*Part II*

# Gesture and processing of visual information

# 4 Interactions between discourse status and viewpoint in co-speech gesture

*Fey Parrill*

Viewpoint is a delightfully messy area, as the introduction to this volume makes clear. While the majority of the chapters in this volume center on analyses of specific viewpoint phenomena, the central goal of this chapter is to provide some traction on the issue of viewpoint in multimodal language (speech and speech-accompanying gestures) – that is, I attempt to provide both a global picture of the world of viewpoint, as well as a more systematic description of how viewpoint in gesture can be understood.

In what follows, I begin by separating viewpoint into three phenomena: conceptual, linguistic, and gestural. I then describe a general notion of viewpoint (as discussed by researchers like Kuno, MacWhinney, and Chafe), and viewpoint in the *blending* or *conceptual integration* framework. I argue that viewpoint as seen in co-speech gestures can be helpful in unifying these approaches. Finally, I describe an experimental study demonstrating that both linguistic and gestural viewpoint can be affected by discourse status. This study highlights the ways in which the two modalities (speech and gesture) are linked.

## 4.1 Conceptual, linguistic, and gestural viewpoint

The term *viewpoint* is often defined as a conceptualizer's perspective on an event or scene (Chafe 1976; DeLancey 1981). This is a problematic definition, as it is unclear what perspective is. Many researchers define perspective as point of view, and the two terms are often used interchangeably, leaving us with a circular and unsatisfying definition. The construct of viewpoint is an important one, however ill-defined. It captures the fact that humans represent events from some experiencer's consciousness, and that they are able to project their own visual perspectives, thoughts, and feelings onto other entities. Most researchers seem to agree that viewpoint is, in its most basic form, spatial. That is, viewpoint is most essentially about a perceiving entity's physical perspective on an event or scene. The metaphors used in some discussions of viewpoint (e.g. *viewing arrangement*, *camera angle*, *vantage point*) reflect that fact. The perceiving entity's physical perspective is thought to result in the use of certain linguistic devices, thus making a spatial system linguistic. Viewpoint can also

be extended to include representations of epistemic states – that is, a particular physical location (say, close enough to another entity to be able to hear it speak) can make one privy to information that other entities do not have access to. Viewpoint can thus involve knowledge. This fact is often salient when considering written texts, which have narrators who have points of view, and representations of characters' points of view, and so on. In short, the construct of viewpoint is applied to a wide range of phenomena, some of which are about physical locations and some of which are about much more abstract conceptual structures.

The study described here uses cues from a part of the language system that is non-linguistic, namely co-speech gestures. These gestures are intricately linked to speech, but are not governed by a grammar and are not symbolic. Because co-speech gestures are spatial, however, they can provide a bridge between viewpoint in the sense of a conceptualizer's location, and viewpoint in a more abstract linguistic sense.

In considering how viewpoint might be reflected in communicative behavior, it is helpful to consider the phenomenon as having three distinct dimensions: the real or imagined physical location of a conceptualizer (referred to as *conceptual* viewpoint), the linguistic manifestations of that location (referred to as *linguistic* viewpoint), and spatial cues to that location as seen in gesture (referred to as *gestural* viewpoint).

## 4.2 Conceptual viewpoint

Conceptual viewpoint can refer to a mental representation based on visual perception of a current physical location. For example, from my office window I can see the Cleveland Museum of Art, and I would use certain language in describing its location to you as a result of the visual angle I have. More often, however, viewpoint is about an imagined physical location. That is, I might need to describe the Cleveland Museum of Art to you while in California. Cognitive science has long had the apparatus to explain how humans generate mental images, and we know that mental images retain many of the properties of real visual images (Finke 1989; Kosslyn 1994). A mental representation of a visual scene may thus have an implicit or explicit viewing angle, just as a real visual scene does (Kosslyn 1994). Recent research suggests that mental images and motor programs are integral to using language – that is, language use involves running a mental simulation (a partial reconstruction) of what is being talked about (Tanenhaus *et al.* 1995; Kaschak and Glenberg 2000; Glenberg and Kaschak 2002; Zwaan *et al.* 2002; Richardson *et al.* 2003; Borghi *et al.* 2004; Gibbs 2005; Bergen *et al.* 2007). For example, describing a person walking around the Cleveland Museum of Art will involve generating mental images of the building and activating motor programs for walking. Simulations can vary in

viewpoint as well. One can simulate an event from the point of view of an actor in the scene or from a more distanced point of view (that of an observer).This distinction – between the point of view of an entity within the scene and that of an observer outside the scene – has received a fair amount of attention, and is thought to have fairly direct links to certain linguistic phenomena. I will return to this point below.

