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Thinking for speaking about motion: L1 and L2 speech and gesture*

GALE STAM

Abstract

It has been claimed that speakers of Spanish and English have different patterns of thinking for speaking about motion both linguistically and gesturally (Stam 1998; McNeill and Duncan 2000; McNeill 2000; Kellerman and van Hoof 2003; Neguerela et al. 2004). For example, Spanish speakers' path gestures tend to occur with path verbs, while English speakers tend to occur with satellites (adverbs or prepositions) and verbs + satellites. What happens when Spanish speakers learn English, where do their gestures occur? Also, what do their gestures tell us that their speech alone does not?

To investigate these questions, this study examines the use of 'path' gestures in motion event narrations of a group of native Spanish speakers, a group of native English speakers, and two groups of Spanish learners of English (intermediate and advanced). L2 learners' gestures revealed L1 thinking for speaking patterns with grammatically correct and fluent L2 speech.

1. Introduction

The process by which learners acquire a second language is complex, gradual, nonlinear, and dynamic (Larsen-Freeman 1991), and learners progress from one level of proficiency to another with varying degrees. Since it is impossible to view the rules and structures learners have internalized, one method used to assess learners' level of proficiency has been to look at their performance and production errors (Ellis 1986). Although this method has merit, it does not provide a full picture of learners' mastery of the language. Learners may produce grammatically well-formed utterances and still assign different meanings to semantic categories such as temporality, space, motion, and causality (Klein 1986).

A means to access learners' underlying mental representations is needed so that the meanings learners assign to the utterances they make become apparent. Vygotsky (1986) pointed out that the only way to study an internal

process is to externalize it experimentally. Several empirical studies have been conducted that have elicited subjects' gestures as well as their speech to see what additional information the gestures provide (Marcos 1979; McNeill 1992, 2000; Goldin-Meadow 1999, 2000; Goldin-Meadow and Alibali 1995). These studies have shown that examining both subjects' speech and gesture gives researchers an enhanced window onto the mind through which mental representations and processes can be observed. For instance, Goldin-Meadow and Alibali (Goldin-Meadow 1999, 2000; Goldin-Meadow and Alibali 1995) have looked at the speech and gesture of children in the process of learning Piagetian conservation tasks. They have found that children in transition of learning the task produce speech-gesture "mismatches"; in other words, the information that the children's gestures conveyed was different from that conveyed in their speech — their speech indicated that they viewed the objects as being unequal, while their gestures indicated that they thought they were the same. Goldin-Meadow claims that speech-gesture "mismatch" is not just an index of transition for learning during childhood. It applies to adults as well. Speech-gesture mismatch may be relevant for detecting transitory phrases in second language acquisition. It may indicate whether language learners are in transition from thinking in their L1 to thinking in their L2.

I propose that looking not only at learners' speech but also at their accompanying gestures gives us a clearer and more complete picture of their progress in learning another language than looking at speech alone. "To make a gesture ... is to bring thought into existence on a concrete plane, just as writing out a word can have a similar effect" (McNeill 2005: 99). By looking at gestures, we can see learners' thought processes in action. Furthermore, if both nonverbal communication and verbal communication are part of learners' communicative competence as Pennycook (1985) and Neu (1990) have suggested, then it is necessary to look at learners' gestures as well as their speech to have a true sense of their proficiency in their L2.

The purpose of this paper is to demonstrate the value of looking at gesture to investigate Slobin's (1991) thinking-for-speaking hypothesis — the idea that languages not only provide speakers with a framework for the expression of experiences, events, and thoughts but also restrict how experiences, events, and thoughts are expressed at the time of speaking — further in terms of second language acquisition. To investigate the hypothesis, I examine the expression of path in the motion events of native Spanish and native English speakers and two groups of Spanish learners of English (intermediate and advanced) to see which patterns of the L2 the learners have acquired and which patterns of the L1 they have retained.

2. Spontaneous gestures

The types of gestures discussed in this paper are spontaneous movements of the hands, which speakers are often unaware of making, that accompany speech. These types of gestures and speech are co-expressive (McNeill and Duncan 2000). They can parallel speech, where both the speech and the gesture indicate the same entity, or they can complement speech, where the gesture indicates some information that is not present in the speech, but is present in the speaker's thought.

The approach that I take in regard to gesture is the McNeillian perspective that speech and gesture arise from the same underlying mental process and form a single-integrated system (McNeill 1992, 2000). According to McNeill, both speech and gesture develop from a growth point, "the speaker's minimal idea unit that can develop into a full utterance together with a gesture" (McNeill 1992: 220). The growth point consists of both imagistic and verbal aspects. McNeill proposes an interactive model in which thought, language, and gesture develop over time and influence each other.

Speech-gesture mismatches do not form growth points and single idea units (McNeill 2005). They are indicative of a developmental process in which new developments first appear in gesture, later in speech, and in the transition stage as a mismatch. In terms of second language acquisition, a speech-gesture mismatch would mean that a learner would have an L2 gesture pattern, but would use an L1 speech pattern.

3. Thinking for speaking

"Thinking for speaking" refers to thinking that occurs on-line in the process of speaking. Slobin, building on Talmy (1985) and exploring the influence of language on thought, proposed that 'in acquiring a native language, a child learns a particular way of thinking for speaking' (Slobin 1991: 12). Slobin based this hypothesis on two assumptions: (1) in acquiring the grammar of a language, a child learns a particular "framework for schematizing experience" and (2) "a special kind of thinking is called into play, *on-line*, in the process of speaking a particular language" (Slobin 1991: 7).

To test this hypothesis, Berman and Slobin (1994) conducted a cross-linguistic study of L1 narrative development in several languages (English, German, Hebrew, Icelandic, Japanese, Mandarin, Russian, Spanish, and Turkish) using the story *Frog, where are you?* (Mayer 1969). The subjects included children at various ages and adults. They found that speakers of different languages had different patterns of thinking for speaking in how semantic domains such as motion were indicated lexically and syntactically.

3.1. *Motion events*

A motion event is the movement of some entity through space and includes the following components (Talmy 1985, 1991, 2001; Aske 1989): motion, figure (the moving object), ground (reference object(s) in relation to which the figure moves), path (the direction of the motion), and manner (the way the motion is performed).

