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## A Helping Hand? Gestures, L2 Learners, and Grammar

Marianne Gullberg

### INTRODUCTION

This chapter aims to illustrate what second language (L2) learners' gestures can reveal about L2 grammar. It is a popular lay view that learners use their hands and feet when faced with a native speaker to compensate for shortcomings in their L2, and in particular to overcome lexical problems. If you do not know the word for, say, "hammer," you can perform a gesture that outlines or sculpts the properties of the hammer or imitates the action performed with it. The relationship between the lexicon and gesture is seen as "natural" and particularly useful for compensation in many areas, including studies of aphasia (e.g., Anderson *et al.* 1997; Goodwin 2000; Heeschen and Schegloff 1999; Klippi 1996), and specific language impairment (e.g. Fex and Månsson 1998; Månsson 2003). In the second language acquisition (SLA) literature on lexical compensatory communication strategies (henceforth CSs (for overviews, see Bialystok 1990; Dörnyei and Scott 1997; Faerch and Kasper 1984; Kasper and Kellerman 1997; Yule and Tarone 1997), the same view has been predominant. Both the interactionally oriented frameworks (e.g., Tarone 1980) and the psycholinguistic and cognitive ones (e.g. Bialystok 1990, 1994; Faerch and Kasper 1983; Kellerman and Bialystok 1997; Poulisse 1990, 1994) have looked at gesture as informative only with respect to the lexicon. Learners do indeed use gestures to deal with lexical problems in L2, but gestures do not replace speech as is often thought. Instead, L2 learners typically produce a gesture in conjunction with speech marked with question intonation in order to elicit overt help from their interlocutors (for a detailed analysis of learners' compensatory strategies,

see Gullberg 1998). However, gestures do more compensatory work than that. Learners also use gestures to overcome communicative problems resulting from non-fluent interaction. The most frequent type of compensatory gesture performed by learners is a meta-communicative type of gesture that comments on the breakdown of communication, by modifying what has just been said, flagging on-going word-search. These gestures also manage floor-keeping when fluency causes too much disruption. Both of these types of compensation put gestures firmly in the domain of compensatory achievement strategies, as identified by CS research.

This chapter explores the rather more provocative notion that some learners' gestures are directly related to grammar. It considers the systematic relationship between gestures and speech in L2 in the domain of pronominal reference in discourse, and investigates whether learners may use gestures to overcome *grammatical* difficulties related to pronoun use in L2. The analyses presented here are intended to shed new light on the existing accounts of the L2 phenomenon in speech and to provide new insights into both L2 language use and L2 acquisition.

The starting point is the observation of an interlanguage phenomenon in L2 speech, namely the difficulties L2 learners have in creating cohesive discourse at early to intermediate stages of proficiency as a result of limited grammatical means. The production of sustained discourse in real-time face-to-face interaction is a very demanding task in L2. Nowhere is the gap between L2 explicit, declarative knowledge—knowing “that”—and implicit, procedural knowledge—knowing “how”—greater (Anderson 1983). The management of information about people and objects, time, space, and actions from one utterance to the next, a process known as anaphoric linking or reference tracking (Fox 1987; Garrod 2001; Givón 1983; Lambrecht 1994), is complex. It requires both control of lexical items and grammatical categories such as gender, number, definiteness, case, tense, aspect, etc., under time pressure. Crucially, some of the forms of these grammatical categories are also sensitive to information organization or discourse status, i.e., whether an entity has been mentioned before or is newly introduced. There is a growing body of data showing that the acquisition of target-like reference tracking, and in particular reference maintenance, is difficult in a L2 in all domains. When referring to person or animate entities, for instance, learners at the earliest stages of proficiency tend to rely on implicit means of reference, often dropping arguments altogether, as in (1). It has to be inferred from the preceding discourse who does the coming.

- (1) *komme in eine baustell*  
 come in indef.fem build place  
 “come in a building site” (example from Klein and Perdue 1992: 24)

At somewhat later stages, learners shift to an overly explicit means of reference, as in (2). In contexts of local co-reference (cf. Hickmann and Hendriks

1999), where the same referent is maintained from one utterance to the next, learners typically use lexical nominal expressions (lexical NPs) instead of pronouns or zero anaphora.

(2)<sup>1</sup> *la dame<sup>i</sup> a eh donnÉ pour eh la dame<sup>j</sup> et ehm la dame<sup>i</sup> allÉ pour une autre dame<sup>k</sup>*

def.fem lady<sup>i</sup> has uh give for uh def.fem lady<sup>j</sup> and uhm def.fem lady<sup>j</sup> go for indef.fem other lady<sup>k</sup>

“the lady<sup>i</sup> has uh given to uh the lady<sup>j</sup> and uhm the lady<sup>j</sup> go to one other lady<sup>k</sup>”

In this sequence, all entities are referred to by lexical NPs, there are no pronouns and no zero anaphora. In native discourse, a similar construction would be described as in (3), with maintained reference (indicated by superscript j) expressed with a pronoun:

(3) the woman<sup>i</sup> gave it to a woman<sup>j</sup> who<sup>j</sup> gave it to another lady<sup>k</sup>

In native discourse, lexical NPs for maintained reference are sometimes used for pragmatic reasons, such as when there are several possible active antecedents. In L2 production, however, there is no evidence of differentiation of this kind. Instead, the over-use of lexical NPs for maintained reference appears to be fairly undifferentiated. Although there is evidence of language-specific and typologically related effects in this domain (e.g., Hendriks 2003; Yoshioka 2005), the general pattern has been observed in learners of many source- and target languages (e.g., Ahrenholz 1998; Carroll *et al.* 2000; Chini 2005; Extra *et al.* 1988; Givón 1984; Hendriks 2003; Prodeau 1998; Strömquist and Day 1993).

