Preliminary considerations for a study of gestures and second language fluency

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Preliminary Considerations for a Study of Gestures and Second Language Fluency

James P. WOLF*

Abstract

The aim of this paper is to develop a proposal for a study of gestures and second language (L2) fluency. While gesture and speech are fundamental to human communication, much debate exists concerning their precise relationship vis-à-vis one another. This paper thus begins by examining some competing hypotheses and perspectives concerning gesture and speech. Subsequently, different types of gestures are discussed before detailing some of the research that has been done in this area. Along the way, I point out gaps in the L2 literature concerning the study of gesture and speech, and on this basis I begin to design a research proposal to investigate these areas. The study that I have designed is admittedly a work in progress and will require a systematic approach to fully execute it. To this end, I conclude this paper by mentioning limitations of the study as it is currently conceived and point out the steps necessary to advance this research initiative.

1. Introduction

This paper marks the first stage in an extensive study of the relationship between gestures and second language (L2) fluency. This research program will span a period of one to two years, and will involve the careful analysis and interpretation of data obtained from L2 speakers under experimental conditions. The ultimate goal of this research is to develop a better understanding of how the communicative systems of gesture and speech interact and impact L2 speakers’ fluency during speaking tasks. As the first stage in this endeavor, the primary aim of the present paper is to outline some preliminary considerations in order to assist the development of this research program. This will undoubtedly yield insights

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and reflection that will help improve the research design in future stages.

Although both gesture and speech are considered fundamental elements of human communication, their exact relationship to one another has been a source of theoretical debate among researchers. This is due in part to the multitude of factors that produce individual differences in gestural behavior. Such factors include gender (Nicoladis et al., 2007), culture (Gullberg, 2006), personality (Wiens et al., 1980), and cognitive skills (Hostetter & Alibali, 2007), as well as the formality of speech, the socio-economic status of interlocutors, and the topic of conversation (Gullberg, 2006). In the literature, however, the bulk of the debate concerning the relationship between gesture and speech has thus far focused on whether gestures primarily accompany speech for intrapersonal or interpersonal purposes.

2. Contrasting Intrapersonal and Interpersonal Arguments for Gesture

2.1. The Intrapersonal Perspective

A number of researchers have emphasized the intrapersonal (i.e. self-directed) benefits of producing gestures along with speech (Gullberg, 2003; Kita, 2000; Krauss et al., 1996; Goldin-Meadow et al., 2001; Morsella & Krauss, 2004). These researchers argue that gestures facilitate speech production by lightening cognitive load which enhances access to language or concepts. Some maintain that gestures facilitate speech production directly by activating semantic representations of target words through sensorimotor activity (Morsella & Krauss, 2004), while others claim gestures accomplish this indirectly by helping to maintain spatial representations in working memory (Wesp et al., 2001). Several theories assume an intrapersonal perspective claiming that gestures facilitate speech production. Among these are the (a) Lexical Retrieval Hypothesis, the (b) Image Activation Hypothesis, and the (c) Information Packaging Hypothesis.

According to the Lexical Retrieval Hypothesis (Butterworth & Hadar, 1989), gestures enable a speaker to sustain mental concepts while simultaneously searching for lexical items. Gesturing is thus thought to enable lexical retrieval without disrupting a speaker’s train of thought. For its part, the Image Activation Hypothesis (Freedman, 1977) suggests that gesturing allows a speaker to keep an image in mind long enough to describe it. In other words, gesturing is theorized to benefit visual working memory which, in turn, assists a speaker’s description of an image. Lastly, the Information Packaging Hypothesis (Kita, 2000) claims that gesture and
language function together to create our thoughts. Put differently, gesturing is considered to facilitate speech production by helping to organize (or package) the conceptual content of our messages.

2.2. The Interpersonal Perspective

While some researchers have emphasized the intrapersonal (or psycholinguistic) benefits of producing gestures, others have instead argued for the interpersonal (or socio-communicative) benefits. These researchers view gestures as conveying socially meaningful information to others in conversation and assert that gesture and speech are tightly integrated with one another (Kendon, 1980, 2004; McNeill (1992, 2005). Thus, rather than playing an auxiliary or facilitating role, gesture is thought to be unified with speech in a single communicative system. In line with this notion, Gullberg (2006) notes that theorists adopting the interpersonal perspective consider gesture and speech to derive from a common cognitive domain or instead view gesture and speech output as arising from a shared communicative intention. Gullberg mentions turn regulation, feedback eliciting, agreement marking, and direction pointing as some of the functions performed by interpersonal gestures. Perhaps most importantly, Gullberg attempts to bridge the gap between the intrapersonal and interpersonal perspectives by suggesting that gestures are multi-functional and thus perform both self- and other-directed functions.