Languages differ in how they indicate manner and path. Based on where the language encodes path, Talmy (1985, 1991, 2001) has classified languages into two categories: verb-framed and satellite-framed languages. Verb-framed languages (Romance, Semitic, and Japanese) encode directionality on the verb, while satellite-framed languages (Indo-European except Romance, Finno-Ugric and Chinese) encode directionality on a satellite, an adverb or a particle.

Spanish and English are examples of these two typologically different languages (Talmy 1985, 1991, 2001). Spanish is a verb-framed language. Motion and path are indicated by the verb, and if there is manner in speech, it is indicated outside the verb by an adjunct, such as an adverbial or a phrase, typically a gerund or a phrase with *como* 'like'. In Example 1 below, the verb *sale* indicates path while the gerund *volando* indicates manner.

- (1) *y sale volando*
'and he exits flying'

Although the verb in Spanish tends to have only path not manner and motion, Aske (1989) has pointed out that Spanish does have instances of manner and motion verbs with a path satellite component. He argues that there are two types of path phrases: one a locative path phrase, which indicates a one-dimensional location in which an activity takes place, and the other a telic path phrase, which indicates the path of motion + end-of-path location/state of figure. Spanish allows locative but not telic path phrases.

Spanish speakers tend to describe states and to elaborate descriptions of settings (Slobin 1996a, 1996b; Berman and Slobin 1994; Slobin and Hoiting 1994). For Spanish speakers, crossing a spatial boundary is equivalent to a change of state and requires a new predicate. Example 2 below illustrates this. Instead of saying that the deer threw the boy into the water, the speaker expresses the event in three clauses by describing the first action, describing the setting which allows the trajectory to be inferred, and ending by saying the boy fell in the water (the boundary crossing).

- (2) *Lo tiró. Por suerte, abajo estaba el río, El niño cayó en el agua.*
'(He) threw him. Luckily, below, was the river. The boy fell in the water.' (Slobin and Berman 1994: 265)

English, in contrast, is a satellite-framed language. Motion and manner are indicated by the verb, and path is indicated by a satellite, such as a particle or an adverb. In Example 3 below, the verb *flies* indicates manner while the adverb *out* indicates path.

(3) *and he flies out of the cage*

English speakers tend to describe processes and to accumulate path components, that is, adverb particles and prepositions, in speech (Slobin 1991, 1996a, 1996b; Berman and Slobin 1994; Slobin and Hoiting 1994). They tend to express boundary crossings by adding prepositional phrases indicating path and ground. Example (4) illustrates this. The speaker describes the process of the figure going to the bowling alley by the accumulation of path components *down*, *across* and *into* and indicates boundary crossings by the prepositional phrases *down the drainspout*, *across the street*, and *into the bowling alley*.

(4) *and he rolls down the drainspout across the street and into the bowling alley*

McNeill and Duncan (2000) have investigated speech and gesture in motion event narrations of Spanish and English speakers and found that the two languages have different patterns of thinking for speaking gesturally as well as linguistically. They reported that Spanish speakers tended to focus their path gestures on path verbs or ground noun phrases, and they might have manner in gesture when there was none in the accompanying speech. They reported that English speakers, on the other hand, tended to focus their path gestures on satellites or ground noun phrases, accumulated path components, and almost never had manner in gesture when there was none in the accompanying speech.

McNeill (2000) also found that Spanish speakers and English speakers treat border crossings differently. Spanish speakers either “a) add a special gesture not in the path sequence for the border, together with a linguistic reference to the border crossing itself in the form of *se mete* (with the semantic effect of ‘he forces himself’), or b) omit the border altogether and describe the path instead as going ‘up to (*hasta*) the border” (McNeill 2000: 49).

3.2. *Thinking for speaking and second language acquisition*

Slobin (1991) has pointed out that one of the ways that the thinking-for-speaking hypothesis can be investigated is by looking at second language learners and the difficulties speakers of particular first languages have in mastering aspects of particular second languages. Here, the differences in typology between Spanish and English are important. If different patterns of thinking for speaking exist in Spanish and English, then Spanish speakers learning English need to learn another pattern of thinking for speaking (the English one) in order to become proficient speakers in English (Stam 1998).

Slobin has hypothesized that many language patterns that are acquired in childhood are “resistant to restructuring in adult second language acquisition” (Slobin 1996a, 89). Kellerman (1995) has suggested in his *transfer to nowhere principle* that adult second language learners may not be cognizant of how languages vary in their thinking for speaking patterns and thus learners may learn L2 linguistic forms but apply them from an L1 perspective.

A few L2 acquisition studies have empirically tested Slobin’s hypothesis in the speech and writing of L2 learners (Carroll et al. 2000; Cadierno 2004) and found evidence of transfer of L1 thinking for speaking patterns. In addition, several studies have explored thinking for speaking and gesture in second language acquisition (Stam 1998, 1999, 2001; Kellerman and van Hoof 2003; Negueruela et al. 2004). Stam (1998) suggested that in looking at speech and gesture together in the narrations of English language learners, “we can see evidence of language transfer as well as the beginning of ‘thinking for speaking’ in English” (Stam 1998: 618).

Kellerman and van Hoof (2003) examined the narrations of native Dutch, Spanish, and English speakers, as well as Dutch and Spanish learners of English. For native Spanish speakers, they replicated previous findings (McNeill and Duncan; 2000; Stam, 1999) showing that path gestures mainly fell on verbs (65 %). Native Dutch speakers tended to focus their path gestures on the satellite or satellite phrase (55 %), while native English speakers tended to focus their path gestures on both the verb and the satellite (50 %). Both Spanish (65 %) and Dutch (47 %) learners of English tended to focus their path gestures on the verb. They concluded that the Spanish speakers were still thinking for speaking in Spanish when narrating in English. However, they did not have an explanation for co-occurrence of the Dutch speakers’ gestures with the verb in English and said that this result needed further examination.

Neguerela et al. (2004) also examined Spanish and English, but looked at two groups of learners (Spanish learners of English and English learners of Spanish) in addition to native Spanish and native English speakers. Their results on the native Spanish speakers and native English speakers replicated previous findings about the placement of path gestures: in Spanish, they tend to occur on the verb or ground noun phrases and in English, on satellites or ground noun phrases (McNeill and Duncan 2000; Stam 1999; Kellerman and van Hoof 2003). In addition, they found that both groups of L2 learners maintained their L1 thinking for speaking patterns when narrating in their L2. The Spanish learners of English continued to focus their path gestures on verbs or ground NPs, and the English learners of Spanish continued to focus their path gestures on satellites or ground noun phrases.

