Shapes and placement of gestures by Germans in descriptions of motion events*

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Based on how different languages verbalise motion events they can be divided into two main categories: satellite-framed (e.g. English) and verb-framed languages (e.g. Spanish) (Talmy 1985; Slobin 2004). According to, for example, McNeill and Duncan (2000), this should be reflected by the constituents with which gestures coincide. However, previous research (van Hoof 2000; Vrinzen 2003; Boot 2003) suggests that even two satellite-framed languages can differ in their gesture placement. Therefore, Experiment 1 of the present study compares three Germanic languages with regard to gesture placement. Together, the three previous studies and this paper indicate that a categorisation based on speech cannot necessarily be applied to gestures.

In Experiment 2, the German participants' gesture shape was investigated. The data were coded according to a scheme designed by Müller (1998). Results suggest that gesture shape is as rule-bound as gesture placement.

1. INTRODUCTION

When communicating, human beings need to draw from their mental lexicon and grammar rules in order to utter a clear message. However, we hardly ever say the exact same thing twice. Baker (2002: 13) mentions creativity to be "one of the characteristics of the human linguistic competence". The first sentence of this paper, for example, has probably never been uttered in exactly this way, although it consists of elements (e.g. words) that are not unique and it abides by the grammatical rules of the English language. This view is shared by, for example, Chomsky (1965: 6), who states that "…an essential property of language is that it provides the means for expressing indefinitely many thoughts and for reacting appropriately in an indefinite range of new situations". Coulthard (2004) even emphasises that people are very unlikely to recount an event in exactly the same way twice, even when little time has elapsed between the two retellings.

Because of these infinite possibilities, there are not only many different ways of phrasing something, but there are also several possibilities for individuals to emphasise different parts of the same utterance when only considering the words that are produced. That is, the way in which certain parts of utterances are emphasised is exactly the way a speaker intends. Thus, Fox (2001) reports that the duration of pitch peaks in accented syllables indicates whether or not the speaker intends to finish his/her turn. Furthermore, Tomlin et al. (1997: 68) claim that speakers "always [have] some *purpose* or *goal*" (emphasis by Tomlin et al.) when they say something. Thus, when a speaker talks about a drawing, the goal can be to comment on the quality of the drawing, or on what can be seen in the drawing. Both descriptions are about the exact same thing, but will differ drastically from each other. Tomlin

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et al. (1997: 70) go on to explain that speakers may want to "…steer the listener's attention to particular referents and propositions…" by means of "focus organisation".

The same principle holds for descriptions of motion events. Every language has its own way of describing them in speech and gestures. For instance, English speech expresses the path of a movement in the verb and the manner in a satellite (see below), while French does this the other way round. Based on this observation, Talmy (1985) divides all languages into two groups: verb-framed (e.g. Romance languages, Japanese and Korean) and satellite-framed languages (e.g. Chinese and Indo-European languages minus the Romance languages). Two languages placed in different categories are expected to be different, but two languages viewed as belonging to the same category are somewhat less expected to show different patterns. Categorical similarity in one way (i.e. satellite- or verb-framed; based on speech) does not necessarily mean that motion events are gestured about in the same way. For example, Chinese is categorised as satellite-framed. Nevertheless, its gesture placement tends to follow the topic-initial pattern of the verbal language (McNeill & Duncan 2000). Therefore, a categorisation that is based on speech does not necessarily hold for the gesture placement in a language.

This research attempts to extend this conclusion to German. Like the other Germanic languages discussed in this paper (Dutch and English), German is categorised as a satellite-framed language and is therefore expected to show similar gesture patterns to (at least one of) these languages. The research question Experiment 1 of this paper is:

On which constituents do German, English and Dutch native speakers place path-gestures when describing motion events in a cartoon-retelling task?

