


Multimodal knowledge building in a Japanese secondary English as a foreign language class

Multimodality & Society
2022, Vol. 2(1) 64–85
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/26349795221081300
journals.sagepub.com/home/mas


Thomas Amundrud 

Faculty of English Language Education, Nara University of Education, Nara, Japan

Abstract

Multimodal analysis examines how different modes, such as space, gesture, and language, instantiate meaning together. In this paper, a Systemic Functional-Multimodal Discourse Analysis demonstrates how teachers enact their pedagogy with their students across modes through what is represented experientially, how relationships between people are construed interpersonally, and how coherent texts are realized textually. This paper is a preliminary study of classroom data from a larger project looking at the multimodal pedagogy of Japanese secondary school teachers of English through the paired lenses of Systemic Functional-Multimodal Discourse Analysis and Legitimation Code Theory. It demonstrates how methods from these perspectives may be productively combined. How this teacher builds cumulative knowledge multimodally can be uncovered through the analysis of pedagogic register (Rose, 2018) and exchange (Berry, 1981; Martin and Rose, 2007), as well as classroom space and representing and textual action (Amundrud, 2017; Martin and Zappavigna, 2019). How both gesture and dialogic exchange between the teacher and students modulate the contextual relation of the knowledge construed in class is also explored via semantic gravity, which looks at how closely connected knowledge practices are to their context (Maton, 2014). As a preliminary study, the paper closes with limitations and future directions for this pedagogic multimodality research.

Keywords

SFL, SF-MDA, LCT, Japanese secondary schools, EFL, pedagogic register, classroom space, gesture

Corresponding author:

Thomas Amundrud, Takabatake-cho, Faculty of English Language Education, Nara University of Education, Nara 630-8528, Japan.

Email: amundrudthomas@cc.nara-edu.ac.jp

When teachers teach, how does their use not only of language, but also other modes like gesture and classroom space contribute to their teaching? Classrooms are complex multimodal environments that involve “simultaneous engagements with at least the modalities of speech, written texts, visuals, space, and body language” (Hood, 2011: 31). Research in recent decades has examined how modes such as gesture embody and enable foreign language teaching alongside spoken and written language from such diverse perspectives as Conversation Analysis (e.g., Jakonen, 2020) and Second Language Acquisition (e.g., Sato, 2020).

A further perspective on the multimodal realization of classroom pedagogy utilized in examining classroom multimodality (for instance, Hood, 2011; Komarawan, 2019; or Lim, 2021) comes from the tradition of Systemic-Functional Linguistics (SFL) and Systemic-Functional Multimodal Discourse Analysis (SF-MDA) particularly. Systemic-Functional Multimodal Discourse Analysis “is concerned with the meaning potential of semiotic resources distributed across strata...and the theory/analysis of the integrative meaning of semiotic choices in multimodal discourse” (O’Halloran, 2008: 444). Through systemic and functional multimodal analyses, teachers, and analysts can conceptualize how meanings are made across modes through a single robust integrated theoretical architecture (Lim, 2021). Complementing SFL, in the past decade there has been a proliferation of work developing Legitimation Code Theory (LCT), which explores knowledge practices according to their organizing principles of knowledge, or legitimation codes (Maton, 2014), including within language teaching (Amundrud, Inako, Edsall, 2020).

This paper introduces ongoing research into the multimodal, bilingual pedagogy of Japanese teachers of English whose secondary English as a Foreign Language (EFL) classes are held under the guidelines of Japan’s Ministry of Education, Culture, Sports, Society, and Technology (文部科学省, which is officially abbreviated in English as MEXT) to teach English in English in both lower and upper secondary schools (MEXT, 2011; MEXT, n.d.).

The methods and analysis presented in this paper will demonstrate a perspective on classroom discourse that incorporates language, space, and gesture, and which examines both the discursive structure of the pedagogy practiced as well as its unfolding connection to context. After explaining the core ideas of SF-MDA and LCT, the data and methods used in this study will be discussed. Subsequently, three analyses of a single transcript from the classroom of a single pseudonymous teacher-participant, Kenta, will demonstrate the usefulness of these integrated systemic, multimodal, LCT-based theory, and methods in investigating pedagogic practice, and thus further the theoretical development and interdisciplinary dialogue of multimodal theories in multilingual environments.

Theoretical foundations

Analyzing language through SFL

Systemic-Functional Linguistics describes language as “a social semiotic,” or a resource people use to accomplish their purposes by expressing meanings in context (Halliday, 1978). As such, “language is seen as a social resource; meanings are negotiated in social

contexts by social beings” (Burns and Knox, 2005: 236). Accordingly, a systemic and functional multimodal discourse analysis examines how modes—which are semiotic resources that are shaped by culture, and which are based on yet distinct from their material substrates (Bateman, 2011)—create meaning through systems of choice, both individually and in relation to other modes, including language. It is important to note here that this meaning of “mode” is distinct from the variable of register in SFL of the same name that describes the role language plays in context of situation (e.g., Halliday and Hasan, 1985).

The construal of meaning as systems of choice consisting of what could have been said versus what was said (Rose and Martin, 2012) gives SFL its “systemic” moniker. Systemic-functional linguistics is “functional” in that, through the analysis of language in use, it is possible to identify how people use language and other modes, and how these modes are indeed structured for use (Eggins, 2004). In SFL, language is theorized as making three kinds of meanings, called *metafunctions*, simultaneously (Halliday and Matthiessen, 2013): *ideational*, in how our experience of the world is construed; *interpersonal*, in how meanings are enacted between participants in a text, or between interlocutors; and *textual*, in how meanings in a text cohere with their context to make a structured text.

In SFL, context is modeled as strata at different levels of abstraction through *realization*, so that “social contexts are realized through texts which are realized through sequences of clauses (Martin and Rose, 2007: 4).” Although all strata are relevant to the examination of language and meaning in context, significant to this study are the strata of lexicogrammar, discourse semantics, and register. *Lexicogrammar* provides the grammatical structures through which words can be combined into potentially infinite meanings (Eggins, 2004). *Discourse semantics* allows analysts to account for meanings in texts beyond clause level. The discourse semantic system of *negotiation*, which is concerned with the interaction between speakers, is of particular importance to the analysis of classroom interaction. Negotiation is analyzed through *exchange*, or how moves are organized in relation to each other, such as how speakers give knowledge in primary knower (K1) moves, or how teachers in delayed primary knower (DK1) moves alert students to display knowledge in subsequent secondary knower (K2) moves (Berry, 1981; Martin and Rose, 2007). Finally, essential to the analysis of pedagogy used in this study is *register*, which describes the context of situation, most relevantly here in terms of *field*, which describes the discourse patterns of realizing social activities (Martin and Rose, 2007), and *tenor*, which describes the relationships between participants (Martin, 1992). These frameworks from SFL form the basis on which the present study is grounded.

