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Gesture Research

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Introduction

Research in second language (L2) acquisition examining the speech and gesture of L2 learners and teachers has shown that both of their gestures are important in L2 teaching and learning (see Stam, 2013, for a review). In this chapter we provide an overview of this research, discuss the various research designs and methods used and their challenges, and present suggestions for future research.

Although the teaching of kinesics and cultural emblems in the L2 classroom has been advocated since the 1980s (e.g., Pennycook, 1985; von Raffler, 1980; Wylie, 1985) on the grounds that being competent in an L2 involves the use of the entire body, it was not until the 1990s that gestures in L2 acquisition and teaching were studied empirically. These studies grew out of the groundbreaking work of David McNeill (1985, 1992) and Adam Kendon (1972, 1980), who recognized that language involved more than speech alone. According to McNeill and Kendon, language includes co-speech gestures—the spontaneous movements of the hands that accompany speech—and these gestures need to be taken into account when individuals are speaking their first language (L1) or their L2.

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Kendon and McNeill came to their realizations about speech and gesture from different backgrounds. Kendon, an anthropologist, while doing a frame-by-frame analysis of discourse from an interaction perspective, realized that gesture and speech patterned similarly and that gestures were not haphazard, but organized into hierarchical units. These units (Kendon, 1980; McNeill, 1992) include the gesture phrase (the entire movement from start to finish) and gesture phases (the smaller movements that make up the gesture phrase), and an understanding of them is necessary when conducting or evaluating any type of research that involves gesture especially in L2 acquisition and teaching.

Gesture phases consist of the *preparation* (the movement of the hand to a position for the stroke to be executed, optional), the *stroke* (the part of the movement that expresses meaning, obligatory), *holds* (both pre-stroke and post-stroke maintaining of the position, optional), and *retraction* or *return* (movement back to rest position, optional).

McNeill, a psycholinguist, realizing that speech and gesture were related while giving a speech at a conference in France and the translator was both speaking and gesturing, has focused on the relationship between gesture, speech, and thought. He claims that gesture provides us an enhanced window onto the mind (1992). The model he proposes for verbal thought (McNeill, 2005) is "an interactive model…, an 'imagery-language dialectic' in which thought, language, and gesture develop over time and influence each other and in which the static and dynamic aspects of language are combined" (Stam, 2013, p. 4).

Types of Gestures

It is important to note that co-speech gestures are one type of gesture and that gestures can be differentiated based on their relationship with speech (McNeill, 1992). These different types of gestures have ramifications for how research is conducted in L2 acquisition and teaching.

Co-speech Gestures

Co-speech gestures are synchronous with and only occur with speech. They perform similar pragmatic functions as speech and tend to occur with elements that are high in communicative dynamism (McNeill, 1992): new, contrastive, or focused information. These gestures can be categorized according to their semiotic properties (Stam, 2013): their degree of iconicity (concreteness), metaphoricity (abstractness), deixis (concrete and abstract pointing in space and time), temporal highlighting (beats—quick movements of the

hands that accompany repairs, prosody, introduction of new material), and social interactivity (addressing an interlocutor).

As Stam and McCafferty (2008) have pointed out, co-speech gestures are multifunctional. Some of these functions are for self (e.g., lexical searches and retrievals, lightening of cognitive load, and organization of spatial information), while others are for the interlocutor (e.g., providing information that is not present in speech but is in the speaker's mind, retaining turns, and indicating involvement in the conversation).

Speech-Linked Gestures

Speech-linked gestures, like co-speech gestures, occur with speech. However, their timing is different. They are not synchronous with speech. Rather they occur with speech pauses and fill a gap in the sentence. For example, he went [gesture showing someone climbing].

Emblems

Emblems are culturally specific gestures that can occur with or without speech. They are conventionalized gestures that are known to members of a cultural group, and every culture has them. Many times the same form exists in several cultures, but the meaning is different. Examples of emblems are the okay sign or the thumbs up sign in English. Because emblems are conventionalized and learned gestures, they can be and often are taught in language classrooms.

Pantomimes

Pantomimes occur without speech. They involve the use of the entire body to depict actions, objects, or entire stories. Pantomimes are the type of gestures often used by young children in telling a story, by mimes such as Marcel Marceau, or in word guessing games where speech is forbidden, such as charades.