3. Background of Gesture and Speech Issues

3.1. Types of Gestures

Although several taxonomies of gestures have been proposed, McNeill’s (1992) is cited most often in the literature. McNeill broadly divides gestures into four types; these are (a) iconic, (b) metaphoric, (c) deictic, and (d) beats. Iconic gestures are used when giving concrete descriptions and metaphoric gestures when referring to abstract concepts. For their part, deictics generally involve various pointing gestures. Lastly, beat gestures are rhythmical movements of the hands which tend to stay in sync with the prosody of speech.

3.2. The Nature of Gesture and Speech Research

In the general psychology field a number of studies have examined how restricting gestures during speech production impacts a speaker’s fluency and lan-
guage usage (Graham & Heywood, 1975; Goldin-Meadow et al., 2001; Morsella & Krauss, 2004; Rauscher et al., 1996; Wagner et al., 2004). This is not surprising considering the hypotheses mentioned already which assume that gesturing lightens cognitive load thereby facilitating speech fluency. Other studies have sought to answer whether gesturing improves visual and verbal working memories (Morsella & Krauss, 2004; Tellier, 2008; Wagner et al., 2004). In addition, some studies have claimed that differences in gestural rates are due to individual differences in cognitive skills (Hostetter et al., 2007) while others have argued that these rates are also influenced by the complexity of task demands (Nicoladis et al., 2007).

In recent years, interest in researching the link between gesture and speech has gradually trickled down from the field of general psychology into the area of second language (L2) studies. As a result, a number of L2 researchers have begun to consider the relationship between gesture and speech and its implications for L2 learning and use (Lee, 2008; McCafferty, 2004, 2006; Sherman & Nicoladis, 2004; Tellier, 2008; Yoshioka & Kellerman, 2006). Some of these L2 studies have attempted to understand how gestural behavior in terms of rate and types of gestures used differ for individuals in their L2 versus their L1 communication. These types of studies (e.g. Sherman & Nicoladis, 2004; Yoshioka & Kellerman, 2006) have consisted of qualitative contrastive analyses of the L2 and L1 gestural behaviors.

Other L2 studies have adopted a Vygotskian perspective (1978). These studies have also been qualitative in nature and have involved case studies (McCafferty, 2004, 2006) or micro discourse analyses (Lee, 2008) of the gestural behavior of either just one or a very few individuals. Thus, although a number of experimental studies employing quantitative research methods have been conducted to investigate the relationship between gesture and speech in the general psychology field, such studies appear to be lacking in the L2 field. By utilizing experimental/quantitative methods, it would be possible to gain a broader understanding of the extent to which gesture and speech interact and impact L2 speakers’ fluency during language production tasks. While several studies have investigated the effects of gesture restriction on speech fluency in the general psychology field (Graham & Heywood, 1975; Goldin-Meadow et al., 2001; Morsella & Krauss, 2004; Rauscher et al., 1996; Wagner et al., 2004), this type of study has perhaps eluded consideration in the L2 field. The purpose of my study will therefore be to examine how gesture restriction during speaking tasks affects L2 speakers’ fluency.
4. Scope of the Proposed Study

4.1. The Audience for the Study

The proposed study should be of interest to language teachers who place emphasis on developing their learners’ oral fluency in the target language (TL) through speaking tasks. In addition, L2 researchers who specialize in the area of fluency development should also find the study of interest. Moreover, the study should also appeal to a number of communication specialists and psychologists outside the L2 field.

4.2. Delimitations of the Study

The proposed study will confine itself to examining the effects of gesture restriction on the fluency of Japanese university EFL learners during speaking tasks within the framework of an experimental research design. Fluency will be defined as an automatic procedural skill (Schmidt, 1992) and operationalized in terms of temporal and dysfluency speech markers.