Analyzing pedagogy through pedagogic register

This study analyzes classroom talk through *pedagogic register*, which consists of “pedagogic activities that are negotiated in pedagogic relations between teachers and learners, and presented through pedagogic modalities” such as of speaking and writing (Rose, 2018: 1). Pedagogic register is enacted in language through the discourse semantic system of negotiation (Rose, 2018: 4), described above.

The three pedagogic register systems of interest here are *interacts*, *acts*, and *cycle phases*. Interacts and acts are “two simultaneous systems for the structuring of pedagogic relations” (Rose, 2018: 6). Interacts model learner and teacher roles in, for instance, teachers or learners inquiring, learners displaying knowledge, or teacher’s presentation or evaluation involving either affirmation or rejection. Acts are distinguished between observable behavioral acts and inferable conscious acts of sensing, thinking, and feeling. Finally, cycle phases model the elements of pedagogic structure within the learning activities that constitute a lesson. Knowledge is “acquired/construed” by learners in a learning task, which is usually focused and evaluated by the teacher. Learners are often prepared to succeed in these learning tasks in advance, and the knowledge that they acquire/construe is subsequently elaborated (Rose, 2018: 21). Specific examples of interacts, acts, and cycle phases will be discussed in the first section of the Analysis below.

Beyond modeling pedagogic discourse, crucial to the analysis of talk in multilingual classrooms is a means to investigate language choices. This research utilizes the systemic framework of language shift (Kartika-Ningsih, 2020; Kartika-Ningsih and Rose, 2018), which describe the multilingual classroom interactions in which meaning making is realized in two or more languages. Language shift includes not only code-switching/mixing, but also translation and paraphrase between languages. Language shift is favored as a construct to describe this phenomenon because it is explicitly designed to describe the structure of how participants, and particularly teachers, choose which languages, and how languages are shifted between both between and within moves in exchange.

Analyzing space and gesture through Multimodal Discourse Analysis

Multimodal Discourse Analysis provides tools for describing how classroom space and gesture mean.

Classroom space in this study is analyzed as a system in the interpersonal metafunction because material proximity communicates semiotic proximity; how close or distant a speaker is from their audience influences the breadth of meanings they can physically make (Matthiessen, 2009). The system of classroom space is based on the position of teachers in relation to students in the classroom and the kinds of teaching and meaning-making teachers can do in those spaces (Amundrud, 2017; Lim et al., 2012). The system network for classroom space used in this study is shown in Figure 1.

The selection of each option in the system of classroom space is contingent upon the nature of the activity that is taking place, and so locations within the classroom may perform different functions within this system at different points in the lesson. In *interpersonal space*, teachers are next to students and can consult them on their work; in *classwork space*, students work at their desks and teachers may observe; in *supervisory space*, teachers silently move behind and between rows of students to ensure task compliance; and in *personal space*, generally at the front of the classroom, teachers arrange their personal belongings and prepare for the lesson. The choices for classroom space relevant here are *authoritative space* and *monitoring space*. Authoritative space is

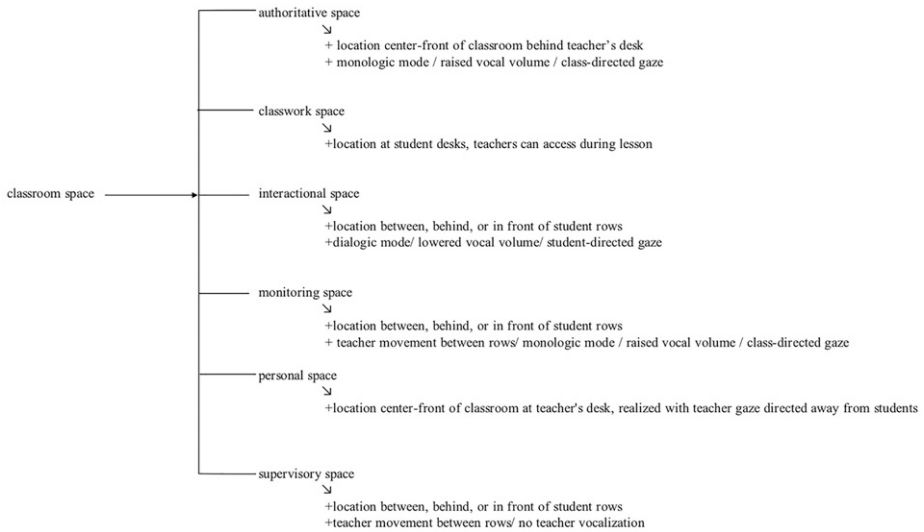


Figure 1. System of classroom space, derived from Amundrud (2017); Lim et al. (2012)

usually furthest from students at the front of the classroom; as this is from where the teacher-participant mainly gives instruction and direction, like many teachers, it is where the teacher's power in terms of tenor is most salient. Finally, in monitoring space, a novel choice proposed in this paper, teachers can give instruction, as in authoritative space, while standing between rows of students, thus having greater proximity to them, as in interactional space and supervisory space, and so can both observe and provide instructional scaffolding to individual students and the entire class.

Gesture is an essential element of how teachers represent knowledge, relate to students, and organize learning in the classroom. The functional typology of gesture developed in systemic functional multimodal discourse analytic studies is designed to facilitate researcher annotation and teacher reflection on the types of gestures used in teaching, and the meanings conveyed through them (Lim, 2021: 67). Although all three metafunctions are in play when analyzing gesture, this paper will focus mainly on how gestures realize ideational meaning in pedagogy, as shown in the system network for *representing action* in Figure 2.