Why should reference tracking be difficult in L2? The principles of reference tracking, ways of foregrounding and backgrounding new and maintained information, respectively, are believed to be more or less universal even if they map onto different linguistic means in individual languages (e.g. Hendriks 2003; Hickmann and Hendriks 1999; Lambrecht 1994). Learners could, therefore, be expected to transfer the general principle that new and maintained referents need to be marked differently from their L1 into their L2, even if they have to find other means for marking it. Yet this is not what they seem to be doing. It is perplexing that learners prefer something to nothing, full lexical NPs over Ø. Various explanations have been proposed to account for locally over-explicit co-reference in speech. Hendriks (2003), following Véronique *et al.* (2000), has suggested that the pattern is a natural reflection of the fact that lexical means are acquired before grammatical ones such as pronouns. Williams (1998) has proposed that learners deliberately avoid error-prone pronominal forms that encode several grammatical distinctions simultaneously (gender, number, and case). Instead, learners favor full lexical NPs in a desire for hyper-clarity. A recent suggestion is that learners avoid pronouns because their deployment requires planning at two levels simultaneously: the level of local grammar and

the level of discourse (Carroll and Lambert 2003; Carroll *et al.* 2000; Prodeau 1998). To choose the appropriate form, learners have to consider the grammar locally in an utterance—is the entity masculine or feminine? singular or plural? is it an agent or a patient in the clause? At the same time, they also have to consider where they are in discourse more globally—is the referent new or has it been mentioned before? should it be encoded as an indefinite NP, a definite NP, or with a pronoun (and if so, is it masculine or feminine, singular or plural, an agent or a patient?, etc.)? This constitutes a double planning load that is too heavy for learners who, at this stage, still have trouble finding words and who have not automated the grammatical encoding. By opting for lexical NPs throughout, learners can plan at one level only and thus alleviate the processing load.

This chapter considers what we can learn about this grammatical problem in L2 by taking gestures that accompany referring expressions for person into account. The study considers the systematic association between spoken referring expressions and gestures in space. First, L1 and L2 production is examined to reveal (a) systematic parallels between properties in L2 speech and gesture and (b) parallel effects of grammatical development in both modalities. Second, the cohesive properties of the gesture–speech ensemble allow us to test the validity of the communicative accounts of the interlanguage phenomenon. Learners are said to “avoid” pronouns in their desire for hyperclarity. This terminology suggests that the behavior is strategic and compensatory. When only speech is considered, such reduction strategies cannot be investigated. However, the analysis of learners’ gestures provides a method for doing just that and for testing the communicative hypothesis. The study therefore investigates whether over-explicit reference tracking in L2 speech and gesture constitutes a communicative, compensatory device, not for lexis, but for grammar and discourse. This chapter examines both whether over-explicit L2 speech is a communication strategy, dependent on co-occurring disambiguating gestures, and whether gestures that accompany over-explicit referring expressions are an interactionally motivated communication strategy to disambiguate speech.

## REFERENCE AND GESTURES IN L1

Gestures, defined as the (mainly manual) movements speakers perform unwittingly while they speak (cf. Kendon 1986, 2004; McNeill 1992), are closely and systematically related to language and speech both temporally and semantically.<sup>2</sup> A number of studies have shown that gestures reflect both lexical and discursive linguistic structures (e.g., Duncan 1994; Kita and Özyürek 2003; McNeill 1992). Gestures offer particularly rich affordances for cohesion in discourse. The mechanism of gestural cohesion rests on gestural patterns, such as handedness, hand configuration, or specific spatial areas, that are consistently associated with content through iconicity or indexicality over a stretch of discourse. McNeill (2000) calls such recurring associations “catchments”.

A number of studies have shown that systematic and repeated associations are found in L1 narratives between referring expressions in speech and gestures (Levy and McNeill 1992; Marslen-Wilson *et al.* 1982; McNeill and Levy 1993). When a referent is first introduced, it is often associated with a particular point in space, a *locus*, through a pointing or a “deictically inflected” iconic gesture (Kendon and Versante 2003). Note that the locus bears no relationship to actual space—it is an arbitrary and abstract “construction” of narrative space. However, once established, it is often maintained throughout discourse such that speakers refer back to the locus when they reintroduce the referent associated with it. As referents and loci multiply through the use of localizing gestures, speakers charge gesture space with referential meaning. Gesture space turns into a sketch pad or map of discourse that allows explicit, visual co-reference to be established. This aspect of gestural cohesion and its effects closely resemble the grammatical procedures found in Sign Language for agreement (e.g., Engberg-Pedersen 1993; Liddell 2003).

Example (4) is an extract of a narrative in native Dutch. Two new referents are introduced: *de vrouw achter de balie*, “the woman behind the counter,” and *een collega een man*, “a colleague a man.”

- (4) [*de vrouw achter de balie*] *die kan het niet lezen*  
 [def woman behind def counter] demon.dist kan it not read  
*die haalt er [een collega bij een man]*  
 demon.dist get.3psing there [indef colleague near indef man]  
*die kan het ook niet lezen*  
 demon.dist can it also not read  
 “[the woman behind the counter] she can not read it  
 she gets [a colleague there a man]  
 he can not read it either”

In speech, new referents (*de vrouw achter de balie*, *een collega* [. . .] *een man*) are marked with lexical NPs and when maintained they are marked with a pronoun (*die*). In gesture, the speaker anchors the two new referents in space with gestures, indicated in the transcription by square brackets. When reference is maintained, there are no gestures. Notice that the gestures coincide precisely (or down to a level of 40 ms, which is the duration of a video frame) with the referring expressions in speech.

## REFERENCE AND GESTURES IN L2?

It is striking that the properties of gestural cohesion in L1 appear to be determined precisely by the factors that cause difficulties for cohesion in L2 speech, namely the interaction between grammar proper and information organization principles that govern the alternation between fuller lexical and lighter pronominal forms. Given the differences between spoken maintained reference in L1 and L2, L2 learners’ gestures could resemble those of L1

speakers—with localizing gestures on the introduction of reference but no gestures with maintained reference. This is a pattern supposedly driven by principles of information organization which should be the same in L1 and L2. However, learners' gestures in L2 could also reflect L2 spoken cohesion, i.e., an over-explicit expression of maintained reference. To enable the study of L2 learners' speech and gesture for cohesion, data have been collected from early foreign language learners of French and Swedish and early Dutch foreign language learners of French.

### Method and Data

The participants represent three different L1s (Swedish, French, Dutch) and two L2s (Swedish, French). The Swedish learners of French (N=5) studied French as a foreign language in Swedish secondary school and were in their fifth year of study. The French learners of Swedish (N=5) were in their third year of studying Swedish as a foreign language at the University of Caen, France. The Dutch learners of French (N=8) had studied French as a foreign language at the University of Nijmegen for a maximum of four years. All learners had had very limited contact with the foreign language outside of the classroom, and no one had ever lived in a Swedish- or French-speaking country, respectively.