The language-specific tendencies that were found in previous studies (e.g. van Hoof, 2000; McNeill & Duncan 2000; Stam 2006) suggest that gestures are not as random parts of language as they seem to the untrained eye. However, it is yet unclear whether these tendencies also apply to a more detailed aspect of gestures: their shape. Müller (1998) presents a coding scheme, by which gesture shapes can be coded for their shape in much detail. She notes that gestures can represent different things in different ways. Therefore, she divides the gestures she studied into four modes of representation. These modes of representation stand for the way in which gestures depict something. The research question of Experiment 2 is:

How similar are the shapes of representational gestures on motion events with different speakers?

Before we elaborate on how these research questions will be answered by this study, it is important to explain some of the concepts that are used in the questions, beginning with the term *gesture*. Here, gestures are viewed as deliberate movements of the hand(s), which are part of the communication process and are related to the speech they coincide with. The focus of this paper is on hand gestures, as they are the most common type of gesture (McNeill 1992) (cf. Gullberg (2010) on methodological reflections regarding gesture research and Kimbara (2008) on the choice for gestures of the hands only).

Representational gestures, which have a direct relation to the speech content and denote, for example, a concrete object (e.g. *ball*) or action (e.g. *to walk*) have been investigated most frequently. This is probably attributed to the fact that they can usually be linked directly to what they represent. For instance, when both hands are shaped as if they are holding a large ball when the speaker is referring to someone carrying a bowling ball, it is very likely that the hands indeed represent holding a bowling ball, and not, for example, holding a large bowl or vase. This is why this study focuses on representational gestures.

Representational gestures are what McNeill (1992) classifies as *iconic, metaphoric* and *deictic* gestures. Iconic gestures have the closest relation to speech and represent a concrete concept, such as an object. Metaphoric gestures are slightly more abstract, as they denote more abstract concepts such as emotions. Finally, deictic gestures are pointing gestures. McNeill mentions one additional category: *beats*. These gestures move "along with the rhythmical pulsation of speech" (McNeill 1992: 15).

Another important concept is *motion event*, and related to that, the division of languages into *satellite*- and *verb-framed*. A motion event is '(a) movement(s) by one or more person(s) or object(s) in a certain way', for example, someone who kicks a ball away. Motion events are popular objects of research because the movements in motion events are more likely to elicit gestures in retelling tasks than, for example, still objects (Gullberg 2007). Also, motion events have been elaborately examined with regard to speech in numerous languages by many researchers (e.g. Brown 2003; Narasimhan 1998; Slobin 1996, 2004). Most research in this area focuses on Talmy's (1985) typology of what he calls verb-framed and satellite-framed languages. In verb-framed languages, the trajectory (or: path) of the motion is expressed through the verb, while satellite-framed languages generally express the path through the satellite.

According to Talmy (1985: 102) satellites are related to the verb root and form a "verb complex" with the verb. This is best illustrated by an example. (1) is an English sentence in which the satellite is in italics; (2) presents the same sentence in French with the satellite italicised.

(1) John swims *across* the river (Kellerman 2006)
(2) Jean traverse la fleuve *en nageant*
John travels-across the river swimming

Motion events can be described as having several constituents. Besides the motion, motion events consist of a figure, a path, a ground and a manner or cause. This is best illustrated by an example. We first use an English example by author and then repeat (2), so we have a satellite-framed and a verb-framed language, respectively. Note that the verb displays different constituents of the motion event in each language.

(3) The cat walks up the stairs
Figure: the cat
Motion and manner: walks
Path: up
Ground: the stairs
(4) Jean traverse la fleuve en nageant
Figure: Jean
Motion and path: traverse
Manner: en nageant
Ground: la fleuve

In order to discuss the gesture placement of Dutch, German and English and how this is related to the constituents of these languages, the differences in constituent order need to be explained. German and Dutch are rather similar with regard to their constituent order. In both languages, the satellite (denoted in italics) usually follows a verb (underlined) in main clauses (see (5) for German and (6) for Dutch). Furthermore, the satellite can precede a verb in subordinate clauses (see (7) and (8)). These examples also illustrate the fact that the verb and satellite can be separated in both languages, although this is limited to subordinate clauses in German but not in Dutch.