The system of representing action provides systematic options for gestures, both correspondent with and independent of language. Following Martin and Zappavigna (2019), this system is hypothesized to coincide with discourse semantics. However, developing upon the broader description of paralanguage given by Martin and Zappavigna (2019), it provides an additional layer of delicacy for representing gestural semiosis that explicitly describes the meanings embodied (Lim, 2021). Through this system, gestures are posited as *activities* that illustrate or embody a change in position, *items* that depict real or abstract entities or emblems, or *qualities* that demonstrate the characteristics of an item (Amundrud, 2017: 202). These options for representing action

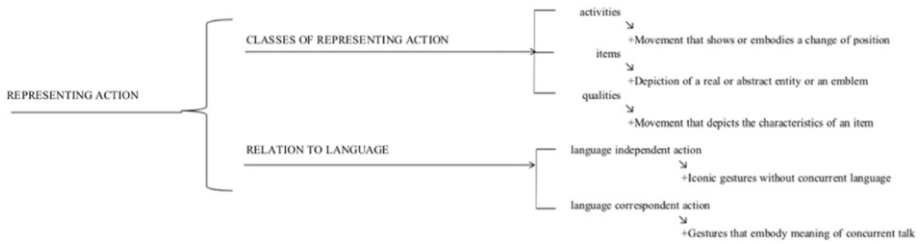


Figure 2. System of representing action, derived from Amundrud (2017).

describe what on “Kendon’s continuum” (McNeil, 1992) are called metaphoric, icons, and emblems, but with their relation to language more distinct.


Beyond the system for representing action shown in Figure 2, textual actions are committed by deictic, pointing gestures, through which the teacher brings in other ideas and people into their talk (Martin and Zappavigna, 2019). Both representing and textual actions will be described in more detail in the analysis of the classroom data in terms of both the multimodal composition of the classroom text as well as the structuring of knowledge as examined through LCT.

Analyzing knowledge through LCT

Legitimation Code Theory examines the different forms taken in different fields of human endeavor by contextually defined knowledge practices, whose organizing principles, or legitimation codes, are conceived in terms of relative strength or weakness (Amundrud, Inako, and Edsall, 2020). “Legitimation” here means how these knowledge practices both approximate and shape the “rules of the game” as to what defines achievement in their respective field (Maton, 2014: 17).

The three main dimensions currently investigated by LCT are Specialization, which examines the grounds for achievement within knowledge practices according to epistemic and social relations, Autonomy, which examines the relations of practices as modeled between separate social universes, and Semantics (Maton, 2017). As its name indicates, the dimension of Semantics is concerned with meaning (Ingold and O’Sullivan, 2017), and allows analysts to examine the context dependency of knowledge practices through semantic gravity (SG) (Maton, 2014). Semantic gravity describes “the degree to which meaning relates to its context...The stronger the SG+, the more closely meaning is related to its context; the weaker the gravity (SG–), the less dependent meaning is” on its social or symbolic context (Maton, 2011: 65). Although developments in LCT have led to the distinction in terminology of this principle as “epistemic-semantic gravity” from other forms of semantic gravity, these developments do not concern the present analysis, and so only “semantic gravity” will be used. As will be seen in the analysis below, this social and symbolic context can be co-created through gesture, resulting in the strengthening of SG and the closer connection of meaning to context.

Table 1. Translation device for semantic gravity, following Doran and Maton (2020).

SG	TYPE	Subtype	Description
	<i>symbolic</i>	<i>conceptual</i>	Symbolic maintain stable meanings in specialized domains. Symbolic conceptuels cannot be physically present and are therefore distant from material context.
		<i>material</i>	Unlike symbolic conceptuels, symbolic materials can potentially be physically present, and thus are less distant from material context.
	<i>manifest</i>	<i>intangible</i>	Manifests maintain stable meanings through their dependence on a given context. Manifest intangibles do not evoke a material context and are not physically perceptible.
		<i>tangible</i>	Unlike manifest intangibles, manifest tangibles have the potential for physical presence.

Legitimation Code Theory analyses use bespoke *translation devices*, such as in Table 1, to provide an external language of description for the data under examination based on the principles of the dimension in question (Maton and Doran, 2017). Doran and Maton (2020) propose the following principles for translating SG, shown in the translation device in Table 1. Discourse is translated into SG by determining first the type—*symbolic* or *manifest*—and then the subtype. The movement in type from symbolic to manifest visualizes a movement from lesser context dependency to greater context dependency. *Symbolics* display stability in their meanings through their position in specialized symbolic domains and so are less dependent on the material context of the discourse in question. Symbolics are divided into two subtypes: *conceptual symbolics* are more distant from a material context and lack potential for physical presence, while *material symbolics* are closer to a physical context and can evoke physical presence. For example, a conceptual symbolic, like that in Line 4 (Appendix B), might refer to an entirely abstract epistemic entity. Meanwhile, a material symbolic, such as in Line 14 (Appendix B), might refer to items that evoke physicality, like cars or carbon dioxide, while part of a specialized domain, such as car sharing and its role in reducing atmospheric carbon dioxide as is featured in the textbook passage used in this excerpt. On the other hand, *manifests* are not given meaning by their location in a specialized domain, as symbolics are, and so they are more dependent upon their surrounding context for stable meanings. Manifests are also divided into two subtypes; *manifest intangibles*, which do not evoke a material context or have the potential to be physically perceived, and *manifest tangibles*, which can both evoke a physical context and have the potential for physical presence, such as the student display in Line 8 (Appendix B). The final section of the subsequent Analysis, as well as Appendix B, both demonstrate in practice how pedagogic discourse is analyzed for SG through the translation device in Table 1.

The theoretical frameworks described in this review will be deployed to address the following research question: How do the complementary analyses from SF-MDA of pedagogic register and multimodal classroom space and gesture, and of SG from LCT, reveal knowledge construction within and across modes in classroom data?

Methods

This section describes the classroom data used in this research and the analytic methods used to explore it. The purpose of this research is to better understand how Japanese teachers of English in secondary schools deploy the three modes of classroom space, gaze, and gesture in the conduct of their lessons. As such, it does not look at student texts or utterances in detail.

This paper contains data collected from the class of a single high school Japanese teacher of English participant, Kenta (pseudonym), in Spring 2020. Institutional research procedures for the author's institution were followed, and consent for audio-video data collection and observation was given by both Kenta and the high school principal for four recorded observations of a single second-year private high school English Communication ($n = 38$) class in February 2020, plus one unrecorded pilot observation in January 2020. According to Kenta, the school is on the lower end of prefectural *hensachi* (偏差値), or T-scores that show the standardized rank of schools (Sasaki, 2008), and which are commonly, albeit informally, used by teachers in Japan to advise students on their academic paths. In the classes observed, Kenta was teaching students about the sharing economy, and car sharing in this lesson specifically, using a MEXT-approved high school textbook, *Power On: English Communication II* (Azami, 2018).