All the previous studies on motion and gesture in L2 have contributed to our knowledge of where the path gestures of L2 learners from different languages tend to occur. However, none of them have examined how path is expressed

both linguistically and gesturally by L2 learners, specifically whether L2 English learners accumulate path components in speech and gesture within a single clause as native English speakers do. This would constitute a striking shift in thinking for speaking.

4. Study

This study investigated how path is expressed linguistically and gesturally by native Spanish and English speakers, and Spanish learners of English (intermediate and advanced) to see which patterns of the L2 the learners have acquired and which patterns of the L1 they have retained. I sought answers to the following questions:

1. How is path expressed linguistically and gesturally in Spanish and in English?
2. How does the expression of path linguistically and gesturally in the English narrations of the L2 English learners compare with its expression in the native English speakers' narrations?
3. What do learners' gestures tell us about their thinking for speaking patterns that speech alone does not?

4.1. Subjects

There were a total of twenty subjects: 5 native Mexican-Spanish speakers, 5 native English speakers, and 10 Mexican-Spanish learners of English (ELLs) at National-Louis University,¹ five at the intermediate proficiency level (from ESOL Levels 3 and 4) and five at the advanced proficiency level (beyond ESOL Level 5, the last class in the ESOL program).

4.2. Procedures

Subjects were shown a Sylvester and Tweety Bird cartoon, *Canary Row*, and asked to narrate what they saw to a listener who had not seen the cartoon. The native Spanish and English speakers were shown the cartoon in its entirety and then asked to narrate it. The L2 English learners were shown the cartoon 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, and specific orders for the narration of the first segment were randomly assigned. The narrations were videotaped, and subjects were not told that gestures were the focus of the study.

4.3. Coding

Two motion events – (1) Sylvester climbs up inside the drainpipe, and (2) Sylvester and the bowling ball move/roll down and out of the drainpipe, across/down the street and into a bowling alley – were selected for detailed analysis of

Table 1. *Speech and gesture coding conventions*

Speech coding		Gesture coding
*	self interruption, repetition, repair	[gesture phrase]
%	nonspeech sound: swallow, laugh	[[gesture] [unit]]
(< >)	filled pause and lengthening	stroke
/	unfilled pause	<u>hold</u>
#	breath pause	

speech and gesture. These events were coded using McNeill's coding scheme (1992) to determine how path was expressed both linguistically and gesturally in Spanish and English and how this element was expressed in the English narrations of the L2 English learners.

First, each subject's speech was transcribed including unfilled, filled, and breath pauses; self-interruptions or self-corrections; and nonspeech sounds. Next, gestures including the gesture phrase (the entire movement from preparation to retraction), the stroke (the part of the gesture with meaning) and any holds (prestroke or poststroke) were coded for form (hand shape and movement) using both regular and slow motion speed. Speech and gesture coding conventions are listed in Table 1.

Subsequently, the gestures were classified by type according to McNeill's classification system (1992) of iconic, metaphoric, beats, cohesive, deictic, and Butterworths.² In addition, the function of the gesture in terms of motion event category (path, ground, etc.), and meaning of the gesture were noted (for example, Sylvester climbing up the drainpipe)³.

Gesture-speech synchrony for all gesture phrases and phases was established by two means: (1) locating the beginning of the gesture phrase, pausing the professional-grade VCR (Sony, model EVO-9650), and then listening to the speech as the pause was released and (2) 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 (Kita 1993; Duncan 2002).

4.4. *Data analysis*

Speech and gesture were analyzed and compared for all subject groups.

4.4.1. *Speech analysis.* The narrations of all groups were analyzed for how path was expressed linguistically – what verbs and satellites were used by each group of subjects to indicate path in their narrations. As a way of comparing speech differences between the groups of subjects, counts were made of clauses⁴ and the number of clauses with more than one path component (adverb particles and prepositions), and means were calculated for each group. Follow-

Table 2. *Motion event speech categories*

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

ing Berman and Slobin (1994), each finite or nonfinite verb unit was counted as a clause, and aspectual and modal verbs were counted with the main verbs as one clause. For example, constructions with *start*, *go*, *try*, and *want* were counted as one clause: *start to jump*, *start jumping*, and *want to go*.

4.4.2. *Speech and gesture analysis.* To investigate the relationship of speech and gesture across groups, the synchrony of the gesture in relation to speech was established. Then, path gestures (path, path and ground)⁵ were identified and counted for each subject. Subsequently, the total number of path gestures was calculated for each group of subjects. Next, what speech element the stroke of the path gesture co-occurred with (verb, satellite, ground noun phrase, and more than one element) was noted and counted for each group, and percentages for the co-occurrence were calculated (cf. Table 2).

In order to compare across languages, it is necessary to consider verbs, subjects and verbs, verbs and objects, and conjunctions (subjects) and verbs as verbs. In Spanish, the subject can be omitted; therefore, the verb without a subject in Spanish is the same as one with a subject and verb in English. In addition, because gestures can express complementary information to speech, all verbs that had co-occurring path gestures were counted, not just motion verbs. Also, not only adverbs but also prepositions of motion are included as satellites because these too can express direction (Talmy 2001) and are necessary to consider when examining speech and gesture.

Furthermore, because gestures do not always fall on complete words or complete grammatical constituents, I decided that: (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.

5. Results

I will first establish the two native speaker baselines, Spanish and English. I will then compare the behavior of the Spanish learners of English to the native English speakers.

5.1. Speech results

5.1.1. *Native Spanish and native English narrations.* Consistent with the results of Slobin (Slobin 1996a, 1996b; Berman and Slobin 1994; Slobin and Hoiting 1994) and McNeill and Duncan (2000), the native Spanish speakers on average produced significantly more clauses (15.8) than the native English speakers did (8.6) in their description of the motion events (Table 3) (an independent sample *t*-test, $t(1, 8) = 3.286, p = .011$).

The Spanish speakers narrated each path movement in a separate clause while the English speakers accumulated path components (adverb particles and prepositions of motion) within a single clause. The English speakers produced a mean of 1.4 clauses with more than one path component, while the Spanish speakers did not produce any (Table 3). The number of clauses with accumulated path components by the Spanish speakers and English speakers is indicative of different linguistic patterns of thinking for speaking about motion in the two languages and is highly significant ($t(1, 4) = -5.715, p = .005$).