As noted above, conceptual viewpoint can be extended to include access to knowledge, because of the link between being physically present in a certain location and being privy to information. Thus, conceptual viewpoint can be understood as the way a language user is mentally simulating an event, and simulations may include mental images, motor programs, and representations of mental states (both the conceptualizer's own and those of other entities). Conceptual viewpoint can be assessed using behavioral measures (e.g. eye-tracking, response time). For example, Bryant and Tversky (1999) have shown that when people are presented with two-dimensional diagrams, they tend to take a point of view outside the scene. When presented with three-dimensional models, participants tend to take a point of view within the scene. This difference in viewpoint results in reliable differences in response time to questions about items contained within the scene.

Linguistic devices that mark viewpoint can be considered instances of *linguistic* viewpoint. Theoretically, linguistic viewpoint reflects conceptual viewpoint, if only partially or schematically. A great deal has been written about viewpoint in language. Several studies have investigated how reading certain kinds of texts results in taking a particular point of view (e.g. Taylor and Tversky 1996), or how shifts in viewpoint affect text comprehension (e.g. Black *et al.* 1979). In general, this research suggests that specific linguistic devices serve as instructions for how an event should be simulated during language comprehension or how it is being simulated during production. The following is a brief sample of linguistic elements in English that have been claimed to reflect viewpoint.

a. *Pronoun choice*: second person pronouns are more likely to induce readers to adopt a point of view inside the scene, while third person pronouns are more likely to induce readers to adopt an external point of view (Brunyé *et al.* 2009).
b. *Frequency of mention of a particular referent in the discourse*: a frequently mentioned referent is likely to be the locus of viewpoint (Chafe 1976, 1994).
c. *A referent serving as the origo for deictic elements*: *Cassandra came to Jane's house* as compared to *Cassandra went* . . . suggests that the locus of viewpoint is with Jane (Chafe 1994; MacWhinney 2005; Vandelanotte, this volume).
d. *A referent appearing with certain classes of verbs*: verbs describing psychological states (*think*, *believe*, *feel*, etc.), verbs of perception (*see*, *hear*, etc.),

quotatives/markers of direct speech (*said*, *was like*, *went*, *was all*, etc.), and others (Chafe 1976, 1994; Kuno 1987; MacWhinney 2005; Dancygier, this volume).

e. *Syntactic subject and word order*: a referent that appears frequently as the syntactic subject of utterances within the discourse is likely to be the locus of viewpoint (Chafe 1976, 1994; MacWhinney 1977, 2005). In languages like English, therefore, different syntactic structures (topicalization, clefts, passives) may function to permit flexibility in locus of viewpoint.

f. *Modals*, *counterfactuals*, *definiteness*, *reciprocal verbs*, *reflexives* . . . (Kuno 1987; MacWhinney 2005; Ferrari and Sweetser, this volume).

Links between linguistic markers of viewpoint and conceptual viewpoint can be established using experimental paradigms as well. Black (1979) has shown that making an element the subject of a sentence establishes that entity as the locus of viewpoint, and that participants' memory for events within a text is better if point of view is consistent across sentences. Brunyé *et al.* (2009) have shown that if participants are presented with a sentence describing a task with the pronouns *I* or *you* (e.g. *I cut the apple*, as compared to *he cut the apple*) they are faster at a picture verification task when the picture shows the task from the point of view of an actor as opposed to an observer. Patterns such as these suggest that, during comprehension at least, there are links between the conceptual and the linguistic.

The picture becomes more complex when one considers data from gestures produced along with speech. The hands and body can be used in ways that encode point of view (McNeill 1992), or *gestural* viewpoint. Gestural viewpoint has received far less attention, despite the fact that it is equally prevalent, and equally valuable in attempting to understand conceptual viewpoint. It is also important to note that some uses of the hands and body that encode point of view are actually instances of *linguistic* and not gestural viewpoint, namely certain phenomena in signed languages. In signed languages, the hands, body, and face can encode point of view, sometimes according to grammatical rules (in which case, such behaviors should be considered linguistic), and sometimes in a way that is gradient and not rule-governed (gestural behaviors). Despite the fact that there are close parallels between some of these phenomena and phenomena in co-speech gesture (Quinto-Pozos 2007; Casey and Emmorey 2009), gestural examples in the sign stream will not be considered here (but see Janzen's and Shaffer's chapters in this volume).