Printed cartoon stories were used as stimuli to elicit narratives. The learners retold a cartoon story from memory to an interlocutor face-to-face, in their L1 as well as in the L2, each time to a native speaker of the language. The interlocutors were confederates instructed to act as naive listeners. The learners were instructed to retell the story to the interlocutor such that the interlocutor could retell the story in her/his turn. After the first retelling, the confederate was taken to another room where s/he was said to be tested on the story. This procedure was intended to ensure detail in the narratives and to promote interaction between the learners and their interlocutors, which, in turn, induces natural gesturing. All instructions were given in the language of the retelling, and the order of languages was counter-balanced. The procedure allowed the learners to constitute their own native controls. It also provided us with a measure of the individual propensity to gesture independently of language condition. All retellings were video-taped and audio-recorded and written consent was obtained from all participants. A post hoc questionnaire was administered to check that participants did not identify gestures as the target of study.

All narratives were transcribed verbatim and each referring expression was coded for referential status as *introduction*, *maintenance*, or *reintroduction*. These notions were defined narrowly (see Table 9.1). In particular, maintained reference was defined as local co-reference, meaning cases where a referent has been mentioned in an immediately preceding clause (cf. Hendriks 2003; Hickmann and Hendriks 1999). Each referring expression was also coded for form, i.e., lexical NP (NP Lex), pronoun (NP Pron), or zero anaphor (NP Ø).

Table 9.1

Speech: Discourse status categories and definitions

<i>Discourse status</i>	<i>Definition</i>
Introduced	First mention of a referent in discourse
Maintained	The referent has been mentioned in the immediately preceding clause
Re-introduced	The referent (re-)appears after a clause where it has not been mentioned

The video data were digitized and all gestures co-occurring with the referring expressions for person were identified by a frame-by-frame analysis of the digitized video using Mediatagger 3.1 (Brugman and Kita 1995), a software for video annotation developed at the Max Planck Institute for Psycholinguistics. Gestures identified as co-occurring with expressions referring to person were strokes of localizing gestures and their (post-stroke) holds, i.e., instances where the gesture is stopped and held in gesture space (Kendon 1972; Kita *et al.* 1998). Gestures occurring outside of speech segments encoding reference to person were disregarded. Gestures co-occurring with verbs or predicates, as in (5), were also not considered.

- (5) The woman [went back] to the pharmacy.

Insofar as gestures occurring on verbs “moved” the referent from one location to another, the spatial re-organization and the new anchor point associated with the referent was noted. Finally, if gestures and their co-occurring referring expression were repeated as a result of disfluency, the resulting speech-gesture ensemble was considered only once. Details on interrater reliability for the different studies can be found in Gullberg (2003, 2006).

## Results

The analysis of L2 speech and gesture showed that L2 learners typically anchor referents and associate them with a locus in space at their introduction, as in L1. However, in contrast to L1 behavior, referents that are maintained from one utterance to the next are often also accompanied by gestures. In other words, learners localize a new referent in space with a gesture, and, at the immediate next mention, they produce another gesture, an *anaphoric* gesture, indicating the same locus in space.

- (6) *oui and eh c'est une autre femme à la magasin*  
 yes and uh it.is indef.fem other woman<sup>1</sup> at def.fem shop  
 Listener: *mhm*  
*et eh [l'autre femme] ne comprend pas le papier*  
 and uh [def.other woman<sup>1</sup>] not understand not def.masc paper



Listener: *d'accord*

Listener: OK

*eh [l'autre femme] quest eh <sigh> eh sa eh un be eh [eh garçon]*  
 uh [def.other woman<sup>i</sup>] quest uh <sigh> uh poss.fem uh indef.masc  
 be uh [uh boy<sup>j</sup>]

*[l'autre femme de magasin] eh eh <long pause> eh de demandE eh cette eh eh*  
*l'assistance*

[def.other woman<sup>i</sup> of shop] uh uh <long pause> uh as ask uh  
 demon.fem uh uh def.assistance

*de [autre garçon]*

of [other boy<sup>j</sup>]

"yes and uh it's one other woman<sup>i</sup> in the shop

Listener: mhm

and uh [the other woman<sup>i</sup>] does not understand the paper

Listener: OK

uh [the other woman<sup>i</sup>] quest uh <sigh> uh her uh a be uh  
 [uh boy<sup>j</sup>]

[the other woman<sup>i</sup> in the shop] uh uh <long pause> uh a ask uh  
 this uh uh the assistance from [other boy<sup>j</sup>]"

As before, there are two new referents in segment (6), *une autre femme*, "another woman," and *garçon*, "boy." There is a dominance of lexical NPs in speech and no pronouns. In particular, maintained reference, marked by superscript in the text, is marked by a lexical NP. Note, however, that this learner distinguishes the indefinite NP at the introduction from the definite NP at the next mention. However, all subsequent and immediate reference to the woman is marked by a definite full lexical NP. In gesture, again indicated within square brackets, the participant places the referents in different loci, just as in L1: the woman to his right and the manager further to his right. At each mention of the maintained referent, the speaker produces an anaphoric gesture indicating the locus associated with that referent. In L2, referents are thus marked in gesture when introduced but also when maintained. In fact, maintained reference is accompanied by gesture significantly more often in L2 than in L1. Table 9.2 summarizes the mean proportion of maintained referring expressions occurring with gestures in L1 and L2 in the three language pairs.

