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Further Changes in L2 Thinking for Speaking?

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Abstract

Cross-linguistic research has shown that languages differ typologically in how motion events are indicated lexically and syntactically, and that speakers of these languages have different patterns of thinking for speaking (for a review, see Han and Cadierno 2010). Spanish speakers express path linguistically on verbs, their path gestures tend to occur with path verbs, and their manner gestures may occur without manner in speech, whereas English speakers express path linguistically on satellites, their path gestures tend to occur with satellite units, and their manner gestures rarely occur without manner in speech. Stam (2006b) has shown that the English narrations of Spanish learners of English have aspects of their first language (Spanish) and aspects of their second language (English) thinking

for speaking patterns. She has further shown that these patterns continue to change over time. An L2 learner's thinking for speaking about path in English became more native-like, but her thinking for speaking about manner did not (Stam 2010b). This paper investigates whether the learner's L2 thinking for speaking patterns continued to change from 2006 to 2011. It shows that her thinking for speaking about path and manner had continued to change, but her thinking for speaking about boundary crossings had not.

1. Thinking for speaking

Cross-linguistic research has shown that languages differ typologically in how motion events are indicated lexically and syntactically, and that speakers of these languages have different patterns of thinking for speaking, the thinking that occurs in the process of speaking (Slobin 1991; for a review, see Han and Cadierno 2010). Based on how path and manner are encoded, languages have been categorized into three types: verb-framed, satellite-framed, and equipollently-framed (Slobin 2006; Talmy 2000).

Spanish and English exemplify two of these typologically different languages (Slobin 2006; Talmy 2000). Spanish is a verb-framed language, whereas English is a satellite-framed language. In Spanish, motion and path are indicated by the verb, and manner if present in speech is indicated outside the verb by an adjunct, an adverbial such as a gerund or a phrase. For example, in *él entra bailando* 'he enters dancing', the verb *entra* 'enters' indicates path, while the gerund *bailando* 'dancing' indicates manner. In English, motion and manner are indicated by the verb, and path is indicated by a satellite, a particle. For example, in *he dances in*, the verb *dances* indicates manner, while the particle *in* indicates path. Spanish speakers when narrating a motion event tend to describe states and emphasize settings while English speakers tend to describe processes and accumulate path components (for a review, see Stam 2010b). In addition, the gestures the speakers make follow the same patterns: Spanish speakers' path gestures tend to occur with the verb and do not cross boundaries, while English speakers' tend to occur with a satellite unit and can cross boundaries (Stam 2010b).

1.1. Thinking for speaking and second language acquisition

Slobin hypothesized that many language patterns acquired in childhood are "resistant to restructuring in adult second language acquisition" (1996: 89). Therefore, several studies (for reviews, see Cadierno 2008, 2013; Stam 2010b) have investigated his thinking for speaking hypothesis and second language acquisition to determine

(i) whether it is possible for learners to acquire another thinking for speaking pattern,
(ii) what pattern learners are thinking in when they are speaking their second language – their first language (L1), their second language (L2), or somewhere in between – and
(iii) whether this changes with proficiency level.

Stam, (1998, 2006a, 2006b, 2008), Kellerman and van Hoof (2003), Lewis (2012), and Negueruela et al. (2004) looked at Spanish and English speech and gesture to investigate whether learners' thinking-for-speaking patterns about path change when they acquire a second language. Their findings varied, however, as a result of differences in their study

designs (Stam 2010b). Kellerman and van Hoof (2003) and Negueruela et al. (2004) found that L1 Spanish speakers' gestures indicated that they were still thinking for speaking in their L1 Spanish when narrating in L2 English, whereas Stam (1998, 2006a), found that when L2 English learners narrated in English, their thinking for speaking patterns were a mixture of L1 and L2 patterns, reflecting their interlanguage systems. Furthermore, Lewis (2012) looking at L1 English learners of L2 Spanish in a study abroad program found that the majority of the participants showed L2 thinking for speaking patterns for path in their L2 after six months abroad. These results suggest that it is possible for thinking for speaking patterns to change, but it is not clear to what extent.

