gesture on teaching and learning of L2 grammar.

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Notes

1 The notions of interactional competence for teaching and learning are closely related to Walsh's (2006) notion of classroom interactional competence. Because teachers and students generally adopt distinct participant roles in classroom interaction, we find ICT and ICL to usefully focus on the actions of teachers and students, respectively. This distinction allows analysts to readily discuss the implications of research with respect to how teachers and students may tailor their actions in light of research findings.

2 With gestural catchments, we refer to recursive gestures that share both form and meaning and create discursive cohesion among students and teacher in the classroom. For instance, in Smotrova and Lantolf (2013), two students aligned with each other by employing the same metaphoric gesture that exhibits their understanding of *look outward* (i.e., moving right hand upward above their heads, then forward and back to their shoulders).

3 We have obtained permission from all participants to use their images in publications.

4 All participants are given pseudonyms (for instructors) or codes (e.g., S1 or S2).

5 The categories of gesture that appeared in the data analysis (namely, "abstract deictic gestures" and "metaphoric gestures") are not used in a deterministic manner. We acknowledge that gestures may simultaneously be abstract deictic and metaphoric, since gestures can have multiple domains (McNeill, 2005). For a pragmatic purpose, we highlight the specific domain of gesture in relation to teaching and learning English tense and aspect.

6 At a monthly research meeting held during the data collection, the research team viewed a clip of this excerpt and Julie mentioned such systematic use of her gesture for teaching and discussing tense and aspect.

7 Student codes are reused across transcripts (i.e., S1 from Excerpt 2 is not the same S1 in Excerpt 3).

8 S1 who used a circular motion gesture one week previously (in Excerpt 4) and S2 who used the similar gesture (in Excerpt 5) are two different students. Yet S2 was present in the classroom the previous week and Lisa's gestures were equally available to all students in class.

References

Alibali, M. W., Heath, C. D., & Myers, J. H. (2001). Effects of visibility between speaker and listener on gesture production: Some gestures are meant to be seen. *Journal of Memory and Language*, *44*, 169–188. doi:10.1006/jmla.2000.2752

Alibali, M. W., Young, A. G., Crooks, N. M., Yeo, A., Wolfgram, M. S., Ledesma, I. M., et al. (2013). Students learn more when their teacher has learned to gesture effectively. *Gesture*, *13*, 210–233. doi:10.1075/gest.13.2.05ali

Allen, L. Q. (2000). Nonverbal accommodations in foreign language teacher talk. *Applied Language Learning*, *11*, 155–176.

Arnold, L. (2012). Dialogic embodied action: Using gesture to organize sequence and participation in instructional interaction. *Research on Language & Social Interaction*, *45*, 269–296. doi:10.1080/08351813.2012.699256

Bavelas, J., Gerwing, J., Suttton, C., & Prevost, D. (2008). Gesturing on the telephone: Independent effects of dialogue and visibility. *Journal of Memory and Language*, *58*, 495–520. doi:10.1016/j.jml.2007.02.004

Belhiah, H. (2013). Using the hand to choreograph instruction: On the functional role of gesture in definition talk. *The Modern Language Journal*, *97*, 417–434. doi:10.1111/j.1540-4781.2013.12012.x

Boroditsky, L. (2011). How languages construct time. In S. Dehaene & E. Brannon (Eds.), *Space, time and number in the brain: Searching for the foundations of mathematical thought* (pp. 333–341). London: Elsevier.

Boroditsky, L., Fuhrman, O., & McCormick, K. (2011). Do English and Mandarin speakers think about time differently? *Cognition*, *118*, 123–129. doi:10.1016/j.cognition.2010.09.010

Casasanto, D., & Jasmin, K. (2012). The hands of time: Temporal gestures in English speakers. *Cognitive Linguistics*, *23*, 643–674. doi:10.1515/cog-2012-0020

Celce-Murcia, M., & Larsen-Freeman, D. (1999). *The Grammar book: An ESL/EFL teacher's course* (2nd ed.). Boston: Heinle & Heinle.

Cienki, A. (1998). Metaphoric gestures and some of their relations to verbal metaphoric expressions. In J. P. Koenig (Ed.), *Discourse and cognition: Bridging the gap* (pp. 189–204). Stanford, CA: CSLI Publications.

Goldin-Meadow, S., & Alibali, M. W. (2013). Gesture's role in speaking, learning, and creating language. *Annual Review of Psychology*, *64*, 257–283. doi:10.1146/annurev-psych-113011-143802

Goodwin, C. (2007). Environmentally coupled gestures. In S. D. Duncan., J. Cassell., & E. T. Levy (Eds.), *Gesture and the dynamic dimension of language* (pp. 195–212). Amsterdam: John Benjamins.