Signs

Signs occur without speech. They are codified movements of the hands that have linguistic properties (morphology, syntax, phonology) and form the basis of sign languages such as American Sign Language or alternate sign languages that develop under specific circumstances where speaking is not possible or prohibited (see Stam, 2013).

SLA and Gesture Studies: Core Issues

Second language and gesture studies have been conducted both in and out of the classroom. They have examined teachers' gestures as well as learners' gestures using naturalistic and controlled experimental data. The main topics they have investigated include classroom interaction, the function and perception of teachers' gestures, emblems, thinking for speaking, referent marking, bilingual development, the use of gestures to facilitate learning, and learners' gestures and their functions—for self and for other (see Stam, 2013).

Studies on emblems, culturally specific codified gestures, in second language acquisition (SLA; e.g., Coburn, 1998; Jungheim, 2008; Mohan & Helmer, 1988) are based on the work of Morris, Collett, Marsh, and O'Shaughnessy (1979). These studies have concentrated on assessing learners' ability to recognize and interpret L2 emblems. To do this, learners are shown videos with the emblems being performed and are then asked to fill out questionnaires or respond orally in the case of children (Mohan & Helmer, 1988) about what they thought the emblems meant.

The majority of the other studies have been based on two main theoretical frameworks: McNeillian and conversation analytic (CA). Although these frameworks are different, they are not mutually exclusive, and some studies combine them (e.g., Smotrova & Lantolf, 2013; van Compernolle & Williams, 2011). However, they bring different assumptions, perspectives, and methods to the research.

As mentioned previously, the McNeillian (1992, 2015) psycholinguistic perspective views speech and co-speech gesture as integral parts of language, a single-integrated system expressing two aspects of thought—the verbal and the imagistic. Speech and co-speech gesture are seen as developing together from a growth point. They complement each other, and together indicate the totality of what a speaker is thinking. This means that sometimes the speech and co-speech gesture represent the same entities, and sometimes the gestures indicate another aspect of thought that is in the speaker's mind but is not expressed through speech. Fundamental for research using this perspective is looking at the interaction of co-speech gestures and speech. This involves identifying the gesture stroke of the co-speech gesture in relation to speech through both regular and slow motion video with sound on.

The CA framework is a sociolinguistic perspective. "The central goal of conversational analytic research is the description and explication of the competences that ordinary speakers use and rely on in participating in intelligible, socially organized interaction" (Heritage & Atkinson, 1984, p. 1). Its primary

focus of analysis is sequences in conversation, turns, and repairs as they relate to specific speech acts (e.g., requests, invitations, offers, interviews, teaching sequences) in naturally occurring data (see Atkinson & Heritage, 1984), and it has well-developed transcription conventions. CA examines gaze, head movements, and body posture in relation to sequences and sees gestures as occurring with lexical affiliates (one word) or the rhythm of the language spoken (Schegloff, 1984) only in relation to turns. Because of its focus on sequences, it also considers gestures to include speech-linked gestures, those gestures that fill speech gaps (Olsher, 2008).

The methods that researchers use in their studies on SLA and gesture are based on their research questions and theoretical framework. For example, studies done within a McNeillian framework (e.g., Brown, 2008, 2015; Brown & Gullberg, 2008; Choi & Lantolf, 2008; Gullberg, 2008, 2009; Laurent, Nicoladis, & Marentette, 2015; Stam, 2006, 2010, 2015; Yoshioka, 2008) that investigate shifts in thinking for speaking (Slobin, 1991) from L1 to L2, L2 learners' use of referents, and bilingual language development tend to have clearly defined research questions about what is being investigated and methods. They also tend to be quantitative and qualitative (for an example, see Sample Study 36.1). They involve the use of a stimulus (a video or book) and videotaping of participants' narratives. All phases of gestures are coded in regular and slow motion, paying particular attention to relevant gestures for the study, and examination of the timing of the stroke of the gesture in relation to speech is paramount for answering their research questions.

Sample Study 36.1

Stam, G. (2015). Changes in thinking for speaking: A longitudinal case study. *Modern Language Journal, 99*(S1), 83–99.

Research Background

The researcher, taking the perspective that speech and gesture are a single-integrated system (McNeill, 1992, 2005) and that there are cross-linguistic typological differences in the expression of motion events (Slobin, 1991), built upon a previous longitudinal study—1997 to 2006 (Stam, 2010)—to investigate whether a Mexican Spanish-speaking English language learner's thinking for speaking patterns about motion further changed linguistically and gesturally in her L1 (Spanish) and L2 (English) over five additional years (2011).