In the only longitudinal study to date, Stam (2010b) found that an L2 learner's expression of path changed both linguistically and gesturally in English from 1997 to 2006, but her expression of manner did not. By 2006, the learners' linguistic expression of path followed the English thinking-for-speaking pattern. She consistently expressed path with a satellite. In addition, by 2006 her gestures were more native-English speaker like. They were less segmented and more occurred with ground noun phrases and more than one element and fewer occurred with verbs and *other*. Of interest is the question whether L2 thinking for speaking can continue to change. It is the purpose of this paper to explore the possibility.

2. Study

This study, a follow-up to Stam (2010b), investigated whether an L2 learner's thinking-for-speaking patterns in English continued to change from 2006 to 2011. It sought answers to the following questions:

(i) How does the learner express path and manner linguistically and gesturally in 2011?
(ii) How does this compare with her expression of path and manner in 1997, in 2006, and with native speakers of English?
(iii) What are the implications for thinking for speaking changing in an L2?

2.1. Participant

The participant was a Mexican-Spanish speaking learner of English at the advanced proficiency level at National Louis University at the time that she was originally video-taped in 1997. She had completed the former ESOL program, a semi-intensive five-level integrated skills program with a grammatically based curriculum designed to provide English language learners with the English necessary to succeed in undergraduate studies at the University, and was taking regular English classes. She had been studying English for two years and had been working at a bank for nine months, and she reported using English 40% and Spanish 60% of the time. By 2006, she had graduated from the university with a degree in computer information systems management and had been working at a bank as an accounting specialist for seven years, and she reported using English and Spanish equally (Stam 2010b). In 2011, she was unemployed and looking for a job, and again reported using English and Spanish equally (50% and 50%).

2.2. Procedures

The same procedures were followed in 1997, 2006, and 2011. The participant was shown a Sylvester and Tweety Bird cartoon, *Canary Row* (Freleng 1950), in two segments and asked to narrate each segment in Spanish and English to two different listeners: a Spanish-speaking and an English-speaking one. The order was counterbalanced, with the initial order for the narration of the first segment randomly assigned in 1997 and the same order followed in 2006, and 2011 (Spanish-English, English-Spanish). The narrations were videotaped, and the participant was not told that thinking for speaking or gestures were a focus of the study.

2.3. Coding

One episode which contained three motion events −

(i) Sylvester climbs up inside the drainpipe,
(ii) the ball goes inside Sylvester, and
(iii) Sylvester and the bowling ball move/roll down and out of the drainpipe, across/ down the street and into a bowling alley

− was coded using McNeill's coding scheme (1992) to determine how path and manner were expressed both linguistically and gesturally in English. The function of the gesture in terms of motion event component (path, manner, ground), and meaning of the gesture were noted (for example, Sylvester climbing up the drainpipe). Questions on the coding of or timing of gestures were brought to lab meetings at the McNeill Lab Center for Gesture and Speech Research at the University of Chicago, where members of the lab watched the videotaped segments in question and reached a consensus on what the coding should be, as well as to the 19th Annual Sociocultural Theory and Second Language Learning Research Working Group Meeting (2012).

2.4. Data analysis

Two types of data were analyzed and compared for the 1997, 2006, and 2011 narrations: speech and speech and gesture. These data were then compared with those of native-English speakers from Stam (2006a).

2.4.1. Speech analysis

The narrations were analyzed for how path was expressed linguistically.