5. Literature Review

As the proposed study is in its preliminary stages, the following review is admittedly limited in scope. However, it is intended that the studies described herein will serve as a point of departure for a more comprehensive review as the study progresses. Moreover, for the sake of relevance to the proposed study, it seems wise to limit the current review to studies that have previously investigated the effects of gesture restriction on speech fluency. Because there appears to have been few, if any, such studies done thus far in the L2 field as mentioned earlier, this review will necessarily focus on gesture restriction studies from the general field of psychology.

Graham and Heywood (1975) studied six male university students who were required to describe two sets of twelve line drawings to a group whose task was to draw them. Their results showed that eliminating gestures during these descriptions changed the semantic content of utterances as well as the proportion of time spent pausing. Continuing along, Goldin-Meadow et al. (2001) asked 26 children and 32 adults to remember a list of letters or words, respectively, while explaining how they solved a math problem. Their results indicated that both groups were
able to remember significantly more items during their math explanations when they gestured. They suggested that gesturing eased cognitive load during the explanation task thereby allowing them to devote more resources to the memory task.

Accepting the notion that meaningful gestures enhance lexical retrieval, Ravizza (2003) instead investigated whether meaningless bodily movements, such as tapping one’s hand on a table, would also help individuals retrieve difficult words. Among the 20 university student participants in her study, the results showed that those who were required to tap at their own pace while retrieving words achieved significantly higher success rates those who were immobile. She therefore claimed that movement does not have to be semantically related to lexical items to aid their retrieval. More recently, Wagner et al. (2004) studied 72 university students (43 females, 29 males) to examine the types of mental representations that underlie gestures. The researchers compared the demands that gesturing makes on visuospatial and verbal working memories. Their results showed that allowing gestures significantly improved participants’ performances on both the visuospatial and verbal tasks given. Thus, this suggests that gesture restriction would have negative effects on both visuospatial and verbal working memories.

Morsella and Krauss (2004) studied 79 university students (44 men and 35 women) whose task was to describe either visually present or absent stimuli. They found that participants gestured more when describing visually absent stimuli but that they also gestured when stimuli were present. Furthermore, they found that gesture restriction caused dysfluent speech even when stimuli were visually present. They thus concluded that gesturing can directly impact both spatial memory and lexical retrieval. In sum, this brief review of literature from general psychology seems to suggest that gesture restriction can produce deficits in lexical retrieval, working memory, and overall speech fluency.

6. Research Questions

Again, as this study is still being conceptualized, the research questions listed here should be viewed as tentative rather than set in stone. These questions will need to be fine-tuned and additional questions may come into play as this research proposal develops further.

How is L2 speakers’ fluency affected by gesture restriction during speaking tasks? As noted earlier, although several studies have tackled this question in
general psychology, it has not been addressed in L2 studies. This question seems important since some research evidence suggests that L2 speakers may gesture at a higher rate than they do in their L1 (Sherman & Nicoladis, 2004).

*How is L2 speakers' fluency affected when only one hand is kept immobile during speaking tasks?* It seems to me that this question has not been addressed even in the general psychology field. Given that the left hemisphere of the brain tends to be dominant for language and that movement on the right side of the body is controlled by the left side of the brain, it may be worthy of investigation to contrast L2 speaker performance when the left hand is restricted and vice versa.

*How is the semantic content of L2 speakers' language production affected by gesture restriction during speaking tasks?* Due to the existence of hypotheses which posit that gesturing facilitates lexical retrieval, it is worth investigating how the semantic content of L2 speakers’ language production is affected by gesture restriction.

*How is the complexity of L2 speakers’ language production affected by gesture restriction during speaking tasks?* Complexity involves the ability to form increasingly larger units of syntax when speaking. Smaller units consist of phrases and larger units contain well-formed clauses. Because restriction is purported to impair production in a number of ways, it is worth examining its effects on complexity.

*How do individual differences in working memory relate to fluency, semantic content, and complexity in response to gesture restriction?* Several researchers have argued that gesture functions to sustain images, concepts, and language in working memory. With this in mind, one might suspect that the speech performance of individuals with poorer working memories would be more adversely affected by gesture restriction. Thus, this question seems worth exploring.

7. **Methods**

7.1. **Present Stage of Development**

I would like to reiterate that, because this study is at the initial planning stage, some design-related issues are necessarily incomplete or unresolved and will need to be fleshed out and refined as the study progresses.
7.2. Participants

The participants will consist of 60 Japanese university EFL students of an intermediate level of proficiency ranging in age from 18 to 22. All participants will be asked to sign consent forms before participating in the study.