Research Problems/Gaps

The author sought to investigate how the participant's thinking for speaking patterns about motion changed linguistically and gesturally over a 14-year period and how it compared with monolingual Spanish speakers and native English speakers. This study fills one of the gaps in SLA research, the lack of long-term longitudinal research.

Research Method

- *Type of research*: Quasi-experimental McNeillian longitudinal study of speech and gesture in expression of motion events (thinking for speaking).
- *Setting and participants*: Adult L1 Mexican Spanish learner of L2 English. Five monolingual Spanish speakers and five native English speakers (data from McNeill Lab, Center for Gesture and Speech, at the University of Chicago).
- *Instruments/techniques*: Audio-video recording of participants' narrations of the cartoon *Canary Row* (Freleng, 1950).
- *Data analysis*: Linguistic and gestural analysis of learner's cartoon narration in Spanish and English in 1997, 2006, 2011 and comparison with native speakers' data. Gesture and speech synchrony: where stroke of path and manner gestures occurred.

Key Results

The participant's speech and gesture in the expression of motion in her L2 English changed over the 14 years under study, becoming more native speaker-like in the expression of path and manner; however, she retained some L1 Spanish features especially in terms of boundary crossing, indicating a resistance of the learner's thinking for speaking to shift completely from L1 to L2.

Comments

This study provides one example of research on L2 thinking for speaking and what gestures tell us about learners' conceptualizations from a McNeillian perspective. This approach uses a McNeillian transcription and coding scheme (McNeill, 1992) and synchrony of the stroke of co-speech gesture with motion event speech elements to investigate how a L1 Spanish-speaking L2 English learner's expression of motion events changes longitudinally. The researcher's research questions guided her data collection methods and analysis.

Freleng, F. (Director). (1950). *Canary Row* [Animated Film]. New York: Time Warner.

Studies within a McNeillian framework that investigate whether gestures can facilitate learning are generally experimental in nature (e.g., Hirata, Kelly, Huang, & Manansala, 2014; Morett & Chang, 2015; Tellier, 2008) and follow standard experimental protocol with a control group, pre- and post-tests, different groups with different training conditions (one including gesture), and comparison of the various groups' results. These studies have investigated whether gestures facilitate the learning of vocabulary, perception of Japanese vowels, and Mandarin Chinese lexical tones, for example.

Those studies using a combination of McNeillian and Vygotskian frameworks (e.g., McCafferty, 1998; McCafferty & Ahmed, 2000; Peltier & McCafferty, 2010; Platt & Brooks, 2008) tend to be descriptive qualitative studies that use narrative, conversational, or classroom data to investigate

such topics as L2 private speech, zone of proximal development (ZPD), appropriation of metaphoric and beat gestures, self-regulation, and gestures of identity. Because of their exploratory nature, they may or may not have clearly defined research questions.

Classroom research studies also tend to be descriptive, but tend to be conducted within a CA framework. These studies investigate such topics as teachers' gestures during explanations and trouble talk, the functions of teachers' gestures, and learners' perceptions of them (e.g., Eskildsen & Wagner, 2013; Lazaraton, 2004; Sime, 2006). Again because these studies are exploratory in nature and are done within CA, they generally do not have clearly defined research questions and may interpret gesture as more than just co-speech gestures. Exceptions to CA studies are the ones by Smotrova and Lantolf (2013), which combines CA transcription with McNeillian and Vygotskian frameworks, and Tellier and Stam (2012), which is within a McNeillian framework and involves future French language teachers explaining words to native and non-native speakers of French outside of the classroom.

Other descriptive qualitative studies within a CA framework look at learners' gestures in terms of initiation of repairs, embodied completions, and intersubjectivity (e.g., Mori & Hayashi, 2006; Olsher, 2008; Seo & Koshik, 2010) during small group activities or tutoring sessions. These studies often do not have defined research questions and interpret gesture as more than just co-speech gestures. An exception to this is the study by Eskildsen and Wagner (2015) below.

SLA and Gesture Studies: Challenges in Methods and Analysis

Because Gesture and SLA is a relatively new field, it presents a number of challenges in terms of methods and analysis.