2.4.2. Speech and gesture analysis

The synchrony of the gesture in relation to speech was established by watching the video recording in slow-motion and frame-by-frame (30 frames/sec) with the accompanying audio to establish the onsets and offsets of gesture strokes (Stam 2006b). Path (path, path and ground), manner (manner, path and manner, manner and ground), and ground gestures were identified and counted. Then, what motion event speech element the stroke of the path gesture co-occurred with (verb, satellite, ground noun phrase, more than one element, and *other*) was noted and counted, and percentages for the co-occurrence were

Tab. 143.1: Motion event speech categories (Stam 2006a: 111)

Speech Element	Examples
Verb = V, SV, VO, conjunction (S) V	goes; he goes; throws the ball; and he goes
Satellite = adverbs, prepositions of path	through; up; to; into
Ground noun phrase	the drainpipe
More than one = V + satellite, V + satellite + ground noun phrase, satellite + ground noun phrase	comes out; comes out the drainpipe; out the drainpipe
Other = conjunctions, subjects (alone), prepositional phrases, adjectives, pauses	he, with the ball inside

calculated and compared (see Tab. 143.1, for motion event speech categories). Also, whether manner gestures occurred with the manner in speech was noted and tabulated. Finally, how speech and gesture interacted, that is, what aspects of the motion event the speech and gesture emphasized, for example, process versus ground setting description was examined.

Verbs, subjects and verbs, verbs and objects, and conjunctions (subjects) and verbs were considered as verbs (Stam 2006b), all verbs that had co-occurring path gestures were counted, not just motion verbs, and both adverbs and prepositions of motion were included as satellites as these prepositions can express direction (Talmy 2000). Also, in regard to gestures sometimes falling on incomplete words and grammatical constituents, the following scheme was used: "(1) if the gesture fell on a syllable of the word, it was counted as co-occurring with the full speech element, for example, co from come was counted as a verb; (2) if it was a case of co-articulation, for example s in from gets in, it was counted as a satellite; (3) and if the gesture fell on a preposition and an article, for example to the, it was counted as a satellite" (Stam 2008: 239–240).

3. Results

First the results for speech will be presented and then the results for speech and gesture.

3.1. Speech

In terms of her linguistic expression of path, there was a difference in how she expressed path in English between 1997 and 2006, and this difference persisted in 2011. In 1997, she expressed path 33% of the time with just the verb go without an accompanying satellite or prepositional phrase. This is something that native English speakers do not do — English speakers' verbs are followed by satellites that express path or prepositional phrases that express path and ground (Stam 2006a, 2008). By 2006 and in 2011, the learner was expressing path linguistically with a satellite 100% of the time. However, there was no change in her expression of manner. She did not use the verb *roll* in 1997, 2006, or 2011. This differed from the native-English speakers, who all used the verb *roll* (see Tab. 143.2).

Tab. 143.2: Motion verbs + satellites

L2 Learner 1997 (N=9)		L2 Learner 2006 (N=7)		L2 Learner 2011 (N=6)		Native Speakers (N=30)	
come + out	11% (1)	climb + inside	14% (1)	climb Ø	16.6% (1)	climb + up	6.7% (2)
go Ø	33% (3)	go + inside	43% (3)	go + down, to, up	50% (3)	come + down, out, up	20% (6)
go + down, through	22% (2)	go + out, to	29% (2)	throw + through	16.7% (1)	crawl + up	3.3% (1)
go + up-stairs	11% (1)	throw + into	14% (1)	walk Ø	16.7% (1)	drop + down	10.0% (3)
put + through	11% (1)					fall + back down, into	6.7% (2)
throw + away	11% (1)					go + in, into, out, up, up through	20% (6)
						knock + down	3.3% (1)
						put + into	3.3% (1)
						roll + down, on down	16.7% (5)
						run Ø	3.3% (1)
						throw + down, into	6.7% (2)

3.2. Speech and gesture

3.2.1. Path

As previously mentioned, the different patterns of thinking for speaking of native speakers of Spanish and English are also expressed gesturally. English speakers' path gestures tend to co-occur with a satellite or a verb plus satellite (Kellerman and van Hoof 2003; McNeill and Duncan 2000; Stam 2006a, 2006b) while Spanish speakers' path gestures tend to co-occur with a verb or *other* (McNeill and Duncan 2000; Stam 2006a, 2008).

The learner produced a total of 22 path gestures in English in 1997, 17 in 2006, and 10 in 2011. Fig. 143.1 shows the percentage of path gestures she produced with the different motion event speech elements. In 1997, 32% co-occurred with the verb and 45% with *other* following the Spanish pattern (Stam 2006a, 2008), but she also had some path gestures that co-occurred with the satellite (the English pattern). Her path gestures were somewhere between the Spanish and English patterns.