7.3. Speaking Task Materials

All participants will read and orally retell three short English stories. Each story consists of approximately 140 words and is written at a 750-English word level which allows reading difficulty to be held constant throughout the study. As shown in Table 1, the three stories (S1 to S3) will be restrictively randomized across the tasks for each participant.

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7.4. Research Design

This study will be a single-factor within-participants design with three levels of gestural conditions (non-restriction, both-hand restriction, and left/right-hand restriction). Participants will perform a total of three read and retell tasks meaning one task per gestural condition. To safeguard the internal validity of the study, I will restrictively randomize the three gestural conditions across the three tasks for each participant by means of a counterbalanced design. Utilizing this design, I will be able to secure experimental control by subjecting all participants to all three gestural treatments as shown in Table 2.
7.5. Task Procedures

Participants will perform the three read and retell tasks consecutively in individual sessions with the researcher. All tasks will be video- and audio-recorded for later transcription and analysis. Each session will last approximately 25 minutes. Participants will have two minutes to read each short story prior to retelling it. Although each story has a picture, participants will have to retell the stories without visual access to the pictures. In the NR condition (non-restriction), participants will be free to gesture with both hands when retelling the story. In the BHR condition (both-hands restricted), participants will be required to place both hands on the table when retelling the story. In the LHR (left-hand restricted) and RHR (right-hand restricted) conditions, participants will be required to keep their left or right hand on the table, respectively, when retelling the story.

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<td>BHR (S1)</td>
<td>RHR (S3)</td>
<td>NR (S2)</td>
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<td>LHR (S2)</td>
<td>NR (S1)</td>
<td>BHR (S3)</td>
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<td>4</td>
<td>NR (S2)</td>
<td>BHR (S1)</td>
<td>RHR (S3)</td>
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<td>5</td>
<td>BHR (S3)</td>
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<td>12</td>
<td>RHR (S2)</td>
<td>NR (S1)</td>
<td>BHR (S3)</td>
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Note: NR = non-restriction, BHR = both-hands restricted, LHR = left-hand restricted, and RHR = right-hand restricted; S1 = story 1, S2 = story 2, S3 = story 3

7.6. Fluency Measures: Dependent Variables

Fluency will be operationalized and measured in terms of (a) the number of syllables uttered per minute (Rate A), (b) the number of meaningful syllables per minute (Rate B), (c) the mean length of run (MLR), (d) the mean pause time (MPT), and (e) the total pause time (TPT).

1. Rate A (the number of syllables per minute): the number of syllables within
each narrative, divided by the number of seconds used to finish the task and multiplied by 60.

2. Rate B (the number of meaningful syllables per minute): same as Rate A, but excluding all syllables, words, phrases that were repeated, reformulated, or replaced.

3. MLR (mean number of syllables between all pauses): obtained by counting the total number of syllables between all filled (e.g. hm, um, and uh) and unfilled (i.e. silent) pauses and calculating the mean number of syllables.

4. MPT (mean number of seconds for all filled and unfilled pauses): derived by counting the total number of seconds for all filled and unfilled pauses and calculating the mean number of pause seconds.

5. TPT (total pause time [filled and unfilled]): expressed as a percentage of the total time on task.

7.7. Analyses of Fluency Measures

A series of one-way within-subjects ANOVAs will be performed on all fluency measures followed by post-hoc t-tests. The alpha for achieving statistical significance will be set at 0.05 for the ANOVAs and at 0.017 for the post-hoc tests. If the distribution of the dependent variable scores is severely non-normal in the proposed study, then non-parametric statistics such as the Friedman Test may be a suitable alternative for the data analyses.

8. Necessary Steps for Future Stages of this Research

In order to commence this study, two broad steps need to be accomplished. Firstly, a more thorough literature review of studies on gesture in both the general psychology and L2 fields is in order. Moreover, noticeably absent from the present paper is a review of studies of L2 fluency. These studies must also be reviewed in detail to constitute a legitimate treatment of the present topic. Secondly, the methodology has some major shortcomings at present. While I discussed how fluency might be operationalized and measured, other measures have yet to be discussed. These include measures of semantic content, linguistic complexity, and working memory. To answer the research questions that I have proposed, these measures need to be selected and incorporated into the research methodology. Upon completing these two steps, I will be able to implement the study and begin
the process of data collection.

References