In agreement with previous work on the typological differences between Spanish and English (Talmy 1985, 1991, 2001; Slobin 1996a, 1996b; Berman and Slobin 1994; Slobin and Hoiting 1994; McNeill and Duncan 2000), linguistically the Spanish speakers expressed path with a verb, and the English speakers expressed it with a satellite (an adverb particle) or a preposition of motion (see Appendix for the motion verbs used by each group). The Spanish speakers used verbs such as *entrar*, 'enter'; *ir(se)* 'go'; *salir* 'exit'; *subir* 'ascend'; and *meter(se)* 'insert (oneself), get in(to)' to indicate path, while the English speakers used verb + satellite combinations such as *come + out, up; crawl + up; climb + up; go + out, up; roll + down* and prepositions such as

Table 3. Mean number of clauses and accumulated path components. Native Spanish and native English speakers

	Subject group	Mean	Std. deviation
Clauses	Native Spanish	15.8	3.70
	Native English	8.6	3.21
Clauses with more than one path component	Native Spanish	.00	.00
	Native English	1.4	.55

across and *(in)to* where the satellite and preposition indicated path. Examples 5 and 6 illustrate these differences.

In Example 5, the Spanish speaker produced 4 clauses with verbs that indicated path (5a, b, c, e) *sale*, *se va*, and *entra* in describing Sylvester and the bowling ball. In example 6, the English speaker, in contrast, narrated the motion event in only two clauses: 6a and b. The speaker had two satellites and one preposition of motion indicating path that were added one after the other. These were *down*, *down*, and *into*. In addition, the speaker had two manner verbs *fall* and *roll*, which indicate both movement and manner and is one of the characteristics of satellite-framed languages (Talmy 1985, 2001).

(5) *Native Spanish – Sylvester and bowling ball*

- a. / *al momento de que sale*-PATH
/ at-the moment of that he-exists-PATH
/ at the moment that he 'exits'-PATH
- b. *sale*-PATH *el ga(a)to pero con(n) la bola adentro*
exits-PATH the cat but with the ball inside
ya / verdad?
now / truth
the cat 'exits'-PATH but with the ball inside now/right?
- c. # *y se va*-PATH *directamente*
and ref he-goes-PATH directly
and he goes-PATH straight
- d. *y es de bajada*
and it-is of descent
and it's 'descending'
- e. / *y(y) entra*-PATH *a un(nn) /// bowlerama // sí? /*
/ and he-enters to a(aa) /// bowling alley // yes? /
/ and he 'enters'-PATH a /// bowling alley // right? /

(6) *Native English – Sylvester and bowling ball*

- a. Sylvester falls-MANNER back-PATH down-PATH the drainpipe
- b. rolls-MANNER down-PATH the street into-PATH the bowling alley /

To summarize, there are different speech patterns of thinking for speaking about motion in Spanish and English. Spanish speakers produce more clauses than English speakers and express path linguistically on the verb. In contrast, native English speakers express it on the satellite and accumulate path components within a single clause in speech.

Let us now look at the speech of the English language learners and how path is expressed linguistically.

Table 4. Mean number of clauses and accumulated path components. All English narrations

	Subject group	Mean	Std. deviation
Clauses	Native English	8.6	3.21
	Inter. learners	9.6	5.08
	Advan. learners	10.8	5.20
Clauses with more than one path component	Native English	1.4	.55
	Inter. learners	.00	.00
	Advan. learners	.2	.45

5.1.2. *L2 English narrations.* Both groups of L2 English learners on average produced slightly more clauses in L2 English than the native English speakers did, with the intermediate group producing on average 9.6, the advanced group 10.8, and the native speakers 8.6 clauses (ANOVA, $F(2, 12) = .355$, $p = .708$).

The intermediate learners produced no clauses with more than one path component, while the advanced learners produced a mean of .2. This was significantly different from the native speakers who produced a mean of 1.4 clauses with more than one path component in their speech ($F(2, 12) = 17.20$, $p = .000$).

The learners sometimes expressed path linguistically in English with a satellite. However, there were many instances where the verb in English was not followed by an adverb particle or a preposition (see Appendix, Table A.2). This differed from the native speakers, who followed all their motion verbs with an adverb particle or a preposition with the exception of *run* in the utterance: *Tweety runs and gets a bowling ball*. In the cases where L2 speakers produced no satellite, it was difficult to determine exactly how the learners were expressing path linguistically.

The intermediate learners used verb and satellite combinations such as *get + in, in through*, and *go + away, down, in, through* and prepositions of motion such as *into* and the advanced learners verbs and verb and satellite combinations such as *come + out, through*, and *go + down, out, through* and prepositions of motion such as *to* where the satellite and preposition indicated path. Additionally, the intermediate learners sometimes used a satellite or a prepositional phrase in an utterance without a verb. Examples 7 and 8 illustrate the learners' speech.

In describing Sylvester and the bowling ball going down the drainpipe, across the street, and into the bowling alley, the intermediate English learner in Example 7 used the satellite *away* twice to indicate path: once in 7b following the verb *go* and once in 7c by itself. She also had one instance of the verb *go*

not followed by a satellite (7a). Although the verb *go* is a deictic verb in English like *come* that expresses the fact of motion and indicates the orientation of movement to or from, it is not marked for path because it does not indicate the trajectory of the motion. In Example 8, the advanced English learner used the satellite *out* (8a) and the preposition *to* (8c) to indicate path. In addition, he used the expression *keep moving* with no path component (8b).

- (7) *Intermediate English learner – Sylvester and bowling ball*
- a. and they /// go ///
 - b. ///// go away-PATH /////
 - c. /// ⟨hmh⟩ / /away-PATH / ⟨mm⟩
 - d. //// to finish in a⟨aaaa⟩ // ball* // a ball* / ⟨mm⟩ bowl* bo⟨o⟩wling* bowling
- (8) *Advanced English learner – Sylvester and bowling ball (English)*
- a. and then %click / so he goes out-PATH of the⟨e⟩ / water drain
 - b. and ⟨uh⟩ /// the ball keeps moving with / h⟨h⟩im / right?
 - c. and he goes to-PATH the * / to-PATH a bowling place

Some of the intermediate L2 English learners used the expression *get in* or *get into* to describe Sylvester climbing up inside the drainpipe. Neither the native English speakers nor the advanced L2 English learners did this. The terms *get in* or *get into* are, of course, possible in English. We often use them when describing getting into a car. They are not, however, the most common verbs used for motion in English, which are *go* and *come* (Viberg 1993). In addition, the verb *get* was only used by L1 English speakers in narrating the cartoon in the sense of *obtain*: “*He tries crawling up the drainpipe to get Tweety.*” “*Tweety runs and gets a bowling ball.*” The English speakers tended to use verb and satellite combinations such as *go up*, *come up*, *climb up*, or *crawl up*.