In 2006, 18% co-occurred with the verb, 12% with the satellite, 18% with the ground noun phrase, 24% with more than one element, and 29% with *other*. The percentage of path gestures co-occurring with the satellite remained about the same from 1997 to 2006, while both the percentage of path gestures co-occurring with the verb and *other* decreased, and the percentage co-occurring with the ground noun phrase and more than one element increased. In 2011, 30% co-occurred with the verb, 10% with the satellite,
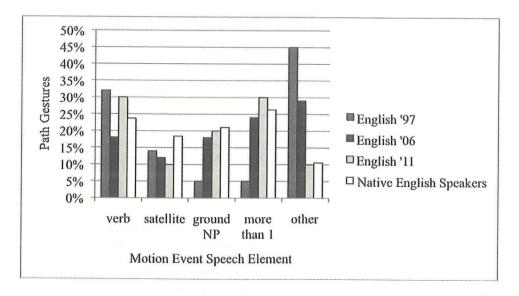
Fig. 143.1: Percentage of path gestures with motion event speech element L2 learner and native-English speakers

20% with the ground noun phrase, 30% with more than one element, and 10% with *other*. Between 2006 to 2011, the percentage of path gestures co-occurring with the satellite and the ground noun phrase remained roughly the same, the percentage co-occurring with the verb increased, the percentage co-occurring with more than one element increased slightly and the percentage co-occurring with *other* decreased.

Fig. 143.1 compares the learner's percentage of path gesture results with those found by Stam (2006a) for native-English speakers. As can be seen in the figure, the learner's gestural expression of path in 2006 had become more English-like except for the percentage of gestures that co-occurred with *other* (the Spanish pattern). In 2011, some aspects of the learner's English-like pattern persisted and even improved, for example, the increase in the percentage of path gestures with ground noun phrase and more than one element and the decrease in percentage with *other*. However, other aspects did not. There was an increase in the percentage of path gestures with verbs and no increase in the percentage with satellites. This suggests that although the learner's expression of path gesturally in English has continued to change, it has not completely changed to the native-speaker pattern of expression.

3.2.2. Manner

McNeill and Duncan (2000) found that Spanish speakers may have manner in gesture when there is none in the accompanying speech, while English speakers rarely have manner in gesture when there is none in the accompanying speech. In both 1997 and 2006, all of the learner's manner gestures co-occurred with no manner in speech. In contrast, 75% of her manner gestures co-occurred with manner in speech and 25% co-occurred with no manner in speech in 2011. This is similar to the native-English speakers who also had 75% of their manner gestures co-occurring with manner in speech and 25% co-occurring with no manner in speech for the three motion events, and suggests

Tab. 143.3: Percentage of manner gestures with manner/no manner in speech

Group	Manner in Speech	No Manner in Speech
L2 Learner 1997 (N=3)	0%	100% (N=3)
L2 Learner 2006 (N=1)	0%	100% (N=1)
L2 Learner 2011 (N=4)	75% (N=3)	25% (N=1)
Native Speakers (N=4)	75% (N=3)	25% (N=1)

that learner's expression of manner gesturally has begun to shift to an English speaker's pattern from a Spanish speaker's (see Tab. 143.3).

3.3. Speech and gesture interaction

Let us look at how speech and gesture interact in the learner's narrations in English in 1997, 2006, and 2011 and how these compare with native-English speakers' narrations. Stam (2010b: 79) compared an example (Stam 2008: 250) of the learner's description of Sylvester coming out of the drainpipe from 1997 with her description in 2006 to see if there were any changes in her L2 thinking for speaking. Stam found that the learner's expression of the motion event in 2006 had become more similar to that of native-English speakers in that there were fewer gestures, they were all path, and there was no emphasis of ground. These examples (Stam 2010b: 79) will now be compared with an example of the learner's description of the same event in 2011.