Gullberg, M. (1998). *Gesture as a communication strategy in second language discourse*. Lund, Sweden: Lund University Press.

Gullberg, M. (2006). Some reasons for studying gesture and second language acquisition. *International Review of Applied Linguistics*, *44*, 103–124. doi:10.1515/IRAL.2006.004

Gullberg, M. (2008). A helping hand? Gestures, L2 learners, and grammar. In S. G. McCafferty & G. Stam (Eds.), *Gesture: Second language acquisition and classroom research* (pp. 185–210). New York: Routledge.

Hall, J. K. (1999). A prosaics of interaction: The development of interactional competence in another language. In E. Hinkel (Ed.), *Culture in second language teaching and learning* (pp. 137–151). New York: Cambridge University Press.

Hall, J. K. (2014, March). Interactional competence for L2 teaching. Colloquium organized at the annual conference of the American Association for Applied Linguistics, Portland, OR.

Hall, J. K., Hellermann, J., & Pekarek Doehler, S. (Eds.). (2011). *L2 interactional competence and development*. Clevedon, UK: Multilingual Matters.

Hall, J. K., & Smotrova, T. (2013). Teacher self-talk: Interactional resource for managing instruction and eliciting empathy. *Journal of Pragmatics*, *47*, 75–92. doi:10.1016/j.pragma.2012.11.017

Hudson, A. (2011). *Teacher gesture in a post-secondary English as a second language classroom: A sociocultural approach*. Unpublished doctoral dissertation, University of Nevada, Las Vegas.

Kendon, A. (2004). *Gesture: Visible action as utterance*. Cambridge, UK: Cambridge University Press.

Kita, S., Danziger, E., & Stolz, C. (2001). Cultural specificity of spatial schemas, as manifested in spontaneous gestures. In M. Gattis (Ed.), *Spatial schemas and abstract thought* (pp. 115–146). Cambridge, MA: MIT Press.

Koshik, I. (2002). Designedly incomplete utterances: A pedagogical practice for eliciting knowledge displays in error correction sequences. *Research on Language and Social Interaction*, *35*, 277–309. doi:10.1207/S15327973RLSI3503_2

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to Western thought*. New York: Basic Books.

Lantolf, J. P. (2000). *Sociocultural theory and second language learning*. Oxford, UK: Oxford University Press.

Lantolf, J. P. (2010). Minding your hands: The function of gesture in L2 learning. In R. Batstone (Ed.), *Sociocognitive perspectives on language use and language learning* (pp. 131–150). Oxford, UK: Oxford University Press.

Lantolf, J. P., & Thorne, S. (2006). *Sociocultural theory and the genesis of second language development*. Oxford, UK: Oxford University Press.

Lazaraton, A. (2004). Gesture and speech in the vocabulary explanations of one ESL teacher: A microanalytic inquiry. *Language Learning*, *54*, 79–117. doi:10.1111/j.1467-9922.2004.00249.x

Macbeth, D. (2011). Understanding understanding as an instructional matter. *Journal of Pragmatics*, *43*, 438–451. doi:10.1558/lhs.v6i1-3.43

Markee, N. (2008). Toward a learning behavior tracking methodology for CA-for-SLA. *Applied Linguistics*, *29*, 404–427. doi:10.1093/applin/amm052

McCafferty, S. G. (1998). Nonverbal expression and L2 private speech. *Applied Linguistics*, *19*, 73–96.

McCafferty, S. G. (2002). Gesture and creating zones of proximal development for second language learning. *The Modern Language Journal*, *86*, 192–203. doi:10.1111/1540-4781.00144

McCafferty, S. G. (2004). Space for cognition: Gesture and second language learning. *International Journal of Applied Linguistics*, *14*, 148–165. doi:10.1111/j.1473-4192.2004.0057m.x

McNeill, D. (1992). *Hand and mind*. Chicago: University of Chicago Press.

McNeill, D. (2000). Introduction. In D. McNeill (Ed.), *Language and gesture* (pp. 1–10). Cambridge, UK: Cambridge University Press.

McNeill, D. (2005). *Gesture & thought*. Chicago: University of Chicago Press.

McNeill, D., & Duncan, S. D. (2000). Growth points in thinking-for-speaking. In D. McNeill (Ed.), *Language and gesture* (pp. 141–161). New York: Cambridge University Press.

Mondada, L., & Pekarek Doehler, S. (2004). Second language acquisition as situated practice: Task accomplishment in the French second language classroom. *The Modern Language Journal*, *88*, 501–518. doi:10.1111/j.0026-7902.2004.t01-15-.x

Nakatsukasa, K. (2013). *Efficacy of gestures and recasts on the acquisition of L2 grammar*. Unpublished doctoral dissertation, Michigan State University, East Lansing.