The intermediate learners had studied phrasal verbs in the second level of the ESOL program. It is possible that they were using a correct English construction but thinking about it from the L1 perspective of *se mete* ‘he inserts himself into’, a very common verb in narrating the event in Spanish. The advanced learners who had had more ESOL classes and who were more proficient may have internalized the situationally appropriate use of *get in* and consequently did not use it in their narrations.

To summarize, unlike the native English speakers, neither group of L2 learners consistently used satellites or prepositions to indicate path or accumulated path components in speech in English. This suggests that the learners have not completely acquired L2 thinking for speaking patterns in speech. However, does this mean that they are applying L1 thinking for speaking patterns when they do not have a satellite or preposition and applying L2 speaking for thinking patterns when they do? Speech alone does not give us enough information.

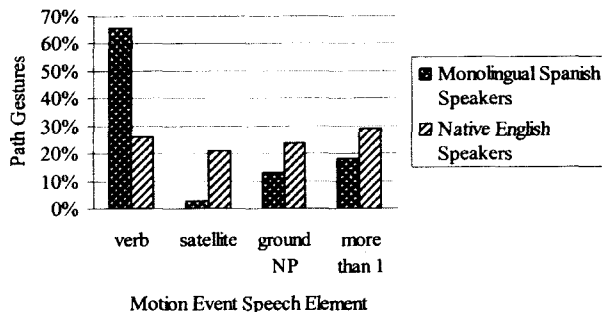


Figure 1. *Percentage of path gestures with motion event speech element*

We need to examine the speakers' gestures and the speech elements that they co-occurred with to answer the question.

5.2. *Speech and gesture results*

5.2.1. *Native Spanish and native English narrations.* As stated above, it has been observed that Spanish speakers tend to focus their path gestures on path verbs or ground noun phrases while English speakers tend to focus their path gestures on satellites or ground noun phrases. In these data, the Spanish speakers produced a total of 38 path gestures which co-occurred with motion event speech elements while the English speakers produced a total of 34. In support of previous findings, Spanish speakers tended to focus their path gestures on verbs, 66 % (25), while only 3 % (1) co-occurred with satellites, 13 % (5) with ground noun phrases and 18 % (7) with more than one element (Figure 1). Of the 7 path gestures that co-occurred with more than one element, 14 % (1) co-occurred with a verb + satellite, 29 % (2) with a verb + satellite + ground noun phrase, 29 % (2) with a verb + ground noun phrase, and 29 % (2) with a satellite + ground noun phrase.

Native English speakers, on the other hand, tended to focus their path gestures over all the motion event speech elements: 26% (9) on verbs, 21 % (7) on satellites, 24 % (8) on ground noun phrases, and 29 % (10) on more than one element. Of the 10 path gestures that co-occurred with more than one element, 50 % (5) co-occurred with a verb + satellite, 20 % (2) with a verb + satellite + ground noun phrase, and 30 % (3) with a satellite + ground noun phrase. This co-occurrence with more than one element supports the finding of Kellerman and van Hoof (2003) that English speakers also tend to focus their path gestures

on a combination of the verb and satellite. The data provide further support for the importance of the combination of verb and satellite in English in that 44 % (4) of the native English speakers' 9 gestures that co-occurred with verbs had holds on the satellite.

The differences between Spanish and English were highly significant for path gestures co-occurring with verbs (one-factor ANOVA, $F(1,8) = 16.730$, $p = .003$), but not for path gestures co-occurring with the other elements. These results indicate that there is clearly a different pattern of path gesturing in regard to verbs for speakers of the two languages: Spanish speakers' gestures tend to co-occur with verbs while English speakers' gestures do not. English speakers' gestures seem to be more evenly distributed across verbs, satellites, ground noun phrases, and more than one element. However, if we look at the data more closely and consider all instances where gesture strokes co-occurred with satellites in the two languages, we notice that 50 % (17) of the English speakers' 34 path gestures involved satellites: 7 with satellites and 10 with more than one element, while only 16 % (6) of the Spanish speakers did: 1 with a satellite and 5 with more than one element.

To illustrate these patterns, let us return to the examples of the native Spanish speakers and the native English speakers narrating Sylvester and the bowling ball going down the drainpipe, across the street, and into the bowling alley with their path gestures (path and path and ground) added (formerly 5 and 6, now Examples 9 and 10).

In the examples the path component in speech is indicated. Only relevant path gestures for this study are marked in the transcriptions. The stroke of the gesture is indicated in bold and explained.

The native Spanish speaker in example 9 had five path gestures (9b, c, d and e). Three of these occurred on the verb 9b, c, and d. One occurred on a verb + ground noun phrase 9e (1a) and the other on a ground noun phrase 9e (1b). The speaker not only narrated each path movement in a separate clause, but had a separate gesture for it. In 9c, the speech and gesture indicate Sylvester and the bowling ball going down the street, in 9d Sylvester and the ball going over a hill and along the street, and in 9e (1a and 1b) Sylvester and the ball entering the bowling alley. Although the speaker's gesture in 9b also indicates path (the ball going into and down Sylvester) it accompanies the verb *sale* 'exit'. The information in the speech and gesture is not the same. This is another type of speech-gesture mismatch (McNeill 2005) different from the one that Goldin-Meadow (1999, 2000; Goldin-Meadow and Alibali 1995) discussed. The gesture here serves as a meta-level comment on the discourse. At the narrative level, the speech indicates that Sylvester is exiting the drainpipe, but on the meta-level the gesture tells the interlocutor that the ball had previously gone into Sylvester. This was an important part of the narrator's message to the interlocutor that would have been lost in looking at the speech alone.