**Table 9.2**

Mean proportion of expressions for maintained reference with gestures in L1 and L2

Language pair	L1 mean %	L2 mean %	
French1-Swedish2	0.02	0.24	t(4) = 2.73, p = 0.05
Swedish1-French2	0.01	0.13	t(4) = 2.36, p = 0.08
Dutch1-French2	0.02	0.11	t(7) = 2.77, p = 0.03

**Table 9.3**

Mean proportion of expressions for maintained reference encoded as NP Lex vs. NP Pron with gestures in L2

<i>Language</i>	<i>L2 mean %</i>		
	<i>NP Lex</i>	<i>NP Pron</i>	
Swedish2	0.74	0.07	t(4) = 6.79, p = 0.002
French2 (Swedish1)	0.45	0.10	t(4) = 2.92, p = 0.043
French2 (Dutch1)	0.61	0.03	t(7) = 4.16, p = 0.004

Another striking observation is that anaphoric gestures tend overwhelmingly to accompany referring expressions encoded as lexical NPs. The anaphoric gestures are significantly more likely to occur with maintained referring expressions encoded as full lexical NPs than with pronouns, as can be seen in Table 3.<sup>3</sup> In fact, when the use of anaphoric gestures is broken down by learners who do or do not use pronouns for maintained reference, learners who never use pronouns but only lexical NPs for maintained reference are found to produce anaphoric gestures significantly more often than learners who do use pronouns. Conversely, learners who use pronouns—even incorrectly—do not produce anaphoric gestures with maintained reference. Their gestural behavior instead resembles that of native speakers. The data for Swedish and French learners are summarized in Table 9.4 (all Dutch learners of French used pronouns somewhere in their narratives).

L2 gestures thus seem to directly reflect the properties of spoken L2. Both modalities are characterized by over-explicit marking of maintained reference: by lexical NPs in speech and by anaphoric gestures in gesture. Moreover, the characteristics of gestural cohesion are directly related to the level of linguistic proficiency: with the development of grammatical means to mark maintained reference in speech, i.e., pronouns, anaphoric gestures seem to disappear.

Note again that gestural behavior is not linked to lexical difficulties. A learner who has a lexical problem but who uses a pronoun to maintain reference does not mark the pronominally encoded referent with a gesture, as can be seen in Example (7).

**Table 9.4**

Mean proportion of referring expressions with gestures in (L1 and L2) produced by participants who do and do not use pronouns for maintained reference (Swedish/French learners collapsed)

	<i>Mean %</i>
L1	0.61
L2 without pronouns (N=7)	0.24
L2 with pronouns (N=3)	0.02

- (7) *il a besoin de l'échafaudage pour ehm*  
 he has need of def.scaffolding for uhm  
*eh eh [un peinture] eh*  
 uh uh [indef.masc painting] uh  
 "he needs the scaffolding for uhm  
 uh uh [a painting] uh"

In this example, the learner produces a pronoun *il*, "he," for the maintained referent. No gesture is produced. In contrast, when she has trouble finding an appropriate lexical item for "painting," she produces a gesture, marked with square brackets in the transcript. The iconic gesture outlines the picture while she says *un peinture*, "a painting," with "try-marked" intonation (Sacks and Schegloff 1979). Conversely, learners with no evident lexical difficulties but who mark maintained referents with lexical NPs also mark these NPs with anaphoric gestures, as we have seen. The phenomenon at hand is therefore not an example of a gestural *lexical* compensatory strategy (cf. Gullberg 1998). It is only related to grammar and discourse.

In sum, gestural reference tracking in L2 differs systematically from gestural reference tracking in L1. Specifically, maintained reference in L2 gesture differs from maintained reference in L1 gesture in the same way as L2 speech differs from L1 speech: it is over-explicit. Moreover, gestural behavior in L2 reflects L2 speech rather than L1 gesture, suggesting that the gestural expression of cohesion is related to an alternation of form rather than to the discourse status of a referent. This is probably the case even in native gesture production, where the factors are generally conflated. The relevance of this observation will be discussed in the next section.

## IS OVER-EXPLICITNESS AN INTERACTIONAL COMMUNICATION STRATEGY FOR GRAMMAR?

Why do learners behave in this fashion? Let us start by considering the effect of gestures on cohesion. Nominal maintained reference is not optimal for successful reference tracking or anaphora resolution because the distinction between new and old information is blurred. The standard interpretation of a lexical NP is that it refers to a new entity or introduces a thematic shift (cf. Fox 1987; Givón 1984; Vonk *et al.* 1992). Learners' choice of full lexical NPs instead of pronouns for local maintained reference leads to a violation of a range of rules for anaphora resolution, including givenness hierarchies and accessibility scales (Ariel 1990; Chafe 1994; Givón 1984), the Gricean quantity principle and versions thereof (Grice 1975; Leech 1983; Levinson 2000), relevance (Sperber and Wilson 1986), and principles of recipient design (Sacks and Schegloff 1979). The over-explicitness causes difficulties in comprehension of discourse as a whole, as seen both in interaction (Gullberg 1998) and experimental studies of discourse (e.g., Cloitre and Bever 1988; Garrod *et al.* 1994; Vonk *et al.* 1992). It is easier for listeners to unpack a pronominal

reference than a full lexical form. Full lexical NPs lead listeners astray. Instead of being hyper-clear, as proposed by Williams, learners' speech is ambiguous and non-cohesive at the discourse level.

While learners' speech is ambiguous, their gestures are not. The physical and spatial properties of gestures make them ideally suited for disambiguation. The association between a unique referent and a locus in space is clear and unequivocal. Spatial anchoring and the repeated indication of a locus allows visual and explicit co-reference to be established even in the absence of clear-cut distinctions in speech (cf. Levy and Fowler 2000). As a consequence, gestures could be exploited by learners to identify or disambiguate in gesture what they cannot distinguish in speech, namely that which is new from that which is maintained. Recall that gestures in L2 accompany precisely those referring expressions in speech that are ambiguous, namely the lexical NPs that mark maintained reference, and no others. Moreover, as we have seen, these gestures disappear when learners develop pronouns and the grammatical means to construct cohesive discourse. The more cohesive the discourse, the fewer anaphoric gestures we find. The gestural reflection of the learner variety would thus allow learners to avoid problems of discourse ambiguity in speech by providing spatial scaffolding for cohesion.