In 1997 (example 1) the learner produced 4 gestures: one manner (1a) co-occurring with *when* a subordinating conjunction, two path (1b) co-occurring with the satellite *out* and (1c) co-occurring with part of the ground noun phrase *from the*, and one ground (1d) co-occurring with the remainder of the ground noun phrase *pipe*.

(1) o[[kay when*when h] [e<e> came ou<u>t][from the][<e> pipe]]
               a   b   c   d

— a: iconic: both hands, right hand at lap moves up to upper left chest with 1 1/2 circles in toward body and away from body, left hand moves up to upper left side <Sylvester + bowling ball rolling> MANNER;
— b: iconic: both hands, right hand at left upper arm moves in toward body and down to left chest, and continues down to lap, left hand moves in toward body and down to left upper arm <Sylvester + bowling ball going down the drainpipe> PATH;
— c: iconic: both hands, right hand at left chest moves down to lap, left hand at upper left side moves down to lap <Sylvester + bowling ball going down the drainpipe> PATH;
— d: iconic: both hands, palms toward center, fingers toward center, joined at left lap <drainpipe> GROUND (Stam 2008: 250).

In 2006 (example 2), the learner produced 2 path gestures: one (2a) co-occurring with the verb, and the other (2b) co-occurring with the ground noun phrase.

(2) [[and he goes a<a>ll] [out of the pipe]]
              a   b

- a: iconic: right hand wrist bent at waist moves slightly to the right to lower right side <Sylvester + bowling ball going out the drainpipe> PATH;
- b: iconic (reduced repetition of previous gesture): right hand wrist bent at lower right side moves to the right and slightly up <Sylvester + bowling ball going down and out the drainpipe> PATH (Stam 2010b: 79).

In 2011 (example 3), she produced 3 gestures: one of which was a path gesture (3b) co-occurring with more than one element *go down the pipe*, another an iconic gesture (3a) showing Sylvester with the ball inside co-occurring with the conjunction *and*, and the other a deictic (3c) showing the location of the street and the endpoint co-occurring with *to the*.

(3)   [[/ and] [/ / go down the pipe all the way] [/ to the street]]
         a   b   c

- a: iconic: both hands, facing center, fingers facing away on both sides of the body on right and left extreme periphery <Sylvester with the ball inside of his stomach>;
- b: iconic: both hands, facing center, fingers away from body, right hand at right center periphery, left had at upper left periphery move down to the right across body to low right periphery and flip up <Sylvester + balling bowl going down and out the pipe> PATH;
- c: deictic: right hand turns over and points down at low right periphery palm towards center fingers toward down, left hand lowers to right center palm towards body, fingers toward right and both hands hold <location of street + endpoint>.

Her gestures in this example indicate that she is thinking of what Sylvester looks like (3a), where he went (3b), and where he ended (3c). In 2011, her speech and gesture for the expression of path is more similar to that of a native speaker's (example 4) than in 1997 and 2006 as there is only one path gesture for Sylvester and the bowling ball going down, and out the drainpipe that co-occurs with more than one element. However, her speech and gesture still differs from that of a native speaker's as she also a deictic gesture for the street. This shows that the learner is still unable to cross boundaries with her gestures and needs to produce a separate gesture for the endpoint, a Spanish pattern.

(4)   . [and he comes out the bottom of the drainpipe]

- iconic + deictic: left hand index finger extended at upper left side goes straight down, then curves toward center under right at lap and holds. <Sylvester + bowling ball going down and out the pipe > PATH (Stam 2010b: 80).

To summarize, between 1997 and 2011, the learner's linguistic and gestural expression of path changed in English. In 2006, she consistently used satellites, and this use persisted through 2011. From 1997 to 2011, there was a decrease in path gestures with *other* and an increase in path gestures with ground noun phrases and more than one element. In addition, her speech and gestures became less segmented, and her gestures covered more constituents in utterances like native-English speakers' gestures do.