(9) *Native Spanish – Sylvester and bowling ball*

a. / *al momento de que sale-PATH* //
 / at-the moment of that he-exists
 / at the moment that he ‘exits’

b. *sale-PATH el ga](a)to pero con(n) la bola adentro*
 exits the cat but with the ball inside
ya / verdad?
 now / truth
 the cat ‘exits’ but with the ball inside now / right? /

iconic: both hands move down along body (ball going into and down Sylvester)
 PATH + GROUND

c. [[# y se *va-PATH* *dire*][*ctamente*
 # and ref he-goes-PATH directly
 # and he goes-PATH straight

iconic: left hand moves across body (Sylvester going down street with ball)PATH

d. *y es de ba]]*[[*jada*
 and it-is of descent
 and it’s ‘descending’

iconic: left hand curves over top and down of an imaginary hill and then moves
 across body (Sylvester going down hill and along street) PATH + GROUND

e. / y(y) *entra-PATH a un(nn)/// bow]]*[[*lerama // sí? /]*
 1a 1b

/ and he-enters to a(aa) /// bowling alley // yes?
 / and he ‘enters’ a /// bowling alley // right?

1a: iconic: left hand moves straight across body to right side and holds (Sylvester
 going along street)PATH + GROUND

1b: iconic (continuation of previous gesture after pause): left hand moves further
 to the right (Sylvester going into the bowling alley)PATH +GROUND, BOUND-
 ARY CROSSING

The native English speaker in example 10 had three path gestures. The first, 10a, occurred on a verb + satellite *falls back*; the second, 10b (1a), on a ground noun phrase, the following verb and satellite *pipe roll down*; and the third, 10b (1b), on a ground noun phrase, the next satellite and the ground noun phrase following that satellite *street into the* with a hold on part of *bowling*. The gesture in 10a shows Sylvester and the bowling ball going down the pipe while the gestures in 10b (1a and 1b) show Sylvester and the bowling ball rolling down the street and into the bowling alley. In 10b (1a and 1b), the speaker’s hand moves continuously with a shift in direction to indicate the two path components that he has accumulated in both speech and gesture.

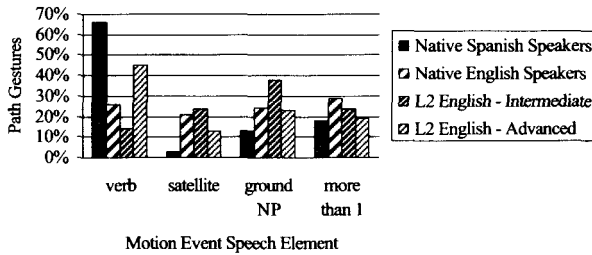


Figure 2. Percentage of path gestures with speech motion event element. All narrations

(10) *Native English – Sylvester and bowling ball*

- a. [ester's mouth Sylvester **falls-MANNER back-PATH**][[down-PATH

iconic: right hand in front of head moves straight down (Sylvester and bowling ball fall down pipe)PATH

- b. the drainpipe rolls down-PATH th[e street into-PATH the

1a

1b

bow]ling alley/

1a: iconic: right hand moves from left to right across body changing direction (angling up on diagonal) with *the street* (Sylvester and bowling ball move across/down street)PATH

1b: iconic+ localizer: (continuation of previous PATH gesture) right hand moves up on a diagonal and holds (Sylvester and bowling ball going into bowling alley + location and orientation of bowling alley)PATH

To summarize, native Spanish and English speakers have different patterns of expressing path gesturally. Spanish speakers tend to produce path gestures with verbs and tend not to accumulate path gestures. English speakers, on the other hand, tend to have half of their path gestures co-occurring with a satellite or a verb + satellite and the remainder with verbs and ground noun phrases. Additionally, they tend to accumulate path gestures in a single clause.

Let us now look at the L2 learners' speech and gesture.

5.2.2. *L2 English narrations.* In English, the intermediate L2 English learners produced a total of 21 path gestures that co-occurred with motion event speech elements: 14 % (3) co-occurred with verbs, 24 % (5) with satellites, 38 % (8) with ground noun phrases, and 24 % (5) with more than one element. Of the 5 path gestures that co-occurred with more than one element: 80 % (4) co-occurred with a verb + satellite and 20 % (1) with a verb + satellite + ground noun phrase.

The advanced L2 English learners produced a total of 31 path gestures in English: 45 % (14) co-occurred with verbs, 13 % (4) with satellites, 23 % (7) with ground noun phrases, and 19 % (6) with more than one element. Of the 6 path gestures that co-occurred with more than one element, 100 % co-occurred with a verb + satellite.

The percentage of path gestures co-occurring with satellites, ground noun phrases, and more than one element (verbs and satellites) for both groups of learners was more similar to the native English speakers' pattern than the native Spanish speakers' (Figure 2). On the other hand, there was a difference in the co-occurrence of the L2 learners' path gestures with verbs. The intermediate learners had even fewer path gestures co-occurring with verbs than the native English speakers did. The advanced learners, in contrast, had many more than the native English speakers did, though not as many as the native Spanish speakers. These differences between the three English proficiency levels (native speaker, intermediate learner, and advanced learner) in the co-occurrence of path gestures with verbs, however, were only marginally significant (ANOVA, $F(2, 12) = 3.593$, $p = .06$). To better understand how the L2 learners' express path gesturally in English, we need to look at how speech and gesture interact in more detail. Let us examine the following examples (formerly Examples 7 and 8, now Examples 11 and 12).

- (11) *Intermediate English Learner – Sylvester and bowling ball (English)*
- a. and they *///* go *///*
 - b. [*///* / go away-PATH *///*]
 iconic: right hand moves laterally to R and holds (Sylvester and bowling ball going down the street)PATH
 - c. *///* [hnh / [away-PATH / (mm)]
 iconic (reduced repetition of previous gesture) w/deictic in post-stroke hold: right hand rotates in to body and moves out to the far right side with torso rotating slightly with the motion, retracts back to the body to the right and holds with right index finger extended (Sylvester and bowling ball going down the street)PATH
 N.B.: The subject's gesture here is like Spanish gestures for *hasta* 'until'.
 - d. *///* to finish in a(aaaa) / ball* // a ball* / (mm) bowl* bo(o)wling * bowling

The intermediate learner in Example 11 had two path gestures: one co-occurred with a verb and satellite *go away* (11b) and the other with a satellite *away* (11c). In terms of the motion event speech elements they co-occur with, they seem to follow the L2 English pattern not the L1 Spanish one. No gestures co-occur with verbs alone.