For this study, video was recorded on a prosumer video camera in the rear of classroom, and a GoPro was placed on the teacher's desk to capture teacher movement outside main camera range. Audio was recorded with a video camera lapel microphone and a voice recorder backup that the teacher carried in his breast pocket. Shortly after in-person observations, which were accompanied by informational in-person and email interviews, videos were first annotated to identify the generic structure of each lesson and points of interest. Individual lesson segments were subsequently excerpted for professional transcription and translation of Japanese utterances. The resulting transcripts and translations, with researcher correction, were then entered into the data analysis software, Multimodal Analysis Video (Multimodal Analysis Company, n.d.). This software enables the analyst to simultaneously grasp the breadth of system choices occurring across modes examined, and exports coded data to Excel.

The final methodological consideration here is how this data was coded for language, gesture and classroom space, and SG. Moves, which are where “speaker change could occur without turn transfer being seen as an interruption” (Egins and Slade, 1997: 186), were the basic unit of analysis for talk, and gestures and changes in space were coded as they occurred. Language for both English and Japanese (Halliday and Matthiessen, 2013; Martin and Rose, 2007; Teruya, 2007), classroom space, and gesture (Amundrud, 2017) were coded first, according to the systems outlined in the previous section, and SG was coded on the second pass.

Analysis and discussion

From the above review of the literature on SF-MDA and LCT, and the subsequent description of the methods applying them to the present study, let us now look at two

transcripts of the same excerpt from one of Kenta's lessons, and examine the excerpt through the lens of pedagogic register in [Appendix A](#), and that of classroom space and gesture, and SG, in [Appendix B](#). Both transcripts include line numbers (#), speakers Kenta (K) and students (S), and exchange (Ex.). Following [Teruya \(2007\)](#), lines featuring either Japanese or language shift are written first in their original language choice, then in syntactic English translation, and last glossed in English. [Appendix A](#) contains columns analyzing pedagogic register and language shift, and [Appendix B](#) contains columns analyzing multimodality in terms of classroom space and gesture, as well as semantics in terms of SG.

Pedagogic register and language shift

This subsection will start to demonstrate the utility of pedagogic register and language shift in analyzing classroom discourse through a summary of the lesson excerpt presented in [Appendix A](#). In this excerpt, Kenta is reviewing the content of the reading the students completed in a previous class about the benefits of car sharing. This specific excerpt was chosen because it demonstrates Kenta's use of initiation-feedback-response (IRF) sequences to review this material with his students and help them find the answers in their shared text ([Rose, 2018](#)) in a multimodal manner, and because it is conducted largely in English. The italicized terminology indicates choices in pedagogic register and language shift, reviewed in the literature above.

After closing a previous IRF sequence, in Lines 1 and 2 Kenta *inquires* for knowledge to *focus* students on the task of answering what happens if car sharing starts through a delayed knower (DK1) move, a question he rephrases in both Japanese and English through *intramove language shift* in Line 3. A student *proposes* CO₂ as the answer in Line 4, the knowledge of which Kenta *qualifies* in order to reject it in Line 5, the reasoning for which he explains in Line 6, “そこに答えは行かない/the answer is elsewhere.” In Line 7, Kenta *prepares* the students with a second delayed knower (DK1) move to successfully answer in Line 8, which they do. Kenta returns to English to praise them in Line 9 and *inquires* again, changing between moves to L1 Japanese to expand the focus of his delayed knower move complex in Line 10, and then repeating in L2 English in Line 11. In Line 12, he clarifies focus with an intermove L1 language shift to inquire for student reasoning, thus preparing students to successfully display the answer in Line 13, an IRF cycle repeated in Lines 14 and 15. This brings the students to display together the reasoning for why car sharing decreases CO₂, and demonstrates how, in this instance, the teacher used triadic dialogue ([Nassaji and Wells, 2000](#)) to collaboratively build knowledge from L1 Japanese into L2 English.

Readers who refer to [Appendix A](#) alongside the previous paragraph will notice that this description puts in prose the coding and transcript organization of pedagogic register and language shift, rendering them into a single eyeful that can be read in a more congruent manner than conventional linguistic transcripts. However, only using a fraction of the total options for pedagogic register presented in [Rose \(2018\)](#), this brief excerpt demonstrates how acts are exchanged via interacts through each move of the pedagogic exchange ([Rose, 2018: 29](#)), leading to successful student displays, and how language shift



Figure 3. Kenta pointing to a student with a palm-upward deictic gesture in Monitoring space, Lines 1 and 2.

reveals the pedagogic import of the language choices made by teachers and students. This supports the assertion by Rose (2018) that pedagogic register is applicable to a range of teaching situations, and that pedagogic register transcription is readily usable by researchers, teachers, and students as well. The next subsection will expand this analysis to include classroom space and gesture, and the subsequent subsection will build further upon this brief overview of pedagogic register to look at SG as well.

Multimodality: Classroom space and gesture

This subsection will describe the interpersonal features of classroom space and the ideational and textual features of gesture found in Appendix B. The italicized terminology indicates choices in the systems of classroom space and gesture described above.

This multimodal analysis of the excerpt shows how, in the data observed, Kenta often alternates between the *monitoring* and *authoritative* spaces. In the monitoring space, Kenta moves between student rows and brings students into the classroom text through deictic, pointing gestures, such as a palm-upward deictic gesture in Line 2, and ensure their compliance with class activities through his close proximity (Figure 3).

In the authoritative space of standing in front of students, Kenta can utilize the whiteboard and expound on course materials with maximum visibility to all students. From Line 4, Kenta demonstrates the use of this shift from monitoring to authoritative space when he rejects the student's proposed answer in Line 3, visualizing the location of the answer he is guiding the students towards with a *language correspondent representing activity* of pulling back coterminous with "before that" (Figure 3).

Lines 10 and 11 show the potential for the gesture system outlined in the literature review to fully describe the semiosis of nonverbal action. Although uttering Line 10, Kenta visualizes the reasoning he is co-creating with his students through a *language correspondent representing activity* in which makes a large upwards than downwards



Figure 4. Onset of stroke for action correspondent to 減れば (if it decreases), Line 10.

slope with his right hand (Figure 4), and releases the gesture after 減れば (if it decreases), before onset of 何 (what) (Figure 5).