(5) Er stellt sich *auf* die eine seite vom Katapult (participant 34JM)
"He steps on the one side of the catapult"
(6) De vrouw steekt de straat die voor haar huis ligt *over*
"The woman crosses the street in front of her house" (no satellite in English)
(7) ...die für Strassenbahn *oben über* die Strassen laufen (participant11SE)
"…that are above the street for the train"
(8) Er staat stroom *op* de tramkabels [main clause] | die *over* de straat lopen [subordinate clause]
"Electricity runs through the train cables | that are above the street"

English differs from these two related languages. Here, the satellite follows verb in both main and subordinate clauses and cannot be separated from verb (see (9) and (10).

(9) The dog runs *up* the street
(10) * The dog runs the street up

For clarity, this paper is divided into two main sections. Section 2 describes the hypothesis, method and results and discussion of Experiment 1 on gesture placement. In section 3, these elements of Experiment 2 are elaborated on. Finally, a general conclusion is provided.

2. EXPERIMENT 1

Based on the literature related to language-specific tendencies with regard to gesture placement and Talmy's (1985) categorisation of languages into verb-framed and satellite-framed, we can hypothesise the following concerning Experiment 1:

If Dutch and German speakers place the majority of their gestures on the same constituents, the difference between these languages and English may indeed be caused by a difference in the constituents' order.

In order to test this hypothesis, an experiment with a cartoon re-telling task was conducted.

2.1. Method

The data were collected by the author at Düsseldorf University in Germany. All participants were students of the university and their native language was German. They were paid € 5.00 for their participation.

Each of the 25 sessions was conducted by two people: a speaker who watched a Tweety and Sylvester cartoon (Canary Row, divided into eight clips; Freleng 1959) and a listener who was unable to see or hear the cartoon. After watching a clip (ranging from 25 to 79 seconds), the speaker recounted to the listener what happened in the clip. The speaker then watched the next clip, and recounted the events in the new clip, and so on, until all eight clips had been watched and retold. The Appendix presents a description of each clip. The listener was a new participant in every session.

All sessions were recorded with a video camera, which was placed in such a way that the speaker's body was visible from a little below the knees to slightly above the head. The camera was directly in front of the speaker, at a distance of approximately two to three meters. The listener sat about one meter to the front and right of the camera, so the speaker's gestures were clearly visible to the camera, but the speaker did not look directly into it. This way the speaker was less likely to be distracted by the camera.

After recording all data on a digital video camera, the recordings were digitised using Windows Movie Maker. Each file contained the data from one speaker. Then, the speech about movements was transcribed in Elan (a digital sound and video annotation tool developed at the Max Planck Institute for Psycholinguistics). Next, the transcribed parts were watched at a normal pace for any hand movements. If these were detected, the part was played again frame by frame (25 frames per second) and the exact timing of the stroke of the gestures[1] as compared to the speech was determined. Some movements were dismissed as being other movements than gestures (e.g. playing with the headphones).

After having marked where exactly the strokes of gestures depicting only the path of a motion began and ended, the utterances were watched with the sound turned on to determine with which words the gestures co-occurred and the syntactic function of these words. These functions were divided into ten categories : 'finite verb', 'non-finite verb', 'satellite', '[finite verb + satellite]', '[finite verb] + [satellite]', 'ground noun phrase (NP)', 'figure NP', 'pause', 'sentence' and 'other'.

2.2. Results and Discussion

There were a total of 726 gestures in 63:45 minutes of speech time. The average gesture rate was eleven gestures per minute, but the range was quite large: between approximately six to twenty gestures per minute. There were nineteen usable sessions, as some listeners were not native speakers of German and one speaker did not gesture at all.

As was explained above, the collected German data is to be compared to previous research on gesture placement. Four studies have been selected, which investigate Dutch and/or English: van Hoof (2000), Boot (2003), Vrinzen (2003) and Stam (2006). Table 1 presents an overview of the results of all four studies. The categories of the different studies are adapted to fit a kind that can be applied to all studies. Thus 'finite verb' and 'non-finite verb' of the present study are combined to form 'verb'. The category displayed as 'silence/pause' in this table includes only unfilled pauses in van Hoof, Boot and Vrinzen, but include both filled and unfilled pauses in the present study. 'Sentence' of this study and 'verb + satellite + ground noun phrase' and 'satellite + ground noun phrase' of Stam are placed in the 'other' category. Furthermore, Vrinzen and Stam do not differentiate between the figure and the ground noun phrase. Therefore, the results of their 'noun' categories are displayed in 'Ground NP' (which in these studies thus means both ground and figure noun phrase).