Methods

In terms of methods, the research varies widely in many areas, including the participants' L1 and L2, their L2 proficiency level or age, the types of data that are collected, the nature of the data collection, and the length of the study. As outlined above, although the methods are based on the theoretical perspective of a particular study and its research questions, there can be some overlap in the methods used from each of the different perspectives.

Languages, Proficiency, and Age

Regarding languages, studies have been done with participants whose L1 is American Sign Language (ASL), Dutch, English, French, German, Indonesian, Italian, Japanese, Korean, Mandarin Chinese, Mexican Spanish, Swedish, Thai, Turkish, and Venezuelan Spanish and whose L2s have generally included Dutch, English, French, Italian, Japanese, Korean, Swahili, Swedish, and Spanish. There have also been several studies on bilinguals' use of gesture in the following language pairs: French-English, Hindi-English, Mandarin Chinese-Japanese, Spanish-English, and Turkish-English. Although speech and gesture have been investigated in a number of languages, it is not sufficient. More research is needed in a wider variety of L1s, L2s, and bilingual language pairs as well as participants who are fluent in more than two languages.

As for the proficiency levels and ages of participants in the research, the range includes monolinguals to bilinguals, beginners to near-native-like learners, and children aged four to adults. Although these ranges are quite inclusive, gaps remain for future research to address. For SLA to be able to address developmental questions, it is important to have a wider variety of ages and proficiency levels.

Data Collection

The types of data collected by researchers interested in SLA and gesture include first and foremost audio-video recordings of the participants, which are then transcribed, so that gestures and speech can be captured and speech, gesture, and speech-gesture synchrony can be studied. Depending on their research questions, many researchers also collect proficiency measures for their participants through self-ratings or standardized assessments. Other assessments include auditory tests and gesture interpretation tests which are generally created for the purpose of a particular study. Interviews are also sometimes conducted, mainly for participants to reflect on their use of gesture or other nonverbal forms of communication. Questionnaires or online surveys are often used to collect background information on participants, to make sure that they did not realize that gesture was the focus of the study, or to ask participants for their perceptions on elements of the study such as their interest in the particular topic or their evaluations of gazing activities or use of gesture. In addition, some studies use eye tracking, near-infrared spectroscopy (NIRS), observation and field notes, collection of written texts and teaching

materials, informal conversations, stimulated recalls, rank ordering, Likert scales, or participant comments to inform their understanding.

For data collection, it is important to consider which research tasks, languages, groupings or conditions, and materials to use to answer particular research questions. These depend on the theoretical perspective for each study. Research tasks often include recording interactions of participants doing particular activities or narrating what they saw in a particular video or book to an interlocutor. From a CA perspective, researchers often watch video recordings and comment on particular aspects that arise in the data. The experimental studies generally include different groupings of participants who participate in different research conditions such as not seeing gestures, seeing gestures, repeating gestures, or seeing images instead of gestures and measuring and comparing the outcome on particular tasks. Groupings can include many participants or a whole classroom in addition to dyads, small groups, or even a single participant. Some studies investigate L1 gestures only, some L2 gestures only, but most look at both L1 and L2 gestures and the difference between them.

The most common materials used in data collection are video clips, shown to participants, who narrate what they viewed. The most common video clip used across studies is *Canary Row* (Freleng, 1950) with Sylvester and Tweety Bird which is used in thinking for speaking research due to the number of motion events in the clip. The advantage of this is that participants' narrations can be compared across languages or across proficiency level groups as they are narrating the same stimulus and it allows for replicability. Other videos that have been used include *Simpsons*, *Nine Months*, *Pink Panther*, *Pear Story*, and *Pingu* (a Swiss animated cartoon), a weather report, refusals and nonrefusals, classroom interactions, lectures, or a person performing emblems, putting away objects, or pronouncing particular words. Audio files, books such as Mayer's (1969) *Frog* stories, or printed cartoons have also been used.

Studies have ranged in length from one session to 14 years, although most are one session to a few weeks long. A common feature among the experimental studies is to counterbalance the tasks or languages used so that there is no ordering effect. Finally, in gesture studies, participants are generally only excluded if they do not gesture much.