Núñez, R., & Sweetser, E. (2006). With the future behind them: Converging evidence from Aymara language and gesture in the crosslinguistic comparison of spatial construals of time. *Cognitive Science*, *30*, 401–450.

Olsher, D. (2008). Gesturally-enhanced repeats in the repair turn: Communication strategy or cognitive language-learning tool? In S. G. McCafferty & G. Stam (Eds.), *Gesture in second language acquisition and classroom research* (pp. 109–130). London: Routledge.

Peltier, I. N., & McCafferty S. G. (2010). Gesture and identity in the teaching and learning Italian. *Mind, Culture, and Activity*, *17*, 331–349. doi:10.1080/10749030903362699

Richards, K. (2005). Introduction. In K. Richards & P. Seedhouse (Eds.), *Applying conversational analysis* (pp. 1–18). Basingstoke, UK: Palgrave Macmillan.

Rosborough, A. A. (2011). *Gesture as an act of meaning-making: An ecosocial perspective of a sheltered-English second grade classroom*. Unpublished doctoral dissertation, University of Nevada, Las Vegas.

Sacks, H., Schegloff, E., & Jefferson, G. (1974). A simplest systematic for the organization of turn-taking for conversation. *Language*, *50*, 696–735.

Schegloff, E. (1987). Analyzing single episodes of interaction: An exercise in conversation analysis. *Social Psychology Quarterly*, *50*, 101–114.

Sert, O. (2015). *Social interaction and L2 classroom discourse*. Edinburgh, UK: Edinburgh University Press.

Sime, D. (2008). "Because of her gesture, it's very easy to understand": Learner's perceptions of teacher's gestures in the foreign language class. In S. G. McCafferty & G. Stam (Eds.), *Gesture in second language acquisition and classroom research* (pp. 259–279). London: Routledge.

Slobin, D. I. (1996). From "thought and language" to "thinking for speaking." In S. Gumperz & S. Levinson (Eds.), *Rethinking linguistic relativity* (pp. 70–96). Cambridge, UK: Cambridge University Press.

Smotrova, T. (2014). *Instructional functions of speech and gesture in the L2 classroom*. Unpublished doctoral dissertation, Pennsylvania State University, University Park.

Smotrova, T., & Lantolf, J. P. (2013). The function of gesture in lexically focused L2 instructional conversations. *The Modern Language Journal*, *97*, 397–416. doi:10.1111/j.1540-4781.2013.12008.x

Sueyoshi, A., & Hardison, D. M. (2005). The role of gestures and facial cues in second language listening comprehension. *Language Learning*, *55*, 661–699. doi:10.1111/j.0023-8333.2005.00320.x

Taleghani-Nikazm, C. (2008). Gestures in foreign language classrooms: An empirical analysis of their organization and function. In M. Bowles, R. Foote, S. Perpiñán, & R. Bhatt (Eds.), *Selected Proceedings of the 2007 Second Language Research Forum* (pp. 229–238). Somerville, MA: Cascadilla Proceedings Project.

ten Have, P. (2007). *Doing conversation analysis: A practical guide*. Los Angeles: SAGE.

Torralbo, A., Santiago, J., & Lupiáñez, J. (2006). Flexible conceptual projection of time onto spatial frames of reference. *Cognitive Science*, *30*, 745–757. doi:10.1207/s15516709cog0000_67

van Compernolle, R. A. (2015). *Interaction and second language development: A Vygotskian perspective*. Amsterdam: John Benjamins.

van Compernolle, R. A., & Smotrova, T. (2014). Corrective feedback, gesture, and mediation in classroom language learning. *Language and Sociocultural Theory*, *1*, 25–47. doi:10.1558/71056194384

van Compernolle, R. A., & Williams, L. (2011). Thinking with your hands: Speech-gesture activity during an L2 awareness-raising task. *Language Awareness*, *20*, 203–219. doi:10.1080/09658416.2011.559244

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Walsh, S. (2006). *Investigating classroom discourse*. London: Routledge.

Wang, W., & Loewen, S. (2015). Nonverbal behavior and corrective feedback in nine ESL university-level classrooms. *Language Teaching Research*. Published online March 24, 2015. doi:10.1177/1362168815577239

Young, R. (2009). *Discursive practice in language learning and teaching*. Malden, MA: Wiley-Blackwell.

Zhao, J. (2007). *Metaphors and gestures for abstract concepts in academic English writing*. Unpublished doctoral dissertation, University of Arizona, Tucson.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix S1. Transcription Symbols.
Appendix S2. Important Features of Gesture for Analysis.