In light of these cohesive effects, gestures seem like an excellent interactional communication strategy to overcome problems with reference maintenance. Previous accounts of over-explicit speech have taken reductionist perspectives by talking about learners as avoiding pronouns. By looking at gestures and speech in conjunction, and specifically by considering gestures as a disambiguation device, it is possible to look at the speech-gesture composite as an achievement strategy for grammar. At least two things are required for gestures to be a likely candidate for a compensatory device for grammar. First, for any gestures to be truly "compensatory" for a linguistic shortcoming, there has to be a tight link between speech and gesture such that they can be shown to relate to each other. This link has clearly been illustrated above. Second, a compensatory device should be of relevance to addressees. There is considerable evidence that addressees make use of and attend to gestural information in interaction. Speakers have been shown to pick up representational and deictic information only present in gestures (e.g., Beattie and Shovelton 1999; Cassell *et al.* 1999; Gullberg and Kita forthcoming; Kelly *et al.* 1999; Langton *et al.* 1996). More importantly for grammar and discourse, when exposed to cohesive or indexical gestures that are inconsistent or conflict with speech, addressees have problems reconstructing narratives (Cassell *et al.* 1999). When native addressees try to disambiguate reference in native/non-native interaction, they often refer back to the loci established by the learners.

- (8) NS *et à ce moment-là [tout] le monde comprend*  
 and at demon.masc moment-there [all] def.masc people  
 understand  
 "and at that moment [every]body understands"

The native speaker (NS) in (8) clearly indicates the loci previously established by the learner as associated with the referents included in "everybody." This spatial information has only been available in the learner's gestures. Despite the absence of overt attention to gestures during discourse, the addressee has, nevertheless, attended to and integrated the gestural information.

A possible third requirement concerns the intention to compensate. It is more difficult to establish whether speakers *intend* their gestures for the addressee. This is a familiar problem in the CS literature. Most gestures are typically performed with a high degree of automaticity and little awareness. Even when speakers have negotiated an expression associated with a given gesture, they often do not remember having performed it. Similar cases of low awareness are documented in the literature on spoken CSs whereby learners circumvent problems before these become overt in speech, and sometimes by using strategies that are applied so often as to become routinized. In contrast to spoken strategies, however, it is possible to determine what is *interactionally* intended gestural behavior (cf. Holler and Beattie 2003; Melinger and Levelt 2004). By manipulating visual access between learners and their addressees, it is possible to examine to what extent learners actually consider their addressees when deploying anaphoric devices in speech and gesture in conjunction as part of an interactional addressee-directed disambiguating strategy.

Previous studies manipulating visual access between speakers and addressees have shown that there is a general reduction in gesture frequency when speakers and addressees cannot see each other (e.g., Alibali *et al.* 2001; Bavelas *et al.* 1992; Cohen 1977). The logic underlying such studies is that gestures that are intended for the addressee disappear when there is no visual access between speaker and addressee. Such a paradigm can be used to examine whether the over-explicit maintained reference in L2 is strategic or not. If over-explicit speech is a communication strategy, dependent on the co-presence of anaphoric gestures for disambiguation, then speech should become less explicit and display more pronouns and zero anaphora when the addressee cannot be seen. Similarly, if anaphoric gestures that accompany expressions of maintained reference are an interactionally motivated communication strategy to disambiguate over-explicit speech, there should be fewer or no anaphoric gestures when the addressee cannot be seen. Note that the claim is not that the relationship between speech and gesture is causal. Even if over-explicit speech is not affected by manipulations in visibility, and therefore not a communication strategy, anaphoric gestures could still be such a strategy.

### Method and Data

Data from 16 Dutch foreign-language learners of French were analyzed. Recall that story retellings were used to elicit spoken discourse and gesture in L1 and L2. For this study the narratives were also elicited under two visibility conditions. Each learner contributed data to one of four possible combinations of language (L1, L2), story (A, B), and visibility condition (+Visible where

speaker and addressee could see each other, and –Visible where they could not). Each learner, therefore, contributed four stories (for further details on the data collection, see Gullberg 2006). A confederate addressee, said to be unfamiliar with the stories, was present at each retelling to ensure gesturing (cf. Alibali *et al.* 2001; Bavelas *et al.* 1002; Cohen 1997). In the L1 condition, the confederate was a native speaker of Dutch, and in the L2 condition, a native speaker of French. After each retelling, the confederate was “tested” on the story in another room, the learner memorized another cartoon, and an experimenter arranged the set-up for the appropriate visibility condition. In the visible condition, the participants were seated face-to-face across a table. In the non-visible condition, a screen was placed on the table between the participants to prevent eye contact and gesture inspection. The procedure was otherwise as described above. The data treatment and coding were also the same as described in the previous study. The analyses presented here focus exclusively on behavior in L2 with or without visual access to the addressee.

## Results

L2 learners encode maintained reference in speech in exactly the same way regardless of whether they can see their addressee or not, as can be seen in Examples (9) and (10).

- (9) (+Vis) *la dame retourne à eh docteur eh eh l'assistante de docteur*  
 def.fem lady return to uh doctor uh uh def.assistant of doctor  
*et l'assistante eh naar le docteur*  
 and def.assistant uh to def.masc doctor  
 “the lady return to uh doctor uh uh the assistant of the doctor  
 and the assistant uh *naar* (Du. to) the doctor”
- (10) (-Vis) *la femme retourne eh avec l'ordonnance à la docteur*  
 def.fem woman return uh with def.prescription to def.fem doctor  
*le docteur comprend pas cette papier son papier*  
 def.masc doctor understand not demon.fem paper poss.masc paper  
*le docteur produce producE le papier*  
 def.masc doctor produce produce def.masc paper  
 “the woman return uh with the prescription to the doctor  
 the doctor does not understand this paper his paper  
 the doctor produce produce the paper”

In both examples, the learners use full lexical NPs to the same extent for maintained reference, and there is no evidence of an increase in use of pronouns. L2 speech is, therefore, not less explicit when the addressee cannot be seen, or, put differently, it is as over-explicit and non-cohesive as ever. Table 9.5 summarizes the quantitative data.

Table 9.5

Mean proportion of expressions for maintained reference encoded as NP Lex or NP Pron in L2  $\pm$  visibility

Mean %	NP Lex	NP Pron	NP $\emptyset$
L2+Vis	0.20	0.76	0.05
L2-Vis	0.21	0.73	0.06
	n.s.	n.s.	n.s.

Similarly, for gesture there is no difference across the visibility conditions. Learners continue to produce gestures with maintained expressions even when the gestures cannot be seen by the addressee. Moreover, as before, they tend to produce these gestures with lexical NPs and not with pronouns. In other words, the gestures still co-occur with the most ambiguous forms. Example (11) and Figures 9.1a-c illustrate this point.