On the other hand, in terms of expressing what actually occurred in the motion event, neither the speech nor gestures capture all aspects of Sylvester's movements. The learner only gestures Sylvester going down the street. This

may be due to her proficiency level and lack of vocabulary. As a result, the word she chooses and gestures on is the satellite *away*, the most salient word for her in describing what occurred. This is very different from the native English speakers who never gestured on a satellite that was not preceded by a verb or a preposition that was not followed by a noun phrase. Although her gesture on *away* differs from that of a native speaker, it may indicate that she is at a point in L2 language development where she is receptive to learning L2 thinking for speaking patterns about motion.

Her speech and gestures also indicate that she still has aspects of her L1 Spanish thinking for speaking pattern in English. Her gesture on *away* just stops and holds with her index finger extended. This is similar to a Spanish gesture for *hasta* 'until' which does not allow boundary crossing (McNeill, personal communication). Her boundary crossing occurs in her subsequent clause. Moreover, she does not accumulate path components in gesture.

(12) *Advanced English Learner – Sylvester and bowling ball (English)*

- a. and [then* %click / so he goes] out-PATH of the(e) / water drain
iconic: right hand arcs straight down, then curves a little to the right and holds
(Sylvester and the bowling ball going down and out the drainpipe)PATH
- b. and (uh) /// the ball keeps moving with / h(h)im / right?
- c. and [he goes to-PATH the*] / to-PATH a bowling place
iconic: right hand moves up and away from body a little (Sylvester entering bowling alley)PATH

The L2 English advanced learner in example 12 had two path gestures: one with a verb %click / so he goes (12a) and the other with a verb and satellite goes to (12c). Although his speech does not indicate that Sylvester and the bowling ball go down and out the drainpipe, his gesture does (12a). Like the L2 English intermediate learner, he does not accumulate path components in speech or gesture. This suggests that although his speech is more fluent and native-like than the intermediate learner, his gestures indicate that he may still have aspects of his L1 thinking for speaking pattern about motion.

To summarize, in their expression of path gesturally the L2 learners have some aspects of both L1 and L2 patterns. Following the L2 English pattern, there is an increase in the number of path gestures co-occurring with satellites, ground noun phrases, and verbs + satellites for both groups compared to the native Spanish speakers. In addition, both groups have fewer path gestures co-occurring with verbs than the native Spanish speakers; however, the advanced learners still have considerably more than the native English speakers, which may be indicative of the L1 thinking for speaking pattern. In addition, an in-depth analysis of the speech and gesture of two learners showed that the L2 learners did not accumulate path components in gesture in a single clause as L1 English speakers did.

6. Discussion and conclusion

This study sought answers to the following questions: how path is expressed both linguistically and gesturally in Spanish and English; how the expression of path in the English narrations of the L2 English learners compares with its expression in the native English speakers' narrations; what learners' gestures tell us about their thinking for speaking patterns that speech alone does not.

The results show that Spanish and English have different patterns of thinking for speaking in the expression of path in motion events in both modalities. In Spanish, path is expressed linguistically through clauses, i.e., separate verbs, and gesturally through path gestures primarily on verbs. In English, on the other hand, path is expressed linguistically through satellites and the accumulation of path components within a single clause, and gesturally through path gestures on satellites, verbs + satellites, ground noun phrases, and verbs as well as by the accumulation of path gestures within a single clause. The number of English speakers' gestures that co-occurred with verbs was significantly fewer than the Spanish speakers' and is reflective of the difference between verb-framed and satellite framed languages.

The expression of path linguistically in both languages is restricted by the structure of the languages. Path is encoded on the verb in Spanish and the satellite in English. The expression of path gesturally is also restricted by the language. However, there is not a one to one correspondence because gestures occur with other motion event speech elements for both groups of speakers. Rates of gesturing vary from person to person, and not every speech utterance is accompanied by a gesture. When gestures do occur, they occur with elements that have high communicative dynamism, in other words, new, focused or contrastive information (McNeill 1992). Hence, how path is expressed gesturally is influenced by three factors: the typology of the language, the discourse itself, and the individual speaker's developing thought.

When they narrated in their L2 English, the learners' speech was somewhere between the L1 and L2 thinking for speaking patterns. With the exception of one advanced learner, they did not accumulate path components in speech and continued to express each path component in a separate clause. On the other hand, they sometimes used satellites or prepositions to indicate path. This suggests that the learners have not completely acquired L2 thinking for speaking patterns in speech.

There was also a difference in the choice of verbs the two groups used. The advanced learners used the same verbs as native English speakers did, while the intermediate learners sometimes used phrasal verb constructions such as *get in*, which indicates that though the learners' are using a correct form in English they are applying L1 Spanish meaning to it in the context of Sylvester going up the drainpipe.

It is not clear whether the L2 learners' lack of accumulated path components in a single clause is a developmental feature of interlanguage or a result of L1 transfer or a combination of both. L1 English-speaking children do not accumulate path components until at least nine years of age (Berman and Slobin, 1994). This would mean that for L1 learners, it is developmental. The same may be true for L2 learners. However, the L2 learners' L1 Spanish does not allow for the accumulation of path components, and the learners could be transferring their L1 thinking for speaking patterns to their L2. A third possibility, one suggested by the advanced learner who did accumulate path components in speech, is that the accumulation of path components is developmental, and the learners' L1 has an impact on when learners acquire this aspect of English in their L2 development. More research is needed on this topic with highly proficient Spanish learners of English to see if the accumulation of path components in speech increases with L2 proficiency.

The inconsistent use of satellites and prepositions and use of only a few manner verbs in L2 speech by the L2 learners is probably the result of transfer of L1 thinking for speaking patterns. Slobin and Berman (1994) claim that "particle and prepositional elements are highly salient and readily accessible to English-speaking children from early on in their development of language structure and language use" (Berman and Slobin 1994: 161).

Gesturally, both groups of learners had an increase in the number of path gestures they produced with satellites and verbs + satellites following the L2 English pattern. When the L2 learners' expression of path gesturally in English was examined with its co-occurring speech, there were some aspects that were similar to L1 English speakers' and some that were different. The motion event speech elements with which their gestures co-occurred were often similar, for example, *go to*, although the actual percentages varied. However, the L2 learners did not accumulate path gestures in single clauses as the native English speakers did. This suggests that the learners' gesture pattern was also somewhere between the L1 and the L2 pattern. This is not an unexpected result from the perspective that speech and gesture form a single system. The learners have not fully acquired L2 thinking for speaking patterns for the expression of path, and both their speech and gesture indicate this.