He repeats a similar representing activity in Line 11, making a smaller, narrower crest with his right hand, repeating the gesture along with his restatement in L2 English. Both repeated gestures in Lines 10 and 11 demonstrate language correspondent representing activities, akin to the processes described in the corresponding utterances. How these language correspondent actions might support student learning is described in the next section, on SG.

A final gesture of note that demonstrates both how this teacher enacted his pedagogy and how the system for gesture described can handle combinations of gesture choices is in Line 14 (Figure 6).

Here, Kenta points to graphic projected on to the whiteboard showing a crossed-out car and fuel pump. This starts as a deictic gesture, connecting through the textual meta-function the oral, image, and gestural texts enacted in this lesson. Kenta then moves the vector of his outstretched hand downwards on “decrease,” making this not only a deictic but also a language correspondent activity.

So, in addition to the teacher’s use of triadic dialogue to encourage a collective basis of knowledge with his students, the analysis of Kenta’s use of classroom space and pedagogic gesture demonstrates how teachers strategically create classroom space based upon emergent needs and utilize hand gesture to visualize ideational content. As we will see in the next section, representing actions such as these can also be shown to unpack meanings co-present in language through their modulation of SG.

LCT: SG

In the previous subsection on multimodality, the semiotic valence of gesture was described though which meaning is made textually, in the case of deictic, pointing gestures,

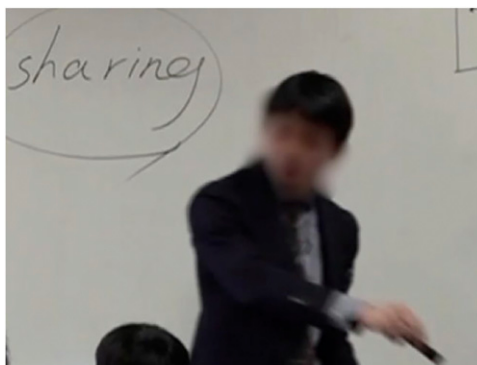


Figure 5. Release of stroke for action correspondent to 減れば (if it decreases), Line 10.



Figure 6. Deictic to language correspondent activity on onset of "decrease," Line 14. Direction of action indicated with overlaid arrow.

and ideationally, in the case of language correspondent actions. But how might gestures such as these support student learning? A distinct yet connected analysis of SG in [Appendix B](#) using the translation device in [Table 1](#) can demonstrate this. Following [Doran and Maton \(2020\)](#), the bolded words in the [Appendix B](#) transcript express the SG coded in the SG column.

As shown in [Table 1](#), SG is visualized on a continuum from greater to lesser context dependency, with the less context dependent of the two types, symbolics, as well as the more context dependent, manifests, containing their own respective subtypes. The least context dependent subtype of *symbolics* are *symbolic conceptuels*, which cannot be physically present and are therefore distant from material context. In [Appendix B](#), only one utterance (Line 6) was analyzed as a symbolic conceptual because it consists of the teacher rejecting a student's answer on the grounds that the correct answer belonged to a separate symbolic domain, “そこに答えは行かない/the answer is elsewhere.” *Symbolic*

materials are more context dependent than symbolic conceptals because they have the potential for physical presence. Symbolic materials were the dominant subtype of SG, comprising nine out of Kenta's 10 verbal moves. This was because the register Field of his utterances concerned car sharing and associated topics such as the decrease in the consumption of natural resources, as described in Lines 10 and 14 and shown in Figures 4, 5, and 6 above, and therefore of atmospheric CO₂ that increased car sharing should lead to, as prompted in Line 14. These topics remain stable within their conceptual domain of car sharing, yet all these items are potentially physically perceptible. There were fewer manifest utterances, which depend upon the context of their utterance for their comprehensibility, and these were confined to student displays. There were no *manifest intangibles* in this excerpt; there were, however, four *manifest tangibles*, which retain stability of meaning through their evocation of potential physical context, when students displayed the answers in Lines 4 (CO₂), 8 (車/cars), 13 (gasoline), and 15 (CO₂). Unlike symbolic materials, all these manifest tangible utterances displayed by the students obtain their meaning from a potential physical context, rather than from a symbolic domain.

As discussed above, the SG of Kenta's utterances in this excerpt is fairly low, with the teacher expounding in both languages on abstract, symbolic concepts, albeit ones, such as car sharing and CO₂, which are grounded in the context of students' potential physical experience, and therefore coded as symbolic materials. The low SG of Kenta's explanation in this excerpt is modulated in two ways. First, Kenta modulates this low SG through his gestures in Lines 5, 9, 10, and 14 (Figures 3, 7, and 4, indicated with arrows in Appendix B) in what Doran and Maton (2020) have proposed as *determinate-physicals*, which give greater SG to utterances through gesture. By embodying the decrease in the number of cars in Lines 10 and 11 (Figures 7 and 4) through his representing actions, for instance, Kenta makes physical the symbolic concepts he imparts.

Another way that the teacher's relatively low SG is modulated through dialogic exchange with his students. For example, Kenta's delayed primary knower (DK1) feedback move in Lines 9 and 10, in which he signals the students that he is preparing them for another knowledge display, decreases SG after the increased SG of the student's secondary knower (K2) response in Line 8 to Kenta's previous DK1 move in Line 7. This, as well as Lines 11–15, demonstrate a mutual modulation of SG between lower SG, symbolic material teacher prompts and higher SG, manifest tangible student displays through repeated moves of the teacher rejecting with qualification and then accepting proposed student answers, as outlined in the prior section on pedagogic register.

Since studies applying SG to a host of pedagogic situations have found that the frequent modulation of SG through what are called "semantic waves" is connected to greater student learning (Maton, 2013), we can speculate that teacher gesture such as applied by Kenta in this instance may also assist students in more concretely grounding concepts that may otherwise be overly abstract. This also connects with the pedagogic principle of redundancy (Christie, 2002), whereby experiential content is repeated to extend learner's understanding. Since repetition in gesture of what teachers express linguistically is a practice that has been found pedagogically beneficial in second language teaching, particularly of lower proficiency students (Sueyoshi and Hardison, 2005), further analysis of SG in gesture may prove fruitful

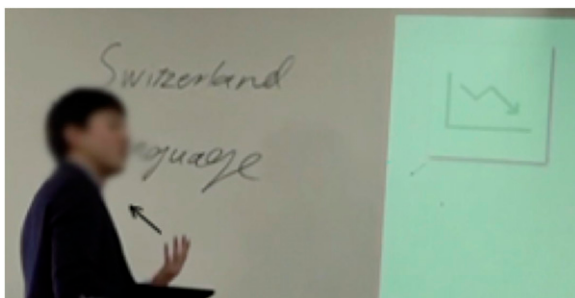


Figure 7. Language correspondent activity of pulling back coterminous with “before that,” Line 5.

in understanding how such “waving” occurs in language classrooms, and how it can be better harnessed by current and future teachers.