- (11) (-Vis) *et [le secrétaire] (Listener: sa secrétaire) eh pour [le docteur]*  
*l'ordonnance*  
 and [def.masc secretary] (Listener: poss.fem secretary) uh for  
 [def.masc doctor] def.prescription  
*pour le docteur*  
 for def.masc doctor  
 Listener: *oui*  
 Listener: yes  
*[le docteur] écrit mais eh pas eh le eh main*  
 [def.masc doctor] write.3psing but uh not uh def.masc uh hand  
 "and [the secretary] (listener: his secretary) uh to [the doctor]  
 prescription to the doctor  
 listener: yes  
 [the doctor] writes but uh not uh the uh hand"

When the learner to the left introduces "the secretary," she localizes the referent with a gesture (Figure 9.1a). Similarly, when she reintroduces "the

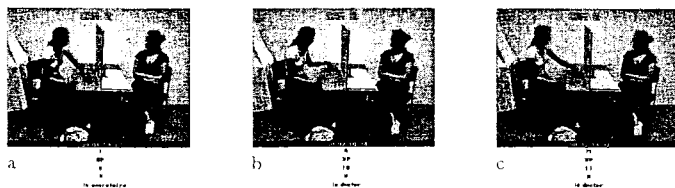


FIG. 9.1a-c Gestures occurring with referring expressions in the -Vis condition. (a) "The secretary" localized when introduced. (b) "The doctor" localized when re-introduced. (c) "The doctor" maintained with anaphoric gesture (but not maintained locus).

**Table 9.6**

Mean proportion of expressions for maintained reference encoded as NP Lex or NP Pron with gestures in L2  $\pm$  visibility

Mean %	NP Lex	NP Pron
L2+Vis	0.51	0.07
L2-Vis	0.61	0.08
	n.s.	n.s.

doctor," she localizes him to her left (Figure 9.1b). When the doctor is maintained in the next clause and encoded with a lexical NP, he is still marked by an anaphoric gesture (Figure 9.1c). Table 9.6 presents the quantitative gesture data.

There were, thus, no quantitative differences in speech or gesture behavior for maintained reference between the two visibility conditions in L2. In other words, learners did not change their speech encoding options depending on whether or not they could see their addressee. They also did not change their gesture behavior. Anaphoric gestures continued to occur with lexical NPs even when the gestures could not be seen by the addressee. Overall, there is little support for the notion that over-explicit L2 speech is an interactional CS dependent on the presence of disambiguating gestures. There also appears to be no support for the hypothesis that anaphoric gestures are deployed as a compensatory and disambiguating device.

#### *Not fewer gestures, but different*

Although there may not be more cohesive gestures in the visibility condition than in the non-visibility, cohesive gestures are clearly deployed and articulated differently when they can be seen. This qualitative difference is exemplified in Figure 9.2a–b.

Gestures and gesture space are more differentiated when open to inspection by all participants, as seen in Figure 9.2a. Loci associated with particular referents (instantiated as NPs) are typically distinct and kept well apart in space. Even more importantly, speakers typically adhere to and return to the loci



FIG. 9.2a–b Spatial distribution of loci (=dark dots) in the +Vis and -Vis conditions. (a) Spatially distinct loci in the +Vis condition. (b) Vague spatial loci in the -Vis condition.



associated with a particular referent on the next mention when the gestures can be seen. In the +Vis condition, speakers often adhere closely to loci throughout a narrative such that when a referent is referred back to, the locus associated with it is clearly indicated. This adherence includes taking into account that the referent may have moved in gesture space as a result of a gesture accompanying an expression for an action undertaken by the referent. Speakers keep track of the new location with which a referent is currently associated. In contrast, in the -Vis condition, gestures are less well spatially defined and loci associated with a given referent are not as rigorously returned to. This is evident in Figure 9.2b, but can also be seen in Figure 9.1b and 9.1c. In Figure 9.1 the locus in gesture space associated with the doctor shifts from one mention (Figure 9.1b) to the next (Figure 9.1c). It is worth pointing out that the difference in gesture articulation observed between the visibility conditions is not a necessary consequence of the (sagittally) more constrained gesture space in the -Vis condition. Speakers can and do differentiate space in the lateral dimension (as can be seen in Figure 9.1a-c).

The difference in adherence to spatial set-up was examined quantitatively in the data. The first gesture/locus associated with a particular referent was identified in each narrative. All subsequent gestures coinciding with a spoken referring expression for that same referent (i.e., maintained or reintroduced) were coded as either spatially permanent or vague. The analysis showed that learners were significantly more likely to adhere to the loci associated with a referent when they could see their addressee than when they could not. Conversely, they were significantly more likely to produce vague gestures or to violate loci set-ups when the addressee could not see them. The distribution of spatially permanent vs. vague gestures across the visibility conditions is summarized in Table 9.7.

Learners, thus, take greater care with their cohesive gestures when these can be seen by addressees. The loci associated with a referent are carefully set up and differentiated, and they are more consistently returned to over discourse. The articulation of the gestures for maintained reference, therefore, appear to be influenced by the interactive situation even if their presence is not (cf. Özyürek 2002). The qualitative sensitivity to visibility points to the possibility that learners deploy anaphoric gestures as a compensatory device after all.

**Table 9.7**  
Mean proportion of spatially permanent vs. vague anaphoric gestures in L2 ± visibility

<i>Mean %</i>	<i>Permanent</i>	<i>Vague</i>
L2+Vis (N=12) <sup>a</sup>	0.42	0.58
L2-Vis (N=12)	0.16	0.84
	$t(11) = 2.18, p = 0.05$	$t(11) = -2.18, p = 0.05$

<sup>a</sup> The analysis is based on data from 12 participants, namely the 12 participants who produced second occurrence gestures in both visibility conditions. 4 of the 16 participants did not produce any such gestures.