(Table 1) *Summary of the findings of van Hoof (2000), Boot (2003), Vrinzen (2003), Stam (2006) and the present study, with the largest category italicised and in bold*

	Van Hoof		**Boot**	**Vrinzen**		**Stam**	**Pres. study**
Syntactic function	**Dutch**	**English**	**Dutch**	**Dutch**	**English**	**English**	**German**
Verb	28%	***27%***	***19%***	***22%***	***32%***	***26%***	14%
Ground NP	0%	0%	13%	17%	3%	24%	9%
Figure NP	***44%***	15%	9%	-	-	-	15%
Satellite	7%	15%	***18%***	***22%***	14%	21%	***18%***

[1] Gestures consist of three to four phases, as explained by McNeill (1992) and Seyfeddinipur (2006). The phases are the preparation phase, the stroke, a possible pre- or post-stroke hold, and the retraction phase. In this paper, Seyfeddinipur's definition of the four phases is followed. The stroke has been described as the part of the gesture that seemed to "display the meaning of the gesture" by McNeill (1992: 107).

[Verb + Satellite]	7%	19%	2%	5%	21%	15%	5%
[Verb] + [Satellite]	0%	8%	-	1%	1%	-	1%
Other	14%	15%	43%	34%	28%	15%	38%
Total (numeral)	98	99	101	101	99	34	726

As can be seen in Table 1, speakers of English tend to place their gestures on the verb. The speakers of German seem to prefer the satellite, but the data for the speakers of Dutch are inconclusive. They either prefer the figure NP (van Hoof) or they choose either the verb or the satellite (Boot and Vrinzen).

This means that our hypothesis, *If Dutch and German speakers place the majority of their gestures on the same constituents, the difference between these languages and English may indeed be caused by a difference in the constituents' order*, may have some truth to it. For Dutch and German, both the satellite and the figure NP have been found to be (one of) the constituent(s) with which many gestures coincide. Yet, Dutch also shows similarities with English. In all three studies including English, the verb was the largest category for this language and both Vrinzen and Boot found the same category to be among the largest in their Dutch data. It thus seems that Dutch is like a bridge between English and German, in that it shows similarities to both languages with regard to gesture placement.

3. EXPERIMENT 2

Because of the balance we saw above between language-specific tendencies (or rules) and differences caused by human creativity, Experiment 2 investigates how these elements are related to gesture shape. McNeill (1992) believes that the lack of strict rules strengthens gestures' communicative purpose, as this allows the speaker to highlight only important or striking parts of the message instead of "[including] features solely to meet standards of form" (1992: 132). This theory is highly relevant to the present study, since this might be exactly what applies to gesture shapes. Certainly, there are some iconized gestures with a standardised shape, such as 'thumbs up', but it is questionable whether such rules apply to all gestures. It is very possible that the exact shape of (representational) gestures is not rule-bound at all, like the exact production of verbal language. Everyone has their own tone of voice and they may produce *cat* with a slightly more aspirated [k] one time compared to a previous production. Still, the word will probably be recognised as *cat* (or rather, a version of *cat*) no matter how high or low someone's voice is and regardless of the amount of aspiration on the [k]. Even when the [k] receives no aspiration at all, it will probably still be recognised as a version of /k/.

This study makes similar generalisations with regard to gesture shape. Shapes that are rather similar are given the same label (see Method below). According to Kendon (2004: 3) a gesture can seem "to be something that is spontaneous and created through the whim of the individual, [but] at the same time it can be shown to be regulated and subject to social convention".