Overall findings

The findings for pedagogic register and language shift, classroom space and gesture, and SG are summarized in [Table 2](#).

The research question asked what the complementary analysis of the same classroom text through the lenses of pedagogic register, classroom space and gesture, and SG might reveal regarding knowledge construction within and across modes through the examination of classroom data from a single teacher. The analysis of pedagogic register, along with language shift, shows us how the teacher managed his classroom in this brief segment to prepare students for successful completion of a task and to build shared knowledge across language choices, as shown in [Table 2](#). Looking at multimodality systemically reveals how the teacher shifted from the Monitoring to the Authoritative space in his classroom so that he could ensure their participation in the class and make use of the visibility and tools made present by the built classroom space as he conducted this joint construction of knowledge. It also shows how Kenta’s gestures both drew students and objects into the embodied pedagogic text and represented in gesture the correspondent linguistic meanings of his utterances. Finally, through SG, the two means through which Kenta and his students modulated the relatively low SG of his utterances is made apparent. First, the teacher uses representing actions that double as determinate-physicals and therefore increase the SG of the utterances they accompany. Moreover, through the mutual modulation of teacher-student delayed primary knower exchanges in which students’ proposed answers are qualified and then accepted, he facilitates the building of collective knowledge in the class.

In sum, this paper demonstrates the methodological utility of combining analyses from the systemic-functional multimodal discourse analysis and LCT. As the above summary shows, the final analysis of SG depends in part on the prior analyses of pedagogic register and multimodality, yet it is not reducible to them; it is, in fact, complementary to the distinct and interrelated examinations of pedagogic register and multimodality. This final,

Table 2. Summary of findings for pedagogic register and language shift, classroom space and gesture, and semantic gravity in this study.

Move #	Pedagogic register and language shift	Space and gesture	Semantic gravity
Moves 1-5	Teacher inquires for knowledge (Moves 1–3) with intramove language shift, then qualifies and rejects student display (Moves 4–5)	Teacher moves from Monitoring to Authoritative space with student display (Moves 1–4). Language correspondent activity co-commits rejection of display (Move 5).	Symbolic: material semantic gravity of teacher utterance modulated by student display (Move 4) and determinate-physical representing activity (Move 5).
Moves 6-10	Teacher imparts reasons for rejection with intramove language shift (Move 6), then inquires again for knowledge (Move 7). Student display is successful, leading to praise and another inquiry for knowledge with interrole then intramove language shift (Moves 8-10)	Teacher brings student (Move 7) and displayed image (Move 9) into classroom text. He commits language correspondent activity (Move 10) correspondent with language.	Symbolic: conceptual semantic gravity of teacher utterance modulated by determinate-physical representing activity (Move 6). Symbolic: material semantic gravity of teacher utterances modulated by determinate-physical deictics (Moves 7 and 9), student display (Move 8), and determinate-physical representing activity (Move 10)
Moves 11-15	Teachers inquires for knowledge (Move 11) and prepares reasoning with intermove language shift (Move 12) for successful student display (Move 12) for successful student display (Move 13), with successful co-construction of answer to initial query, after repetition (Move 14), displayed in Move 15.	Teacher commits activities (Move 11 and 12) correspondent to concomitant language. Deictic in Move 14 transforms into language correspondent activity with shift of movement vector.	Symbolic: conceptual semantic gravity of teacher utterances modulated by student display (Move 13) and determinate-physical representation activities (Move 11, 12, and 14) and deictics (Move 14)

novel contribution demonstrates a potentially productive synthesis between these theories that should be replicated more widely across teaching and other contexts.

Limitations and conclusions

As stated in the introduction, this paper is a preliminary analysis of one small segment of classroom talk and action to show the application of SF-MDA and the LCT dimension of Semantics, and SG specifically, to Japanese secondary EFL classroom data. It is only a preliminary study, and it omits semantic density as well as the LCT dimension of Autonomy (Maton and Howard, 2020), both of which will be examined in later research. This investigation also does not include the mode of gaze (Amundrud, 2019), which will be examined in further work that will include analyses of other excerpts from Kenta's data, as well as data from different teacher-participants.

In closing, the present paper points to the robustness of the analytic tools at hand for looking at pedagogy and multimodality in multilingual settings. From the ready application of pedagogic register to the system network for gesture currently developed and the application of groundbreaking work on SG to classroom gesture, this study demonstrates the potential of the systemic and functional multimodal analysis with LCT to be used together as analytic tools for investigating second and foreign language classrooms. It further shows the analytic and explanatory potential for pedagogic register as a means to uncover classroom pedagogy, and further advances systemic and functional multimodal spatial and gestural analysis as a means through the ways space and gesture mean can be further examined. Most importantly, it shows how redundant meanings that repeat experiential content through gesture modulate the SG of concurrent language. Despite these findings, further work remains necessary to examine how they may point to improvements in teaching itself, particularly how looking at how and in what way gestures, space, and other modes co-create pedagogy, and what teachers can learn to do more explicitly to help their learners learn.

Acknowledgments

The author would like to thank Gretchen Clark, Dominic Edsall, and the editors and reviewers who have commented on previous versions of this paper for their assistance. This paper is dedicated in honor of the life and work of Prof. Margaret Berry (1929-2020).

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project is funded by JSPS KAKENHI Grant Number 19K00908.