As with linguistic viewpoint, it is common for gestural viewpoint to suggest that the conceptualizer is taking a perspective either outside the scene or inside it. Gestures in which the speaker uses her hands or body as though she is a character in the narrative (e.g. pumping the arms as though running while talking about someone running) have been called character viewpoint gestures (McNeill 1992). Gestures in which the speaker traces a character's path or indicates a location as though observing from a distance have been called

observer viewpoint gestures (McNeill 1992). This basic distinction between an internal and an external point of view can be found in conceptual accounts (e.g. MacWhinney's (2005) work on perspective taking; Tversky and colleagues' work on spatial descriptions: Taylor and Tversky 1996; Bryant and Tversky 1999; Emmorey *et al.* 2000), in linguistic accounts (e.g. Langacker 1991), and in research on gesture and signed languages (see Parrill 2009 for a comparison of different terms researchers have used in this arena). The internal/external distinction is thought to reflect a real difference in simulation – that is, simulation from the point of view of an actor or from the point of view of an observer. This difference in simulation would entail differences in mental imagery and motor programs (see Hostetter and Alibali 2008; Parrill 2010, for more detailed discussions of this issue) and might recruit different cortical circuits (Ruby and Decety 2001).

Viewpoint is clearly a complex construct, and most models of viewpoint do not even attempt to account for gestural data. In the next section, I describe a model of linguistic viewpoint that is somewhat distinct from that presented above. I show how this model might deal with gestural viewpoint, and suggest that the relationship between conceptual and linguistic viewpoint can be better understood by considering evidence from co-speech gestures.

## 4.3 Viewpoint in the blending framework

A notion of viewpoint closely related to that presented above can be found in the *blending* or *conceptual integration* framework (Fauconnier and Turner 2002). According to the blending framework, conceptualization recruits a series of partially structured mental models, or *mental spaces*. Viewpoint can be seen as residing in one of these mental spaces, referred to as the *Viewpoint Space*. According to Fauconnier (1997), the Viewpoint Space is "the space from which others are accessed and structured or set up" (p. 49). Certain linguistic structures are seen as *space builders*: they prompt language users to construct new mental spaces, and may also trigger a shift in which space is the Viewpoint Space. For example, in direct speech (e.g. *the man said, I ate a lobster*) the quotative *the man said* prompts the listener to shift viewpoint from the mental space of the speaker's reality (called the Base Space), to the mental space of the referent described by *the man*, which I will call the Story Space. Because information is accessed directly from the Story Space, *I* refers not to the speaker, but to the referent of *the man*. (See Sanders and Redeker 1996, for further discussion.)

Such explicit space builders draw attention to the fact that viewpoint can shift from one mental space to another across clauses. Many of the phenomena listed above can be captured with the mental spaces framework. However, viewpoint shifts can also be the result of more implicit linguistic prompts. Under the rubric of *implicit perspective*, Sanders and Redeker describe examples where the use of the indefinite article indicates that viewpoint has shifted across utterances.

To condense their example: in a sequence like *I lost my cat. A neighbor found a cat with a red collar*, the use of *a cat* requires a shift to the point of view of the neighbor, who does not know to whom the cat belongs.

These more implicit cases are of particular interest when attempting to unify the Viewpoint Space with the more general notion of viewpoint presented above. When one considers an isolated utterance, these two approaches to viewpoint are not equally clear in their claims. Within the mental spaces framework, the Viewpoint Space in an utterance like *the man ate a lobster* would be the same as the Base Space – that is, viewpoint would reside in the narrator's reality. According to the more general account, however, the syntactic subject indicates that viewpoint is with the man, which would entail that the Viewpoint Space is the Story Space. Cases of implicit perspective seem to indicate that viewpoint should not be assumed to be in the Base Space in the absence of more explicit space builders. But linguistic data alone leave this question open.

Gesture serves as an indicator of viewpoint as well, and gestural viewpoint can reveal differences in *conceptual* viewpoint that are not apparent from speech – that is, gesture can indicate that the Viewpoint Space is the Base Space or an embedded space (a Story Space), even when speech is identical.

## 4.4 Gestural viewpoint in the blending framework

The meaning of a co-speech gesture is largely dependent on context provided by speech (McNeill 1992, 2005). For this reason, understanding viewpoint in gesture requires two levels of analysis: what is encoded in speech, and how speech shapes the interpretation of what is encoded in gesture. In addition, when gesturing, the hands typically represent something else. As a number of researchers have pointed out (Liddell 1998, 2003; Dudis 2004; Parrill and Sweetser 2004), this additional level of complexity can be fruitfully understood in terms of *Real Space* blends. Real Space blends involve a particular mental space, the Real Space. The Real Space is a conceptual model of a language user's immediate physical environment, including a representation of her own body (Liddell 1998). Real Space, in conjunction with other mental spaces, serves as an input to a blend. Blending is a general cognitive process that allows humans to take partial structure from various mental spaces and create new mental structures. A blend allows the Real Space articulators (hands, body) to map onto different entities.