This study aims at testing this claim by investigating whether the shape of gestures can indeed be compared to the exact production of verbal language in that there definitely are some general tendencies (e.g. word order in English or the aspiration of the /k/), but that some differences are still allowed between individuals and between utterances by individuals. The hypotheses of Experiment 2 are:

1. *Gestures of the same mode of representation are more likely to be similar than those of two different modes.*
2. *The shape of a gesture is influenced by the way in which the action is presented to the speaker.*
3. *Gesture shape is just as rule-bound as more general features of gestures are, so there must be similarities between different speakers' gestures.*

3.1. Method

In this experiment, the same data were used as in Experiment 1. However, all gestures on motion events were investigated and not only those that depicted the path of a motion.

The "sameness" of the gestures was further coded as objectively as possible according to a scheme designed by Müller (1998), which distinguishes the articulators (shape, orientation, movement of the hand and the location in the gesture space) and the modes of representation (trace, enactment, mould and representation). A trace is a two-dimensional representation of an object or action. For example, it follows the path of a motion and indicates nothing else. In an enactment, the hands of the producer represent the hands (or, in case of the animals in the cartoon, the front paws) of the agent. When a person produces a mould, he or she seems to mould the air into the shape of the object being described as if working clay and making a three-dimensional representation of the referent. And in a representation, the hands represent something other than hands, such as feet.

Difficult cases were discussed with one or both supervisors of my second MA thesis (M. Swerts and L. Mol). An instance of such a case was one in which more than one mode of representation could be assigned to a single gesture. For example, when participants explained that Sylvester was holding Tweety while they fell down, this action was often accompanied by a gesture in which the hand was in a fist and moving downward. This then represented both an enactment (e.g. Sylvester's hand holding Tweety) and possibly a trace (e.g. the downward motion of the characters) or a representation (e.g. the hand represents Sylvester's body moving downward). It was decided that these gestures were to be categorised as 'enactment' as there was no doubt about the enactment element being present.

3.2. Results and discussion

In Experiment 2, there were 1010 gestures in total, which displayed 42 different shapes, divided over seven categories. This time there were eighteen usable sessions, since one of the videos was damaged and could no longer be re-investigated. This section will deal with each of the three hypotheses of this Experiment in turn.

With regard to the first hypothesis, Table 2 presents the results of the hand shapes and how frequently they occur in each mode of representation. Per mode, the relative frequency of the number of gestures (%G) and that of the number of participants producing this shape (%P) in a particular mode of representation are indicated. Thus, 80% of all enactments have the shape 'fist-like' and 100% of the participants produced this shape. The final rows show both the relative and the absolute numbers for each mode of representation and every hand shape category. The right-most column states the total absolute frequencies per hand shape.

(Table 2) *Summary of the different hand shapes per mode of representation, with the most frequent hand shape per mode of representation italicised and in bold*

	Hand shape →	**Fist-(like)**	**Flat hand**	**Point-ing**	**Ball**	**Pipe**	**Walk-ing fingers**	**Other**	**Total (#)**
Enact	%G	***80%***	9%	3%	11%	7%	0%	3%	312
	%P	***100%***	44%	7%	61%	56%	0%	17%	18
Mould	%G	0%	***59%***	0%	12%	18%	0%	12%	17
	%P	0%	***39%***	0%	6%	17%	0%	11%	11
Trace	%G	4%	***41%***	***47%***	1%	3%	0%	4%	628
	%P	39%	***100%***	***100%***	22%	44%	0%	50%	18
Repres-entation	%G	9%	32%	2%	6%	2%	***42%***	8%	53
	%P	22%	39%	6%	17%	6%	***17%***	11%	15
Total	#G	254	309	303	40	44	22	38	1010
	%G	25%	31%	30%	4%	4%	2%	4%	100%
	#P	18	18	18	13	14	3	12	18
	%P	100%	100%	100%	72%	78%	17%	67%	100%

As can be observed in Table 2, in general, most gestures (628; 62%) are traces. Enactments also occur frequently (312; 31%) as compared to the other two modes of representation (mould: 17 (2%) and representation: 53 (5%)).