ORCID iD

Thomas Amundrud  <https://orcid.org/0000-0002-6074-084X>

References

- Amundrud TM (2017) Analyzing Classroom Teacher-Student Consultations: A Systemic-Multimodal Perspective, PhD Thesis, Macquarie University, Australia. Available at: <http://hdl.handle.net/1959.14/1271558>.
- Amundrud T (2019) Applying multimodal research to the tertiary foreign language classroom: looking at gaze. In: Da Silva-Joyce H and Feez S (eds). *Multimodality across Classrooms: Learning about and through Different Modalities*. New York: Routledge, 160–177.
- Amundrud T, Inako A and Edsall D (2020) Looking at knowledge and knowers through legitimation code theory (LCT): an interview with professor Karl Maton. *The Language Teacher* 44(5): 18–21. doi: [10.37546/JALTTLT44.5](https://doi.org/10.37546/JALTTLT44.5).
- Azami M (2018) *Power On: English Communication II*. Tokyo: Tokyo Shoseki.
- Bateman J (2011) The decomposability of semiotic modes. In: O'Halloran KL (ed), *Multimodal Studies: Exploring Issues and Domains*. Abingdon: Routledge, 17–38. DOI: [10.4324/9780203828847](https://doi.org/10.4324/9780203828847).
- Berry M (1981) Towards layers of exchange structure for directive exchanges. *Network 2*: 23–32.
- Burns A and Knox J (2005) Realisation(s): systemic-functional linguistics and the language classroom. In: Bartels N (ed), *Applied Linguistics and Language Teacher Education*. Boston: Springer, 235–259.
- Christie F (2002) *Classroom Discourse Analysis: A Functional Perspective*. London: Continuum.
- Doran YJ and Maton K (2020) Context-dependence: a translation device for epistemic-semantic gravity in English discourse. LCT Centre Online Roundtable.
- Eggins S (2004) *An Introduction to Systemic Functional Linguistics*. 2nd ed. London: Continuum.
- Eggins S and Slade D (1997) *Analysing Casual Conversation*. London: Equinox.
- Halliday MAK (1978) *Language as a Social Semiotic: The Social Interpretation of Language and Meaning*. London: Edward Arnold.
- Halliday MAK and Hasan R (1985) *Language, Context, and Text: Aspects of Language in a Social-Semiotic Perspective*. Burwood, Victoria: Deakin University.
- Halliday MAK and Matthiessen CMIM (2013) *Halliday's Introduction to Functional Grammar*. 4th ed. Abingdon: Routledge.
- Hood S (2011) Body language in face-to-face teaching: A focus on textual and interpersonal meaning. In: Dreyfus S, Hood S and Stenglin M (eds), *Semiotic Margins: Meaning in Multimodalities*. London: Continuum, 31–52.
- Ingold R and O'Sullivan D (2017) Riding the waves to academic success. *Modern English Teacher* 26(2): 39–43.
- Jakonen T (2020) Professional embodiment: walking, re-engagement of desk interactions, and provision of instruction during classroom rounds. *Applied Linguistics* 41(2): 161–184. DOI: [10.1093/applin/amy034](https://doi.org/10.1093/applin/amy034).
- Kartika-Ningsih H (2020) Language shift: bilingual exchange structure in classroom interactions. In: Martin JR, Doran Y and Figueroa G (eds), *Systemic Functional Language Description*. New York: Routledge, 307–330.
- Kartika-Ningsih H and Rose D (2018) Language shift: analysing language use in multilingual classroom interactions. *Functional Linguistics* 5(9): 9. DOI: [10.1186/s40554-018-0061-0](https://doi.org/10.1186/s40554-018-0061-0).

- Komarawan Y (2019) Constructing interpersonal meaning in Indonesian science classrooms through language, space and gaze. *KEMANUSIAAN the Asian Journal of Humanities* 26(1): 1–23. DOI: [10.21315/kajh2019.26.1.1](https://doi.org/10.21315/kajh2019.26.1.1).
- Lim FV (2021) *Designing Learning with Embodied Teaching: Perspectives from Multimodality*. London, NY: Routledge.
- Lim FV, O'Halloran KL and Podlasov A (2012) Spatial pedagogy: mapping meanings in the use of classroom space. *Cambridge Journal of Education* 42(2): 235–251. doi: <https://doi.org/10.1080/0305764X.2012.676629>.
- Martin JR (1992) *English Text: System and Structure*. Amsterdam: John Benjamins.
- Martin JR and Rose D (2007) *Working With Discourse: Meaning Beyond the Clause*. 2nd ed. London: Continuum.
- Martin JR and Zappavigna M (2019) Embodied meaning: a systemic functional perspective on paralanguage. *Functional Linguistics* 6(1): 1–33. DOI: [10.1186/s40554-018-0065-9](https://doi.org/10.1186/s40554-018-0065-9).
- Maton K (2011) Theories and things: the semantics of disciplinarity. In: Christie F and Maton K (eds), *Disciplinarity: Functional Linguistic and Sociological Perspectives*. London: Continuum, 62–84.
- Maton K (2013) Making semantic waves: a key to cumulative knowledge-building. *Linguistics and Education* 24(1): 8–22. DOI: [10.1016/j.linged.2012.11.005](https://doi.org/10.1016/j.linged.2012.11.005).
- Maton K (2014) *Knowledge and Knowers. Towards a Realist Sociology of Education*. Abingdon: Routledge.
- Maton K (2017) Starting points: resources and architectural glossary. In: Maton K, Hood S and Shay S (eds), *Knowledge-Building: Educational Studies in Legitimation Code Theory*. Abingdon: Routledge, 233–243.
- Maton K and Doran YJ (2017) Semantic density: a translation device for revealing complexity of knowledge practices in discourse, part 1. *Onomázein Revista de lingüística, filología y traducción SFL* 5: 46–76. DOI: [10.7764/onomazein.sfl.03](https://doi.org/10.7764/onomazein.sfl.03).
- Maton K and Howard SK (2020) Autonomy: the next phase of dialogue between systemic functional linguistics and legitimation code theory. *Journal of World Languages* 6: 92–112. DOI: [10.1080/21698252.2020.1720160](https://doi.org/10.1080/21698252.2020.1720160).
- Matthiessen CMIM (2009) Multisemiosis and context-based register typology: registerial variation in the complementarity of semiotic systems. In: Ventola E and Guijarro AJM (eds). *The World Told and the World Shown*. London: Palgrave Macmillan, 11–38.
- McNeill D (1992) *Hand and Mind: What Gestures Reveal About Thought*. Chicago: University of Chicago Press.
- Ministry of Education, Culture, Sports, Science and Technology Japan (MEXT) (2011) Survey on the five proposals and specific measures for developing proficiency in english for international communication. Available at: <https://www.mext.go.jp/en/policy/education/elsec/title02/detail02/sdetail02/1373868.htm> (accessed 21 July 2021).
- Ministry of Education, Culture, Sports, Science and Technology Japan (MEXT) (n.d.). English Education Reform Plan Corresponding to Globalization. <https://warp.da.ndl.go.jp/info:ndljp/pid/11402417/www.mext.go.jp/en/news/topics/detail/1372656.htm> (accessed 21 July 2021).
- Multimodal Analysis Company (n.d.) Multimodal analysis video. <http://multimodal-analysis.com/products/multimodal-analysis-video/>(accessed 21 July 2021).
- Nassaji H and Wells G (2000) What's the use of 'triadic dialogue'? an investigation of teacher-student interaction. *Applied Linguistics* 21(3): 376–406. doi: [10.1093/appl/21.3.376](https://doi.org/10.1093/appl/21.3.376).