### *4.4.1 Narrator Viewpoint*

When considering viewpoint in gesture, there are three basic possibilities for Real Space blends. First, the Real Space hand or body may map onto the narrator's hand or body. In Figure 4.1, the narrator produces a so-called *presenting*

Figure 4.1 Narrator Viewpoint gesture (speech: *then he goes up a flagpole or something*)

gesture, while describing the actions of a character in a story. This is a common metanarrative gesture that has a metaphoric interpretation: the speaker is presenting an object to the listener for inspection. That object is interpreted as a segment of discourse. The network of mappings that underlies this example is described in Parrill and Sweetser (2004). For current purposes, however, the important feature is that the Real Space hand of the narrator maps onto the narrator's own hand in the blend. In this case, we would say that the gestural viewpoint is with the narrator. Such gestures will be referred to as Narrator Viewpoint gestures. According to the mental spaces framework, the Viewpoint Space is the Base Space, which models the narrator's reality. The more general account of viewpoint would claim that the entity described by *he* is the locus of viewpoint. Gesture can resolve this inconsistency. The gestural data suggest that conceptual viewpoint really is with the narrator: the narrator's actions are interpreted with respect to the narrator's Base Space, not the Story Space. The blending framework captures this difference by having the connector between an element in the Base Space and its counterpart in the Story Space be an identity relation – that is, the narrator's gesture maps onto the narrator's own action of offering a metaphorical object. Narrator Viewpoint gestures can thus be understood as gestures in which there is an identity relation between a Real Space action and the narrator's own action.

### 4.4.2 *Observer Viewpoint*

The second possibility is for the Real Space articulator to map onto an entity in the Story Space (the reality of the story world). McNeill (1992) has called such gestures Observer Viewpoint (O-VPT) gestures. In Figure 4.2, the narrator's hand no longer maps onto the narrator's hand, but onto a character as a whole.

Figure 4.2 Observer Viewpoint gesture (speech: *then he goes up the flagpole*)

The motion of the hand maps onto the character's trajectory. Gestural point of view is no longer in the Base Space because the hand no longer represents the narrator's hand. The interpretation of the action performed by the hand relies on the Story Space. However, the narrator's viewpoint is still implicitly present. This can be seen from the fact that she is taking a particular visual perspective on the scene. Such cases are not unlike linguistic examples of indirect speech (e.g. *he said that he ate a lobster*): the narrator is responsible for the phrasing of the utterance, but the character (*he*) is responsible for the content (see Sanders and Redeker 1996). The blending framework captures this difference by having the connector between the utterance in the Base Space and its counterpart in the Story Space be a consequence relation, rather than an identity relation. Unlike an identity relation, which involves equivalency between two things (e.g. a description of an utterance and an actual utterance, a gesture and an actual event), a consequence relation involves some kind of re-representation, but no direct equivalence. The same can be said of the Real Space action and its counterpart in the Story Space. The presentation of the trajectory is the responsibility of the narrator, but the content is the responsibility of the character. Thus, Observer Viewpoint gestures can be described as gestures in which there is a consequence relation between a Real Space action and an action in a Story Space.

### *4.4.3 Character Viewpoint*

The third possibility is for a Real Space articulator to represent a character's own articulator. In Figure 4.3, the speaker uses her own body to depict actions

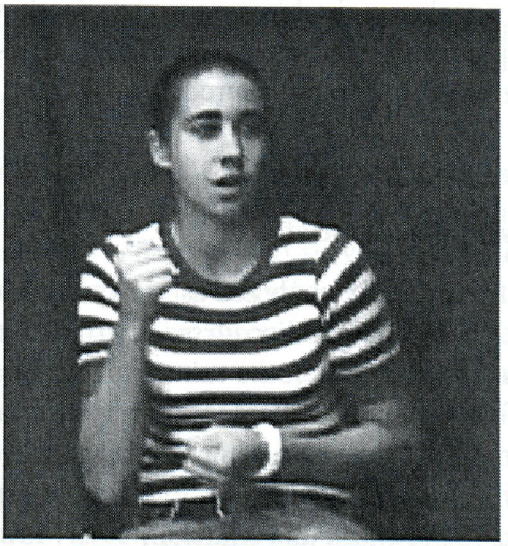

Figure 4.3 Character Viewpoint gesture (speech: *then he goes up the flagpole*)

of the character's body. Her hands map onto the character's hands and her torso onto the character's torso. McNeill (1992) has called such gestures Character Viewpoint gestures. Again, gestural point of view shifts from the narrator's space to a projected entity in the Story Space. In this case, the gestural point of view is the character's, rather than the narrator as an observer within the Story Space. Such cases are not unlike linguistic examples of direct speech (e.g. *he said, I ate a lobster*): the character rather than the narrator is responsible for both the phrasing and the content of the utterance (see Sanders and Redeker 1996). The blending framework captures this difference by having the connector between an element in the Base Space and its counterpart in the Story Space be an identity relation, rather than a consequence relation. Thus, Character Viewpoint gestures can be described as gestures in which there is an identity relation between Real Space action and an action in the Story Space.