Analysis

Types of analysis also depend on the methods, theoretical perspective, and research questions. Researchers working from McNeillian, Vygotskian, or

CA perspectives each have specific ways in which they analyze their data. As most SLA gesture research involves collecting audio-video recordings in order to investigate gesture, analysis involves watching video data many times, often in slow motion for gesture-speech synchrony, and transcribing and/or coding both speech and gesture. Researchers of nonverbal behaviors in general code for blinking; dropping a hand; positions of head, torso, or brow; gaze shifts and the object of gaze; head or hand repetitions; and embodied completions.

Gesture Coding and Speech Transcription

Several different software programs have been used for transcriptions and coding. These include ELAN, Final Cut Express, CHAT, AUSLAN, SPPAS, iMovie, MUMIN, MediaTagger, and Adobe Premiere Elements. How researchers code within a particular program is dependent on what is of importance to them and which coding scheme they are using (e.g., Ekman & Friesen, 1969; Kendon, 2004; McNeill, 1992).

Therefore, depending on what their analysis will be, researchers may code gestures for the following: illustrators, regulators, affect displays, self-adaptors, path, manner, path and manner, ground, iconics, metaphorics, deictics, beats, conventional, cohesive, Butterworth, interactive, proxemics, kinesics, haptics, artifactual communication, kinetographic, iconographic, baton, and those that perform self-regulatory functions. In addition, they may code for gesture phrases, phases, and space, imitations, catchments, meaning of gesture, viewpoint (character or observer), hand shape, movement, handedness, and the trajectory. Because not every researcher codes the same way or analyzes the same aspects of gesture, comparisons between studies are often difficult.

For analysis of speech, researchers generally code for pauses, the introduction and syntactic role of particular verbal elements, private speech, speech disfluencies, timing, language used, and particular speech units, such as I-phrases, utterances, clauses, or sentence units containing particular feature(s). Those researchers who are working within a CA framework follow CA transcription conventions (see Sample Study 36.2). In contrast, researchers who are interested in gesture-speech synchrony often code for the co-occurrence of gesture and the following: ground noun phrase, verb, satellite, references to people, lexical expressions, lexical searches, pauses, referring expressions, and inanimate introductions.

Sample Study 36.2

Eskildsen, S. W., & Wagner, J. (2015). Embodied L2 construction learning. *Language Learning, 65*, 268–297.

Research Background

As gestures are considered a "window onto cognition," as a resource for inter-subjectivity, and as part of interactional development, Eskildsen and Wagner (2015) examined their role in each of these areas in L2 vocabulary teaching and learning of two English prepositions *under* and *across (from)* (Kendon, 1972; McNeill, 1992).

Research Problems/Gaps

The authors sought to investigate how two English prepositions, *across (from)* and *under*, are accompanied by gestures over time in second language vocabulary learning for one L2 learner and how the gestures are reused later with the participant's classmates in order to demonstrate understanding.

Research Method

- *Type of research*: Conversation analytic investigation of speech and gesture
- *Setting and participant*: Adult L1 Mexican Spanish, L2 English learner; ESL program at community college in the United States
- *Instruments/techniques*: Audio-video recordings of classroom interactions
- *Data analysis*: Conversation analysis of the first six instances of participant's use of *under* in 2.5 months and across (from) over a period of 3 years, 4 months

Key Results

For *under*, both the teacher and the participant's use of gesture to explain and understand this term, especially at the beginning, were crucial. Although the participant's gestures retained essential features across time for *under*, his use of gesture changed over time to become more spontaneous and less hesitant. As for *across (from)*, the participant developed the ability to distinguish *across* from *across from* as seen through the change in his gestures. Their analyses indicate the gradual nature of L2 learning and the need for opportunities in the L2 in different situations in order for learners to appropriate environmental affordances.

Comments

This study provides one example of research on speech and gesture from a conversation analytic perspective. This approach uses transcription, with particular transcription conventions, to investigate the sequential organization of participants' use of speech and/or gesture. From this perspective, the researcher sets out to investigate a phenomenon without any preconceived ideas of what they will find.

Types of Analysis

Those doing research from a quantitative perspective measure a wide variety of speech, gestural, and nonverbal elements. For speech, it often includes the number of clauses, referents, words or words per minute, the length of utterances, word types, word tokens, speech time, or introductions of referents. For gesture, it often includes the number of gestures, the length, the rate, the proportion of a particular type of gesture within the overall dataset, the dimension of gestures, or the gesture space used. For nonverbal behavior, the most common is eye fixation. Finally, most studies calculate interrater reliability.