Also, Table 2 indicates there is a significant difference between the four modes of representation with regard to the shapes that occur in each mode ($\chi^2 = 1083{,}109$; $p < 0{,}001$). Most enactments are fist(-like) gestures. Obviously, the moulds are usually flat-hand shapes[2]; the representations most frequently are 'walking fingers;' and finally, traces usually have either a pointing shape or a flat hand[3]. However, it should be noted that the fact that the enactments are usually 'fist-(like)', and especially the representations are often 'walking fingers', is not likely to be generalisable to all enactments and representations. This result seems to be specific to the corpus of the present study.

Based on the findings in Table 2, hypothesis 1, G*estures of the same mode of representation are more likely to be similar than those of two different modes*, seems to be correct. No unique gesture shapes have been found in the data and, with the exception of 'trace', in each mode of representation there was one shape that was more frequent than the other shapes. The mode of representation 'trace' has two possible hand shapes, which can both be viewed as a type of pointing (in German (as well as in English and Dutch), it is possible to point using a flat hand shape).

Regarding hypothesis 2 of this experiment, eleven gestures that were produced by at least 50% of the participants have been selected. Table 3 gives an overview of the actions accompanying these gestures and how frequently these shapes occur in the mentioned mode of representation. The table also shows the relative frequency of the gesture shapes in this mode of representation.

[2] As moulds 'shape' the air in 3-D, a flat hand shape of the hand is (almost) required.

[3] There was no significant difference between these two shapes, occurring in the mode of representation 'trace': $t17 = -0{,}606$; $p = 0{,}277$ (paired samples t-test).

(Table 3) *Common gestures and the actions they represent. # indicates the number of occurrences; % represents this number relative to the total number of occurrences of this gesture*

Action in cartoon	**Gesture (mode of representation)**	**#**	**%**
Sylvester grabbing Tweety	Closing fist (enactment)	17	100 %
Sylvester climbing up the drain pipe	Curled fingers, like holding pipe (enactment)	23	59%
Tweety holding/throwing down a bowling ball with both hands	Fingers slightly curled and spread like holding something large (enactment)	36	80%
Sylvester holding Tweety	Hand closed like holding something small in fist - vertical (enactment)	90	100 %
Granny hitting Sylvester with her umbrella	Hand closed like holding something small in fist - diagonal/horizontal (enactment)	51	96%
E.g. Sylvester looking for Tweety by lifting carpets, etc.	Hand closed like index finger and thumb are holding something (enactment)	42	100 %
E.g. Sylvester rolling down the street	Index finger extended, rest in fist (trace)	138	95%
E.g. Sylvester walking up and down the street	Index finger extended, rest relaxed (trace)	81	100 %
E.g. Sylvester being kicked out by hotel guard	Slightly curled, spread fingers (trace)	59	84%
E.g. Weight hitting Sylvester	Straight, closed fingers (trace)	65	77%
E.g. Sylvester fleeing from train	Straight, slightly spread fingers (trace)	80	82%

In all enactments (the first six shapes), the action performed by the participant is of course the same as that of the character in the cartoon. The other gestures usually represent several actions, but the traces are (almost) always produced in the same direction as the movement in the cartoon. It seems logical that the hand shapes of the enactments tend to represent one action and the hand shape of the traces can refer to different actions: namely the enactments are exact copies of the hand movement the participants saw in the cartoon, while the traces are two-dimensional representations of actions, which can be actions of more than the hand. Therefore, it is interesting to observe that the enactments all represent an action of the hands only, while all of the traces refer to movements of the entire body. Thus, the movement of Sylvester grabbing Tweety (a movement of the hands only), is never represented by a trace, although it is theoretically possible to only refer to the trajectory of this movement in a gesture. Perhaps the actions represented by enactments were considered to be so important for the story-telling by the participants that they needed a copy in a gesture instead of only a representation of the frame of the object or the trajectory of the movement.

Based on these results, hypothesis 2, *The shape of a gesture is influenced by the way in which the action is presented to the speaker*, seems to be incorrect. The shape of a gesture does not seem to be influenced by the way in which the action is presented to the speaker, but rather by the action itself.