### *4.4.4 Interim summary*

This discussion has glossed over a great many details, including the fact that narrators occasionally combine Character and Observer Viewpoint gestures simultaneously, creating Dual Viewpoint gestures (McNeill 1992; Parrill 2009). In the previous sections, I have attempted to show that gesture can indicate the locus of conceptual viewpoint. In the next section, I move from a general discussion of the interactions between conceptual, linguistic, and gestural viewpoint to the presentation of an experimental study. This study suggests that a conceptual variable known to have effects on linguistic viewpoint – namely, whether

information is shared between speaker and addressee – can also have effects on gestural viewpoint. This is precisely what we might expect if gestural and linguistic viewpoint have a common conceptual source.

## 4.5 Gesture complexity and discourse status

Many of the linguistic devices traditionally analyzed as viewpoint phenomena are sensitive to discourse status. The label *discourse status* can refer to a number of complex phenomena: in this chapter, the term refers to assumptions speakers make about what information is available and currently accessible to an interlocutor. These assumptions determine how entities in a discourse are linguistically encoded and how referring expressions are interpreted by addressees (Clark and Haviland 1977; Clark and Marshall 1981; Prince 1981; Clark *et al.* 1983; Birner 1994; Birner and Ward 1998; Clark and Krych 2004). For the current study, one general pattern is of particular importance. When information is shared, less linguistic encoding is typically used in referring to an entity (Givón 1979). For example, the first mention of an entity might involve a complex noun phrase with the indefinite article (*a rabbit wearing a red and grey baseball uniform*). After several mentions, a simple pronoun (*it*) might be used to refer to that entity.

This pattern can be observed in speech-accompanying gestures as well (Levy and McNeill 1992). The fact that gesture is also sensitive to discourse status has been demonstrated experimentally in both narrative (Parrill 2011) and non-narrative language (Gerwing and Bavelas 2004; Holler and Stevens 2007). These experimental studies have analyzed features such as gesture complexity, precision, and informativeness, but have not considered viewpoint. David McNeill, however, has hypothesized that character viewpoint should be used when information is maximally salient or newsworthy (McNeill 1992) – that is, Character Viewpoint gestures should correlate with moments in the discourse where complex linguistic structures are necessary (e.g. the complex noun phrase above). In an analysis of one narration, McNeill shows that gesture complexity increases with linguistic complexity, with character viewpoint gestures occurring only with complex forms such as clauses and verb phrases (McNeill 1992). The current study extends this work in three ways. First, an experimental rather than an observational approach is taken. Second, this study focuses specifically on shared knowledge, rather than looking at newsworthiness or salience more generally. Third, the study focuses on a specific event within a narrative, for which both character and observer viewpoint can plausibly be produced. This control is essential, as there are some events for which viewpoint does not vary, regardless of context (Parrill 2010).

## 4.6 An empirical assessment of gestural viewpoint

### *4.6.1 Participants and method*

Twenty-four University of Chicago students participated in the study for payment. All were native speakers of American English. Participants came to the experiment with a friend, who served as a listener. Each participant watched three cartoon stimuli and described them to his or her friend. Two were practice stimuli and will not be discussed further. The third (experimental) stimulus was a cartoon that a pilot study had shown would evoke both Character and Observer Viewpoint gestures. Participants watched the stimuli in one of two conditions: the *shared knowledge* condition and the *control* condition. In the shared knowledge condition, participants watched the stimuli with their friend. In the control condition, participants watched the stimuli alone. There were twelve participants in each condition.

If the addressee is present while the narrator watches a cartoon (as is the case in the shared knowledge condition), the narrator should be aware that the content of the cartoon is shared. If the production of Character Viewpoint gestures is impacted by the discourse status of the information a narrator is communicating, fewer Character Viewpoint gestures are expected in the shared knowledge condition.

### *4.6.2 Data and analysis*

The speech each participant produced when describing the experimental stimulus was transcribed. The accompanying gestures were also transcribed and coded by two independent coders, who were blind to the experimental condition and hypotheses. Gestures that did not relate to the cartoon content (e.g. metaphoric gestures produced to regulate the discourse) were excluded from this analysis. Coders sorted cartoon-relevant gestures into those in Character Viewpoint and those in Observer Viewpoint. Coders agreed on the viewpoint of 89 per cent of the gestures. Disagreements were resolved through discussion.