## DISCUSSION

The observation that over-explicit maintained reference in spoken L2 has a gestural parallel opened the possibility that anaphoric gestures had a bearing on speech, somehow licensing over-explicit speech by disambiguating it in the spatial modality. Looking at speech and gesture as an ensemble permitted us to test the communicative accounts of L2 anaphoric linking. While it is an attractive notion, there is little support in the data for the idea that over-explicit speech is strategically dependent on the presence of disambiguating gestures. L2 speech was unaffected by whether learners could see their addressees or not. Instead (and as expected), over-explicit reference appears to reflect an acquisitional stage where pronouns and zero anaphora have not been acquired or mastered in the L2, or alternatively, a stage where the processing load of planning at both a local and a global level is too heavy for learners. Either way, learners do not have the means to maneuver between what Poulisse, following Leech, has called principles of clarity and economy (Leech 1983; Poulisse 1987). In native discourse, maintained reference is clearest when most economical, i.e., when expressed by the leanest form, namely a pronoun or zero anaphora. Learners, however, have to flout principles of minimization (Levinson 2000) whereby the leaner the expression, the more meaning can be read into it. L2 learners inverse the pragmatic rules for reference interpretation. Fuller expressions need to be read as meaning less in L2. In the choice between risking ambiguity at the local clause level using an erroneous, ambiguous pronoun, and at the discourse level by obscuring cohesive rules, learners at this level appear to opt for the latter. Less advanced learners can be said to let lower-level sentence organization prevail over higher-level discourse organization, using lexical NPs at the risk of discursive non-cohesion but with the advantage of less local ambiguity (cf. Hendriks 2003, p. 318). Words like "opt for," "choice," and "let prevail" should be treated with caution, however. This study shows that over-explicitness is not a matter of choice or of avoidance. Grammatical development and difficulties with the forms that encode multiple grammatical categories override discourse concerns simply because they have to.

What about over-explicit, anaphoric gestures? The absence of a quantitative difference in gesturing between the visibility conditions suggests that anaphoric gestures are not performed for the benefit of the addressee, and are therefore not interactionally or strategically motivated as a disambiguation device. However, the qualitative difference in gesture realization between the conditions indicates that, although the presence of anaphoric gestures does not depend on whether or not they are visible to the addressee, their form and articulation does. Learners do take their addressee into account when performing such gestures and put the spatial information they provide to good use. The careful spatial realization of the gestures and the adherence to loci in L2 (and L1) indicate a certain "recipient design" (Sacks and Schegloff 1979). Learners appear to be aware of the non-cohesive quality of their speech caused by the over-use of full lexical NPs and the need for disambiguation. The fact that they carefully

articulate the gestures accompanying precisely the ambiguous nominal expressions when the gestures can be seen suggest that they are making an effort to make disambiguation as easy as possible for the addressee through gesture. Overall, the qualitative aspect of cohesive gestures, therefore, makes it probable that they *are* exploited as a compensatory, interactional communication strategy for grammar and discourse wherever feasible and practical. While learners have no choice but to breach rules for anaphora resolution and to be over-explicit in speech, they do what they can to overcome the resulting ambiguity and they exploit anaphoric gestures for disambiguation wherever possible. Note that this observation of gesture allows us to infer that learners are aware of and uncomfortable with the non-cohesiveness of their speech in L2. In other words, the analysis of speech alone does not allow us to establish whether avoidance of pronouns is a reductionist strategy or even whether learners are aware of the discursive problems created by their grammatical difficulties. Only the analysis of gestures allows us to uncover the underlying problem experienced by learners at this stage. This is an important methodological point for SLA and CS research alike.

The question still remains why over-explicit cohesive gestures remain when they cannot be seen. It has been suggested that speakers merely continue to gesture out of habit regardless of the situation (see, e.g., Hostetter and Hopkins 2002). However, the fact that L2 gestures differ systematically from L1 gestures, and that there is a qualitative change in realization depending on visibility, speaks against such an option. A more interesting possibility is that the presence of cohesive gestures rather reflects processes related to speech production, planning and cognitive load. As such, anaphoric gestures may in fact be part of learners' means to help themselves, a speaker-internal compensatory device.

All gestures are clearly not interactionally motivated. For instance, congenitally blind speakers gesture (e.g., Iverson *et al.* 2000), and everybody has an anecdote about gestures on the phone. Several theories have recently been developed that assign a role to gesture in speech production processes. One set of theories proposes that gestures facilitate speech by helping lexical retrieval (e.g., Frick-Horbury and Guttentag 1998; Hostetter and Hopkins 2002; Krauss 1998; Krauss *et al.* 2000; Rauscher *et al.* 1996) or by promoting the organization of thought for verbalization (e.g., Alibali *et al.* 2000; Freedman 1972; Kita 2000). Another set of theories considers gesture and speech as equal partners with a shared conceptual origin that is expressed linearly in speech and holistically in gesture simultaneously (e.g., de Ruiter 2000; McNeill 1992). The speech facilitation theories seem applicable to L2 production and reference tracking in L2, given their inherent view of gestures as compensatory. However, these theories rest on two basic assumptions that turn out to be problematic. First, they assume that gesturing for retrieval occurs in silence such that gestures precede speech (cf. note 2). However, micro-analyses reveal that gestures rarely occur in silence. When speech stops, so does gesture, be it in stuttering (Mayberry and Jaques 2000), in disfluency (Seyfeddinipur 2006), or in L2 production (Gullberg 1998). Second, these theories are built on the retrieval

of content words by representational or iconic gestures, i.e., gestures that represent some feature of the intended referent. In the case of reference tracking, there is no lack of lexical material, rather the opposite. Also, the localizing gestures pertinent here are often abstract deictic gestures that bear no iconic relationship to the referent. It therefore seems difficult to account for L2 cohesive gestures as a reflection of lexical retrieval processes or, indeed, of organization of thought for verbalization. In fact, in the case of L2, a lexical retrieval account is unlikely even for representational gestures, given that the lexeme in L2 that corresponds to the intended L1 concept is not always known by the learner. No amount of gesturing will, therefore, activate the sought lexical item. As a consequence, neither of these compensatory views on gesture seems to be able to account for gestural cohesion patterns in L1 or in L2.