The third and general hypothesis of Experiment 2, though, *The shape of representational gestures is just as rule-bound as more general features of gestures are*, seems to be true. Many similarities could be found between the shapes of the gestures produced by the different participants and no unique gestures were found. Therefore, it seems that the shape of representational gestures has to follow a tendency, as does the gesture coincidence with speech. However, one should take into consideration that gestures that were not related to motion events were ignored in this study. Also, it is possible that non-representational gestures may produce different results.

4. CONCLUSION

In this paper we saw two experiments. The first investigated gesture placement in German, Dutch and English and the second was a detailed research of the shapes of gestures by Germans.

The results of the first experiment indicate that typologically similar languages can differ in their gesture placement. Namely Dutch, German and English are all classified as satellite-framed languages with regard to their speech according to Talmy's (1985) categorisation. This means that language typologies based on speech alone should be termed 'speech typologies', as their categorisation scheme may not apply to all aspects of language, such as gestures.

The second experiment showed us that gesture shape is connected to the mode of representation of the gesture. The way in which actions are presented to speakers if they recall an event does not seem to influence gesture shape. Rather, the type of event (e.g. is it an action of just the hand or of the entire body?) tends to be the prime stimulus for the shape of a speaker's hand when (s)he is gesturing about motion. Thus, the shapes are influenced by what the speaker is trying to convey.

In general, these experiments show that both gesture shape and gesture placement seem to be bound by certain (language-specific) tendencies. Differences were found between the German data and the data of studies including English and/or Dutch. Furthermore there were quite some similarities between the hand shapes of the gestures of the participants. If there were no tendencies governing hand shape, there would have to be vast differences between individual speakers and at least some shapes that were produced only by a single person should have been present. Yet, these results were not found, thus we can conclude that there must be rules or tendencies to gesture shape and placement.

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APPENDIX

Description of the clips in alphabetical order.

Bell boy
Granny calls downstairs to the lobby to have her bags picked up. Sylvester goes upstairs dressed as a bell boy and he picks up the suitcase and the covered cage he finds in the room. He throws away the suitcase and takes the cage into an alley, where he removes the cover. It turns out Granny hid inside the cage and she chases Sylvester down the street, hitting him with her umbrella.

Bowling ball
Sylvester first walks up and down the street, deliberating how he can get up to Tweety's window. He then climbs up to Tweety's window through a drainpipe. Tweety sees this and throws a bowling ball into the pipe. The ball crashes into Sylvester, causing him to swallow it. Sylvester flies out of the drain with the ball inside his stomach and he rolls down the street straight into a bowling centre.

Entrance
Sylvester runs down his building and crosses the street into Tweety's building. He is kicked out by someone and lands in a garbage heap.

Granny
Sylvester climbs up to Tweety's window on top of the drainpipe. Tweety is swinging on his swing in his cage on the window sill. When he sees Sylvester, Tweety flees inside and Sylvester runs after him. Sylvester is then quickly thrown out of the window by Granny, who shouts after him, waving her umbrella.

Monkey
Sylvester sees an organ grinder with a monkey and lures the monkey around the corner of a wall. There he steals its clothes and climbs up the drainpipe dressed as a monkey. Tweety flees inside and Sylvester looks for him in the apartment. There, Granny gives him a penny and as he thanks her by lifting his hat, she hits him over the head with her umbrella.

Swing
Sylvester first makes mathematical drawings of his plan, before he attempts to swing across the street from his building into Tweety's. Unfortunately, he miscalculated and he crashes into the wall next to Tweety's window and falls down.

Tram
Sylvester tries to make his way to Tweety's window by climbing up an electricity pole and rope dancing across the street. Then a tram comes up and chases Sylvester, giving him an electric shock every time it catches up to him. As the camera moves down, it turns out Granny and Tweety are steering the tram.

Weight
Sylvester builds himself a see-saw-like construction, on which he places himself. He then throws a heavy weight on the other side of the see-saw and flies up to Tweety's window. There he grabs the bird and falls down again on the see-saw. This causes the weight to fly up again and as Sylvester walks away with Tweety, the weight hits his head and Tweety is free again.