### *4.6.3 Results*

We first compared the mean number of gestures each participant produced. As shown in Figure 4.4, participants in the control condition produced more gestures than did participants in the shared knowledge condition (Mann-Whitney $U = 2$, $p < .0001$). This finding is in line with the general pattern discussed above: linguistic encoding tends to decrease when information is shared. As linguistic encoding decreases, so does gestural encoding. Because narrators in

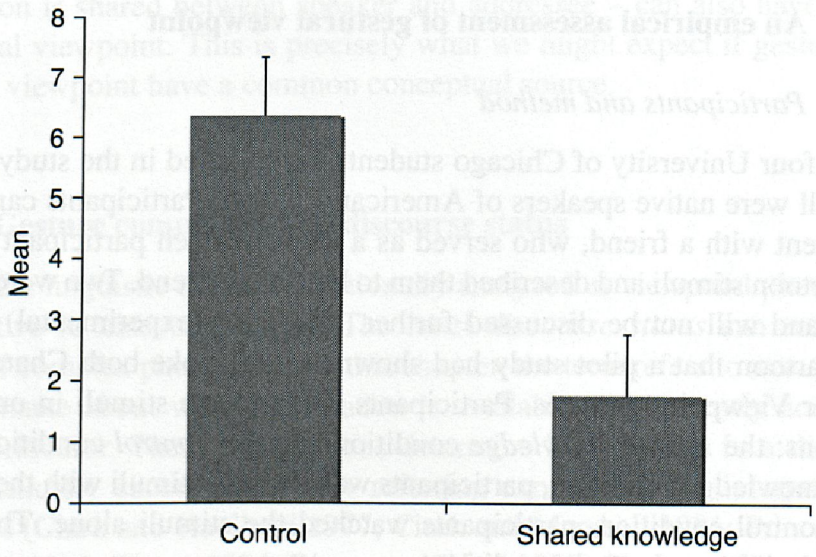


Figure 4.4 Mean number of gestures produced

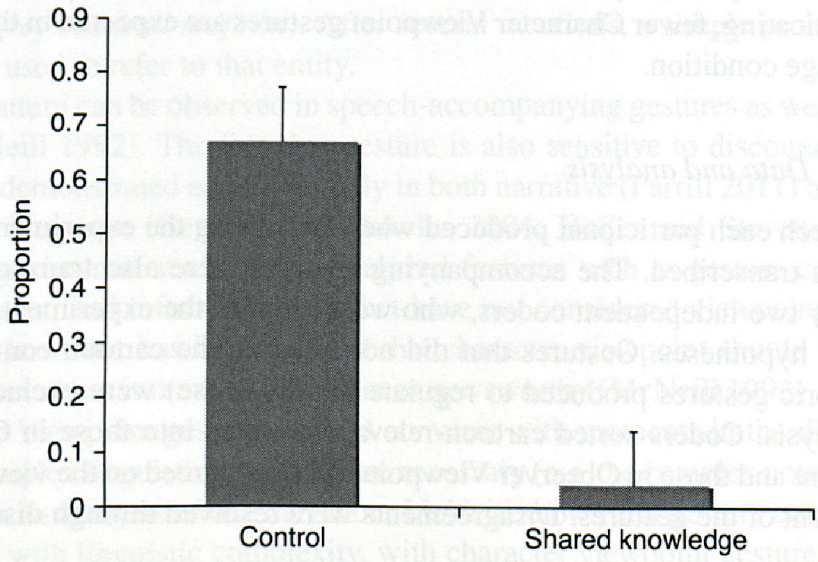


Figure 4.5 Mean proportion of C-VPT gestures produced

the control condition are gesturing more frequently overall, the *proportion* of each narrator's gestures that were in Character Viewpoint was used for a comparison across conditions. The mean proportion of character viewpoint gestures produced by participants in the control condition was also significantly higher (Mann-Whitney $U = 1, p < .0001$). This pattern is shown in Figure 4.5.

### *4.6.4 Discussion*

As predicted, narrators who were aware that their listeners shared knowledge about the content of their narration produced fewer Character Viewpoint gestures. This finding supports the claim that gesture complexity in general, and Character Viewpoint as a special case of maximal gestural complexity, changes as a function of discourse status.

The experiment presented here is a rather unsubtle way of manipulating discourse status. As a result, there are other possible interpretations for the pattern observed. For example, the control condition is a relatively normal situation, whereas the shared knowledge condition is less naturalistic. It may be that motivation was reduced or inhibition was increased in the latter condition. However, the important issue is whether there is an alternative explanation that accounts not just for the lower gesture rate in the shared knowledge condition (which might well be explained by decreased motivation), but also for the difference in the type of gesture produced – that is, there is no explanation for why Character Viewpoint gestures would be affected by motivation while Observer Viewpoint gestures are not.