Researchers interested in making comparisons most often investigate whether participants' gestures are more similar to L1 or L2 users. Other comparisons include participants' speech and gesture in the L1 compared to the L2 under different conditions, the difference in the gesture rate between the L1 and L2, and the differences between different groups or conditions, in eye gazing, or over time. ANOVAs and *t*-tests are the most common statistics that are run on SLA gesture data; however, others consist of descriptive statistics, the Kuder-Richardson formula 20, means, percentages, standard deviations, and chi-squares.

While the above is most often used by those doing experimental research, those doing CA describe or analyze teachers' gestures, students' use of artifacts in a particular setting, learners' use of gesture in small group activities, use of gesture for interpersonal cognition, types of gestures used to initiate repair sequences and embodied actions, and the functions of particular types of gestures. These studies do not generally have research questions and instead their focus is on describing students' or teachers' use of gestures in particular settings, which make them difficult to replicate.

Depending on the type of research done, some elements in the data are excluded and do not contribute to the analysis such as disfluencies, gestures with objects, repair or performance features, unintelligible sounds, self-referential clauses, gestures produced to elicit assistance from the interlocutor, or the use of a mix of the L1 and L2.

Summary

There are several issues and challenges concerning the methods used in gesture and SLA research, such as what is meant by the term *gesture*. Some researchers are open to including any nonverbal behavior such as bodily movements or eye gaze, while others restrict their focus to only co-speech gestures.

Consequently, there is a need for common definitions to be used by researchers. The differences in the kinds of data that are collected can be problematic because they do not allow for comparison across studies. The variety in the way that SLA researchers analyze gestures also presents challenges for the field because claims by one researcher may contradict another's, but they may be looking at very different aspects of gesture. Although methods and analyses used in a study depend on the theoretical perspective one is taking and the research questions being asked, common definitions, research methods, and analyses could provide a way for the field to grow, develop, and make contributions to the body of knowledge on L2 acquisition.

Future Directions

As a new field, gesture research in SLA has the potential to grow and expand our understanding of the L2 acquisition process and improve L2 teaching. However, for this area of research to make the contributions it is capable of, we need additional naturalistic and controlled research studies across more languages as well as access to studies that are being conducted in other countries. In addition, studies need to have clear research questions and clear definitions about what is being studied and analyzed so that they can be replicated. Also the classification system that is being used to code and analyze gesture needs to be clearly delineated. This does not mean that we need to study the same phenomenon or use the same theoretical perspective, but rather that we should approach the research in a more systematic way.

Furthermore, training in the coding and analysis of gesture is needed. Coding of gesture requires practice. Researchers need to learn how to see movement and differentiate between different types of movement and understand their relevance for research questions. Coding needs to be reviewed and questions about it addressed by gesture coding experts for grounding. This could be done by the sharing of data and by workshops on coding offered at professional organizations or institutions.

Resources for Future Reading

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

This book by Adam Kendon is aimed at researchers in the fields of linguistics, communication, semiotics, anthropology, cognitive science, and gesture

study that are interested in research on gesture. It provides an in-depth overview of the history of gesture, what gesture is, how it is used in interaction, and different types of gesture.

McCafferty, S. G., & Stam, G. (Eds.). (2008). *Gesture: Second language acquisition and classroom research.* New York: Routledge.

This volume, edited by Steven McCafferty and Gale Stam, is the first one on gesture in L2 research and is suitable for researchers in the fields of anthropology, communication, linguistics, psychology, sociology, and language teaching. The five sections of the book provide solid evidence for why gesture should be considered in L2 research. Section 1 gives an overview of gesture studies and its application for L2 research, while the other sections have illustrative studies of L2 and gesture research in different contexts.

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought.* Chicago: The University of Chicago Press.

This book by David McNeill is for any researcher who is interested in learning more about McNeill's theory of the interconnectedness of speech, gesture, and thought. The book clearly explains what gestures are, how they are used in different contexts, and how they can be studied. It also provides an illustration of McNeill's coding scheme that has been used in many L2 gesture studies.

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

This book further develops the language-imagery dialectic that McNeill proposed in *Hand and Mind.* It provides a clear description of the growth point, in Vygotskian terms a psychological predicate and a fundamental principle of McNeill's model. It also contains evidence from speech and gesture studies conducted by both McNeill and others that support his viewpoint and a chapter on gesture coding.

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