The learner's expression of manner did not change in English between 1997 and 2006. She continued to express manner within a Spanish thinking-for-speaking pattern. She continued not to produce the manner verb *roll* in English like native-English speakers do, and she expressed manner only in gesture when there was none in speech. However, between 2006 and 2011, her expression of manner began to change. Though she was still not using the manner verb *roll*, she no longer expressed manner only in gesture when there was none in speech. Instead her gestural expression followed the English pattern.

Over the fourteen years, her pattern of thinking for speaking about path in English became more native-like, and her pattern of thinking for speaking about manner began to change.

4. Discussion and conclusion

This study sought answers to three questions: How the learner expressed path and manner linguistically and gesturally in 2011, how this compared with her expression of path and manner in 1997, in 2006, and with native speakers of English, and what implications this had for thinking for speaking changing in an L2.

The results show that the learner's expression of path linguistically in English changed between 1997 and 2011. In 1997, she sometimes expressed path linguistically with a satellite following the English thinking-for-speaking pattern, but she also sometimes expressed it with just a verb following the Spanish thinking-for-speaking pattern. In 2006 and 2011, her expression of path linguistically followed the English thinking-for-speaking pattern. She consistently expressed path with a satellite. However, her expression of manner did not change. She never used the manner verb *roll* in 1997, 2006, or 2011.

There was also a change in how she expressed path gesturally in English from 1997 to 2011. There was an increase in path gestures with ground noun phrases and more than one element and a decrease in path gestures with *other*. Additionally, there was a change in the learner's gestural expression of manner. By 2011, she was following the English pattern of rarely having manner gestures without manner in speech.

In addition, the learner's speech and gestures together changed. The gestures covered more speech and became less and less segmented over time. These differences in the learner's gestural expression of path and manner from 1997 to 2011 reflect a change in her L2 thinking for speaking. Her thinking for speaking about path and manner became more native-like, but not completely as there was no increase in the number of path gestures with satellites, and her path gestures did not include boundary crossings.

The change in the learner's gestural expression of manner in 2011 suggests that perhaps manner is not a pattern acquired in childhood that is resistant to change after all (Slobin 1996; Stam 2010b). It just takes time. It is possible that learners first focus on path, the most salient element of a motion event, and then turn to manner. This would be consistent with what Stam reported in a study on the development of first language thinking for speaking in English (Stam 2010a): satellites are learned early and used consistently, and manner use appears later. It is also possible that the gestural change in manner may be due in part to increased interactions with native speakers and mimesis (McCafferty 2008).

The change in the learner's expression of path both linguistically and gesturally, and manner gesturally is probably a result of her increased English proficiency and her use of the language on a daily basis in a number of sociocultural contexts. As the learner

has interacted more in English in American culture, her thinking for speaking has become more native-like.

Although this study showed that the learner's thinking for speaking about path and manner in her L2 changed over a fourteen-year period the results are limited. Only one individual and her speech and gesture in only one episode of her cartoon narration were examined. To get a fuller picture of changes in the learner's thinking for speaking, more episodes need to be examined. Nevertheless, the fact that some aspects of her L2 thinking for speaking about path and manner have continued to change implies that L2 thinking for speaking is not static. It can change over time. That the learner is still not crossing boundaries with her path gestures like native-English speakers do implies that not all aspects of thinking for speaking change equally. It also raises the question of how long it takes for some aspects to change and whether some are resistant to change as Slobin has proposed. What is needed to explore this question further are more longitudinal studies of second language learners from different language backgrounds as well as studies that test whether L2 thinking for speaking patterns can be explicitly taught.

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144. Gesture and the neuropsychology of language

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3. Neurological substrates of language and gesture
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Abstract

An overview of what is currently known about the neurological substrates and cognitive structures involved in gesture use and how they relate to what is known about the neuropsychology of language.

1. Introduction

There are many relationships between communicative action, gesture, and language. For example, kissing as a sign of affection can be, depending on the circumstances, an actual movement of the whole body, a ritual display for blowing a kiss, or by verbal expressions such as "hugs and kisses" or "je t'embrasse" ('I embrace you') at the end of informal love letters. These different behavioral forms are not identical, however. Each mode of