## 4.7 Conclusions

This chapter has endeavored to accomplish two things. First, I have tried to provide a general picture of the world of viewpoint that takes into account viewpoint in both speech and speech-accompanying gestures. I have suggested that viewpoint is properly considered as three phenomena: conceptual, linguistic, and gestural. Conceptual viewpoint (how a language user simulates an event or scene) is largely hidden, accessible only via linguistic and gestural viewpoint (or behavioral or brain-imaging measures). In considering how these two indices of conceptual viewpoint interact, I have shown that differences among gestural manifestations of viewpoint can be profitably understood using the mental spaces framework. I have also argued that gestural viewpoint can reveal shifts in the locus of viewpoint that are not apparent from speech alone. Another possibility, of course, is that the two systems are distinct, and that gestural viewpoint does not tell us anything about the system governing linguistic viewpoint. In one sense, the two systems obviously *are* distinct. As McNeill (1992, 2005) has pointed out, language is sequential, symbolic, and analytic, while gesture is holistic and imagistic. It is therefore not unthinkable that a conceptualizer might have one linguistic perspective and another gestural perspective. But to assume that gestural viewpoint tells us nothing about linguistic viewpoint seems unwise for two reasons. First, a growing body of research indicates that language relies heavily on imagery and motor systems, the same systems that give rise to co-speech gestures. Second, gestural and linguistic

viewpoint appear to be impacted by some of the same variables. That is, the second goal of this chapter (in addition to providing an overview of viewpoint) was to provide some empirical support for the claim that gestural viewpoint and linguistic viewpoint share conceptual sources. This study has suggested that discourse status, a variable known to be central for selection of linguistic viewpoint, also impacts gestural viewpoint. While this study was not designed to show that the two factors were simultaneously influenced, work by Gerwing and Bavelas (2004) does show such yoked effects. Thus, gestural viewpoint should be considered when making claims about linguistic viewpoint, as both ultimately reflect conceptual viewpoint.

## References

Bergen, Benjamin, Shane Lindsay, Teenie Matlock, and Srini Narayanan. 2007. Spatial and linguistic aspects of visual imagery in sentence comprehension. *Cognitive Science* 31:5, 733–64.

Birner, Betty J. 1994. Information status and word order: An analysis of English inversion. *Language* 70:2, 233–59.

Birner, Betty J. and Gregory Ward. 1998. *Information Status and Noncanonical Word Order in English*. Amsterdam: John Benjamins.

Black, John B., Terrence J. Turner, and Gordon H. Bower. 1979. Point of view in narrative comprehension, memory, and production. *Journal of Verbal Learning and Verbal Behavior* 18:2, 187–98.

Borghi, Anna M., Arthur M. Glenberg, and Michael P. Kaschak. 2004. Putting words in perspective. *Memory and Cognition* 32:6, 863–73.

Brunyé, Tad T., Tali Ditman, Caroline R. Mahoney, Jason S. Augustyn, and Holly A. Taylor. 2009. When you and I share perspectives. *Psychological Science* 20:1, 27–32.

Bryant, David J. and Barbara Tversky. 1999. Mental representations of perspective and spatial relations from diagrams and models. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 25:1, 137–56.

Casey, Shannon and Karen Emmorey. 2009. Co-speech gesture in bimodal bilinguals. *Language and Cognitive Processes* 24:2, 290–312.

Chafe, Wallace. 1976. Givenness, contrastiveness, definiteness, subjects, topics, and point of view. In Charles N. Li and Sandra A. Thompson (eds.). *Subject and Topic*. New York: Academic Press, 27–55.

1994. *Discourse, Consciousness, and Time: The Flow and Displacement of Conscious Experience in Speaking and Writing*. University of Chicago Press.

Clark, Herbert H. and Susan E. Haviland. 1977. Comprehension and the given-new contract. In Roy O Freedle (ed.). *Discourse Production and Comprehension*. Norwood, NJ: Ablex, 1–40.

Clark, Herbert H. and Meredyth A. Krych. 2004. Speaking while monitoring addressees for understanding. *Journal of Memory and Language* 50, 62–81.

Clark, Herbert H. and Catherine R. Marshall. 1981. Definite reference and mutual knowledge. In Aravind K. Joshi, Bonnie L. Webber, and Ivan Sag. *Elements of Discourse Understanding*. Cambridge University Press, 10–63.

Clark, Herbert H., Robert Schreuder, and Samuel Buttrick. 1983. Common ground and the understanding of demonstrative reference. *Journal of Verbal Learning and Verbal Behavior* 226, 245–58.

DeLancey, Scott. 1981. An interpretation of split ergativity and related patterns. *Language* 57:3, 626–57.

Dudis, Paul. 2004. Body-partitioning and real-space blends. *Cognitive Linguistics* 15:4, 223–38.

Emmorey, Karen, Barbara Tversky, and Holly A. Taylor. 2000. Using space to describe space: perspective in speech, sign, and gesture. *Spatial Cognition and Computation* 26, 157–80.

Fauconnier, Gilles. 1997. *Mappings in Thought and Language*. Cambridge University Press.

Fauconnier, Gilles and Mark Turner. 2002. *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. New York: Basic Books.