A recent alternative view holds that gestures may be facilitative for speakers through the reduction of load on verbal working memory. The suggestion is that working memory load is reduced by shifting some of it onto other cognitive systems or to external representations. This notion was first suggested by Nobe. In a series of studies Goldin-Meadow and her colleagues (Goldin-Meadow *et al.* 2001; Wagner *et al.* 2004) have measured recall on memory tasks in children and adults. Participants memorized lists, then explained a math problem, and were then tested on the list. Some participants gestured while explaining the math problem and others did not. Participants who gestured during the math explanation performed significantly better on the memory tasks than those who did not gesture. The authors suggest that gesturers did better because they had moved some of their cognitive load onto gesture, thus liberating cognitive resources to be allocated to other tasks, such as keeping words in short-term memory. Following this line of argument, anaphoric gestures for maintained reference in L2 may confer a cognitive benefit to the learner, in the sense that they alleviate the learner's cognitive load. By gesturing, the learner may create more cognitive capacity to proceed to plan the next unit of discourse. This account seems compatible with the observation that early L2 speech is non-fluent and proceeds by small units, many of which are typically accompanied by gestures (Gullberg 1998; Nobe 1993). A gesture on a maintained referent expressed as a lexical NP could signify that this entity has been planned and executed as a separate unit, much as if it were a new idea, not related to the preceding context. This view is also in line with the processing explanations for over-explicit speech by which learners use lexical NPs to avoid double planning load (Carroll and Lambert 2003; Carroll *et al.* 2000; Prodeau 1998). Keeping words, grammar, and relationships between entities at a local and global level in mind simultaneously is a very heavy load on verbal working memory, and thus for speech planning. If lexical NPs help to reduce the planning load, performing a gesture may help alleviate the load even further. In this sense, anaphoric gestures in L2 could potentially be regarded as a cognitive, speaker-directed communication strategy for grammar and discourse.

## CONCLUSION

Many observers have noted that learners produce more gestures when they speak their L2 than when they speak their L1 (Faraco and Kida 1998; Gullberg 1998; Jungheim 1995; Marcos 1979; Nobe 1993, 2001; Sainsbury and Wood 1977). The simplistic explanation offered for the link between proficiency and gesture is that this is because learners use gestures to solve lexical problems in L2. This study has hopefully shown that there are other reasons for gestures in L2, some of them intimately related to the state of L2 learners' grammar. In the domain of discourse, the grammatical difficulties of the pronominal system and principles of information organization conspire to create problems for learners. This study has shown that there is a very tight link between grammatical development in speech and behavior in gesture. Expressions for maintained reference in L2 are characterized by over-explicit co-reference in both modalities: in speech by lexical NPs and in gesture by anaphoric gestures. The spoken and gestural modalities change in parallel with development of grammatical means for maintaining reference in speech. The study has also shown how the analysis of gesture allows us (a) to identify that learners perceive the cohesive problems created by their over-explicit speech, and (b) to test the communicative accounts proposed to explain the spoken variety of learner cohesion. Over-explicit speech does not appear to be a strategic device, and it seems inappropriate to talk about learners as "avoiding" pronouns. In contrast, the gestural expression for cohesion is clearly multi-functional. The presence of anaphoric gestures is not interactionally motivated, but their form and shape are. The articulatory and spatial properties of gestures that can be seen suggest that learners exploit anaphoric gestures as communication strategies to overcome grammatical difficulties and to alleviate ambiguity wherever possible.

What has the study shown about compensation (for grammar)? Depending on whether compensation is seen as an interactional or a speaker-internal phenomenon, different answers have to be given. Compensation as a notion is both complex and ill-defined. The CS literature has long battled with the problems of defining "strategy" and even "problem," and the interactional and the cognitive approaches have generally not settled on the same definitions (cf. Bialystok 1990; Dörnyei and Scott 1997; Faerch and Kasper 1984; Kasper and Kellerman 1997; Yule and Tarone 1997). Intention, volition, awareness, and surface manifestations have all entered into the equation. Some are clearly more difficult to study than others. The analyses presented here suggest that a dual rather than a mutually exclusive perspective is fruitful. Compensation can range from the overt, clearly interactional, to the covert or more speaker-internal. The analyses of speech and gesture presented here highlight that any given phenomenon can be doing helpful work both overtly and covertly at the same time. The analyses of gesture have also revealed what aspect of the behavior is overtly compensatory -- the actual spatial realization -- and what aspect is potentially covertly helpful -- the presence of the gestures. Finally, they have

shown how behavior in the gesture modality can unveil uneasiness with behavior in speech for which no compensatory device can be found within that modality.

Many questions remain to be addressed—the precise nature of the speaker-internal role of anaphoric gestures, for one. Another question concerns whether gestures related to grammar could be useful in other ways. For instance, it has been suggested that it is crucial to acquisition to produce continued output and to speak (cf. Bruner 1990; Swain 2000). If this is the case, then cohesive gestures could be playing a beneficial role for acquisition in the long term. If gestures allow learners to produce output even in the face of planning overload and grammatical difficulties, then they contribute to the production of continued speech and, therefore, to the creation of potential contexts of acquisition (cf. Py 1986). For now, this study has hopefully shown that learners' gestures are a fruitful object of study beyond the realm of the lexicon and that the relationship between L2 proficiency and gesture is tight and non-trivial.

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## NOTES

- 1 In the transcriptions of learner French, the character E represents a sound somewhere between [ɛ] and [e]. The symbol has been chosen in order not to bias the reading towards an infinitival (*aller*), past participial (*allé*), or imperfective (*allait*) interpretation of the verb forms in the learner output.
- 2 The details of the temporal synchrony are a matter of some debate. Many authors have observed that gesture initiation precedes speech initiation (Butterworth and Beattie 1978; Feyereisen 1997; Kendon 1972; Morrel-Samuels and Krauss 1992; Schegloff 1984). It is not clear, however, whether these measurements take gesture phases into account (Kendon 1972) such that that gesture onset is considered from the onset of the preparation phase (moving the hands into position) or from the stroke phase of a gesture (the most effortful part of the movement). When the onset of the stroke is taken as the starting point, the temporal synchrony can be seen to very tight indeed (Nobe 2000; Seyfeddinipur 2006).
- 3 Gestures only occur with pronominal forms when these are stressed, typically emphatic, independent pronouns, as in the French set *moi, toi, lui*, etc. In L2 production, these typically occur when the form of the referring expression is being negotiated. In native French discourse, gestures sometimes occur on these emphatic pronouns in left dislocations with contrastive stress:

(1) *La secrétaire a pris l'ordonnance.*

def.fem secretary has taken def.prescription

*Le docteur, [hi], il est allé dans son cabinet.*

def.masc doctor [he emphatic] he is gone in poss.masc chamber

"The secretary took the prescription. The doctor, [him], he went into his office."

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