The L2 learners' path gestures provide us with information about their thought processes that their speech alone does not. The high percentage of intermediate learners' path gestures co-occurring with satellites and the low percentage co-occurring with verbs indicates that these learners recognize that the adverb particle is the most salient expression of path in English. This is not unlike L1 children who use words such as *up* for 'pick me up', *out* for 'take me out', and *down* for 'put me down'. However, when we examined the speech and gesture more closely of one of the learners, we saw that although she gestured on a satellite, her speech and gesture were quite different from a

native speaker's. This is an example of a speech-gesture mismatch. The timing of the gesture was good, but the gesture itself was similar in form to a Spanish gesture for *hasta* 'until'. Also, the satellite in speech did not follow a verb. This speech-gesture mismatch indicates that the learner may be at a point in her L2 language development where she would benefit from some instruction about the typological differences between Spanish and English when it comes to motion.

In addition, even though the learners produced grammatically correct utterances, the large percentage of advanced learners' path gestures that co-occurred with verbs indicates that they were not thinking about motion the same way that native speakers were. This is not a gesture-speech mismatch, but rather a phenomenon that frequently occurs with learners who study a language formally. The advanced learners having attended more ESOL courses learned the correct English forms and applied them correctly in an utterance. However, they did so from an L1 verb-framed perspective. The learners are probably unaware of the existence of different thinking for speaking patterns. Whether a similar phenomenon occurs with informal language learners is a subject which warrants further investigation.

How do we learn our L1 thinking for speaking patterns both linguistically and gesturally? Certainly, the linguistic and gestural input we receive about the expression of motion is important. Through the words other L1 speakers use and the gestures they make, we learn what the salient elements for the expression of motion are, for example, motion verbs of manner, adverbs, and prepositions in English and motion verbs of path in Spanish. This is reinforced through nursery rhymes in the L1 – some of which even have stylized gestures or finger plays attached to them such as *The Eensy Weensy Spider* in English, which fronts satellites, and "*La Hormiguita*" 'The Tiny Ant' in Spanish, which begins with the verb *sube* 'ascend'.

In L2 acquisition, it is not as simple because learners may have well-established other patterns. Spanish learners of English need to learn that in English the satellite encodes path, the satellite is obligatory, and path components are often accumulated within a single clause. The learners in this study have begun to learn the importance of the satellite: they may use a satellite in speech, and some of their gestures may co-occur with this element. However, they are not yet aware that English has a different pattern of thinking for speaking about motion from their native language.

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Appendix: Motion Verbs

Table A.1. Verbs used in Spanish narrations

Native speakers (N=52)			
<i>arrojar</i>	'throw'	3.8 %	(2)
<i>aventar</i>	'throw'	11.5 %	(6)
<i>caer</i>	'fall'	1.9 %	(1)
<i>entrar</i>	'enter'	5.8 %	(3)
<i>ir(se)</i>	'go (away)'	15.4 %	(8)
<i>ir bajando</i>	'go descending'	3.8 %	(2)
<i>ir botando</i>	'go bouncing'	1.9 %	(1)
<i>ir subiendo</i>	'go ascending'	3.8 %	(2)
<i>meter(se)</i>	'insert oneself, get in(to) '	13.5 %	(7)
<i>regresar</i>	'return'	1.9 %	(1)
<i>sacar</i>	'take out'	3.8 %	(2)
<i>salir(se)</i>	'exit'	13.5 %	(7)
<i>salir rodando</i>	'exit rolling'	1.9 %	(1)
<i>subir(se)</i>	'ascend'	7.7 %	(4)
<i>tirar</i>	'throw'	1.9 %	(1)
<i>tumbar(se)</i>	'knock down'	1.9 %	(1)
<i>venir(se)</i>	'come'	5.8 %	(3)

Table A.2. *Verbs + satellites used in English narrations by subject group*

Native Speakers (N=30)	Spanish Learners of English (Inter.) (N=28)	Spanish Learners of English (Advan.) (N=30)			
climb + up	6.7 % (2)	bring Ø	3.6 % (1)	climb Ø	3.3 % (1)
come + down, out, up	20.0 % (6)	climb (for)	3.6 % (1)	come Ø	3.3 % (1)
crawl + up	3.3 % (1)	come Ø	3.6 % (1)	come + in, out, through	10.0 % (3)
drop + down	10.0 % (3)	come + out	3.6 % (1)	drop Ø	6.7 % (2)
fall + back down, into	6.7 % (2)	get Ø [destination]	14.3 % (4)	go Ø	16.7 % (5)
go + in, into, out, up, up through	20.0 % (6)	get + in, in through, into	14.3 % (4)	go + down, out, through, to	33.3 % (10)
knock + down	3.3 % (1)	go Ø	3.6 % (1)	go + upstairs	3.3 % (1)
put + into	3.3 % (1)	go + away, down, in, into, out, through, to	25.0 % (7)	keep moving Ø	3.3 % (1)
roll + down, on down	16.7 % (5)	go rolling (from)	3.6 % (1)	put + through	3.3 % (1)
run Ø	3.3 % (1)	jump (until)	3.6 % (1)	roll + through	3.3 % (1)
throw + down, into	6.7 % (2)	put + in, into	7.1 % (2)	throw + away, through, to	13.3 % (4)
		sled + to	3.6 % (1)		
		throw Ø	3.6 % (1)		
		throw + to	3.6 % (1)		
		turn + down	3.6 % (1)		

N.B.: Prepositions of motion are included as satellites in this list. Instances of no satellites in the speech are indicated by Ø, and expressions that occurred in the L2 learners' speech with the verb that do not qualify as satellites are indicated in parentheses.

Notes

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1. The ESOL program at National-Louis University, 1979 to 2005, was a five-level semi-intensive integrated skills program with a grammatically based curriculum designed to provide English language learners with the English necessary to succeed in undergraduate studies. Students were passed to the next level with a minimum grade of C.
 2. This classification is useful for talking about gestures, but it should be remembered that it is not an absolute classification as categories of the classification system are not mutually exclusive and gestures may fit more than one category at a time. A gesture can be both iconic and deictic or be iconic with superimposed beats depending on the level of discourse.
 3. Any questions on the coding of or timing of gestures were brought to lab meetings at the McNeill lab 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.
 4. Self-referential, paranarrative clauses such as *o sea* 'I mean' in Spanish and *I mean, I think I don't know how to say it* in English were excluded from this count.
 5. Unclear gestures and path and manner gestures were excluded from all gesture counts in the analysis.

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