Finke, Ronald A. 1989. *Principles of Mental Imagery*, Cambridge, MA: MIT Press.

Gerwing, Jennifer and Janet Bavelas. 2004. Linguistic influences on gesture's form. *Gesture* 4:2, 157–95.

Gibbs, Raymond. 2005. *Embodiment and Cognitive Science*. Cambridge University Press.

Givón, Talmy. 1979. From discourse to syntax: grammar as a processing strategy. In Talmy Givón (ed.). *Syntax and Semantics 12: Discourse and Semantics*. New York: Academic Press, 81–114.

Glenberg, Arthur M. and Michael P. Kaschak. 2002. Grounding language in action. *Psychonomic Bulletin & Review* 96, 558–65.

Holler, Judith and Rachel Stevens. 2007. The effect of common ground on how speakers use gesture and speech to represent size information. *Journal of Language and Social Psychology* 26:1, 4–27.

Hostetter, Autumn B. and Martha W. Alibali. 2008. Visible embodiment: gesture as simulated action. *Psychonomic Bulletin & Review* 15:3, 495–514.

Kaschak, Michael P. and Arthur M. Glenberg. 2000. Constructing meaning: the role of affordances and grammatical constructions in sentence comprehension. *Journal of Memory and Language* 43:3, 508–29.

Kosslyn, Stephen. 1994. *Image and Brain: The Resolution of the Imagery Debate*. Cambridge, MA: MIT Press.

Kuno, Susumu. 1987. *Functional Syntax: Anaphora, Discourse, and Empathy*. University of Chicago Press.

Langacker, Ronald W. 1991. *Concept, Image, and Symbol: The Cognitive Basis of Grammar*. Berlin: Mouton de Gruyter.

Levy, Elena T. and David McNeill. 1992. Speech, gesture, and discourse. *Discourse Processes* 155, 277–301.

Liddell, Scott. 1998. Grounded blends, gestures and conceptual shifts. *Cognitive Linguistics* 9:3, 283–314.

2003. *Grammar, Gesture, and Meaning in American Sign Language*. Cambridge: Cambridge University Press.

MacWhinney, Brian. 1977. Starting points. *Language* 53, 152–87.

2005. The emergence of grammar from perspective taking. In Diane Pecher and Rolf Zwaan (eds.). *Grounding Cognition: The Role of Perception and Action in Memory, Language, and Thinking*. Cambridge University Press, 198–223.

McNeill, David. 1992. *Hand and Mind: What Gestures Reveal About Thought*. University of Chicago Press.

2005. *Gesture and Thought*. University of Chicago Press.

Parrill, Fey. 2009. Dual viewpoint gestures. *Gesture* 9:3, 271–89.

2010. Viewpoint in speech-gesture integration: linguistic structure, discourse structure, and event structure. *Language and Cognitive Processes* 25:5, 650–68.

2011. The hands are part of the package: gesture, common ground, and information packaging. In Sally Rice and John Newman (eds.). *Empirical and Experimental Methods in Cognitive/Functional Research*. Stanford: Center for the Study of Language and Information, 285–302.

Parrill, Fey and Eve Sweetser. 2004. What we mean by meaning: conceptual integration in gesture analysis and transcription. *Gesture* 4:2, 197–219.

Prince, Ellen F. 1981. Toward a taxonomy of given-new information. In Peter Cole (ed.). *Radical Pragmatics*. New York: Academic Press, 223–55.

Quinto-Pozos, David. 2007. Can constructed action be considered obligatory? *Lingua* 117, 1285–314.

Richardson, Daniel C., Michael J. Spivey, Lawrence W. Barsalou, and Ken McRae. 2003. Spatial representations activated during real-time comprehension of verbs. *Cognitive Science* 27:6, 767–80.

Ruby, Perrine and Jean Decety. 2001. Effect of subjective perspective taking during simulation of action: a PET investigation of agency. *Nature Neuroscience* 4:5, 546–50.

Sanders, José and Gisela Redeker. 1996. Perspective choice and the representation of speech and thought in narrative discourse. In Gilles Fauconnier and Eve Sweetser (eds.). *Spaces, Worlds, and Grammar*. University of Chicago Press, 290–317.

Tanenhaus, Michael K., Michael J. Spivey-Knowlton, Kathleen M. Eberhard, and Julie C. Sedivey. 1995. Integration of visual and linguistic information in spoken language comprehension. *Science* 268, 1632–4.

Taylor, Holly A. and Barbara Tversky. 1996. Perspective in spatial descriptions. *Journal of Memory and Language* 35:3, 371–91.

Zwaan, Rolf A., Robert A. Stanfield, and Richard H. Yaxley. 2002. Language comprehenders mentally represent the shapes of objects. *Psychological Science* 136, 168–71.