- O'Halloran KL (2008) Systemic functional-multimodal discourse analysis (SF-MDA): constructing ideational meaning using language and visual imagery. *Visual Communication* 7(4): 443–475. DOI: [10.1177/1470357208096210](https://doi.org/10.1177/1470357208096210).
- Rose D (2018) Pedagogic register analysis: mapping choices in teaching and learning. *Functional Linguistics* 5(1): 3. DOI: [10.1186/s40554-018-0053-0](https://doi.org/10.1186/s40554-018-0053-0).
- Rose D and Martin JR (2012) *Learning to Write, Reading to Learn: Genre, Knowledge and Pedagogy in the*. London: Sydney SchoolEquinox.
- Sasaki M (2008) The 150-year history of English language assessment in Japanese education. *Language Testing* 25(1): 63–83. DOI: [10.1177/0265532207083745](https://doi.org/10.1177/0265532207083745).
- Sato R (2020) Gestures in EFL classroom: their relations with complexity, accuracy, and fluency in EFL teachers' L2 utterances. *System* 89. Elsevier, 102215.
- Sueyoshi A and Hardison DM (2005) The role of gestures and facial cues in second language listening comprehension. *Language Learning* 55(4): 661–669. DOI: [10.1111/j.0023-8333.2005.00320.x](https://doi.org/10.1111/j.0023-8333.2005.00320.x).
- Teruya K (2007) *A Systemic Functional Grammar of Japanese*. London: Continuum, Vols. 1–2.

Appendix A

Transcript with pedagogic register analysis and language shift

#	Speaker	Transcript	Ex	Interact	Act	Phase	Lang. Shift
1	K	So, what – what does – what – the number of what	DKI	Inquire	Knowledge	Focus	
2	K	(Nonverbal) decrease if we start car sharing?					
3	K	何が減る?/What GA decrease-inf/What decreases? ...If we start car sharing	DKI	Inquire	Knowledge	Focus	Intramove language shift
4	S	CO2	K2	Display	Display	Propose	
5	K	CO2, okay, [∅ what decreases] before that?	DKI	Qualify	Knowledge	Reject	
6	K	そこに答えは行かない。/There NI answer WA go-neg-inf./The answer is elsewhere	KI	Impart	Reasoning	Reject	Intermove language shift
7	K	普通にシェアリング始めたら まず何が減る...一番?/Usual NI sharing start COND.tara first what GA decrease-inf...first./Usually, if you start sharing something, what decreases...first?	DKI	Inquire	Knowledge	Prepare	
8	S	車/Car/Cars	K2	Display	Display	Propose	

(continued)

(continued)

#	Speaker	Transcript	Ex	Interact	Act	Phase	Lang. Shift
9	K	Excellent! the number of car decreased and then...	DKI	Praise/ repeat/ inquire	Teacher evaluation	Affirm	Interrole language shift
10	K	車の台数が減れば ...何が減る?/Car NO machine number GA decrease COND.ba...what GA decrease-inf./If the number of cars decreases...what else decreases?	DKI	Inquire	Knowledge	Focus	Intermove language shift
11	K	What does this – what – the amount of what decreased?	DKI	Inquire	Knowledge	Focus	Intermove language shift
12	K	車、乗らへんねんか 。 /Car ride-neg-inf-kansai BND.because./If people aren't using cars	DKI	Inquire	Reasoning	Prepare	Intermove language shift
13	S	Gasoline	K2	Display	Display	Propose	
14	K	Gasoline, right. Then, the – the – the amount of gasoline or natural resources decreased and then...finally?	DKI	Inquire	Knowledge	Focus	
15	S	CO2	K2	Display	Display	Propose	

Appendix B

Transcript with classroom space, gesture, and semantic gravity

#	Speaker	Transcript	Ex	Class space	Gesture	SG
1	K	So, what – what does – what – the number of what	DKI	Monitoring		3 - symbolic: material
2	K	(Nonverbal) decrease if → we start car sharing?			Deictic to student	
3	K	何が減る?/What decrease-inf/What decreases? ...If we start car sharing	DKI			3 - symbolic: material

(continued)

(continued)

#	Speaker	Transcript	Ex	Class space	Gesture	SG
4	S	CO2	K2	Authoritative		1 - manifest: Tangible
5	K →	CO2, okay, [∅ what decreases] before that?	DK1		Language correspondent activity of pulling back coterminous with "before that"	3 - symbolic: material
6	K	そこに答えは行かない。/There NI answer WA go-neg-inf./The answer is elsewhere	K1			4 - symbolic: Conceptual
7	K	普通にシェアリング始めたら まず何が減る...一番?/Usual NI sharing start COND.tara first what GA decrease-inf...first./Usually, if you start sharing something, what decreases...first?	DK1		Left hand deictic, pointing to student in front on 一番 (first)	3 - symbolic: material
8	S	車/Car/Cars	K2			1 - manifest: Tangible
9	K →	Excellent! the number of car decreased and then...	DK1		Deictic to displayed projected image	3 - symbolic: material
10	K →	車の台数が減れば ...何が減る?/Car NO machine number GA decrease COND.ba...what GA decrease-inf./If the number of cars decreases...what else decreases?	DK1		Language correspondent activity	3 - symbolic: material
11	K	What does this – what – the amount of what decreased?	DK1		Language correspondent activity	3 - symbolic: material

(continued)

(continued)

#	Speaker	Transcript	Ex	Class space	Gesture	SG
12	K	車、乗らへんねんから。/Car ride-neg-inf-kansai BND.because./If people aren't using cars	DK1		Language correspondent activity, mimicking driving a car	3 - symbolic: material
13	S	Gasoline	K2			1 - manifest: Tangible
14	K →	Gasoline, right. Then, the – the – the amount of gasoline or natural resources decreased and then...finally?	DK1		Deictic to displayed image that becomes a language correspondent activity with onset of “decrease”	3 - symbolic: material
15	S	CO2	K2			1 - manifest: Tangible