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Gesture in Language

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Aliyah Morgenstern and Susan Goldin-Meadow

1 Introduction to Gesture in Language

From childhood to old age, our bodies move as they go about the mundane activities of our daily lives, resonating with our environment as we interact with others through actions, speech, sign, and gestures. The body is the existential basis of culture and perception (Bourdieu, 1977), and it is through the kinetic and multimodal coordination of our productions and our perceptions that we become fully cooperative participants within our own cultural community (Merleau-Ponty, 1972). In order to capture the full complexity of language, new approaches are needed to analyze all our semiotic resources as they are deployed in their natural habitat. This habitat involves the orchestration of bodies engaged in communicating through speech or sign and gestures.

The purpose of this edited volume is to focus on the forms, functions, and roles of gesture in language across the lifespan, as it is deployed in a multitude of skillful variations in the collective coordination of communicative bodies.

We examine the role of gesture over the lifespan in its complex interaction with language. We explore the forms and uses of gesture before, during, and after language development over the lifespan, and when there is more than one language in bilingual people and second-language learners. We thus investigate how gesture, language, and multimodal communication can be studied in relation to developmental time. Rather than view gesture in language as a stable phenomenon, as is usually done in large corpus studies relying on big data, our aim is to examine the relation between gesture and language both in time and over time. Most chapters target communicative development over multiple data collection points, either in naturalistic environments or in experiments conducted longitudinally with the same participants or cross-sectionally with participants of different ages. Some chapters also include the moment-to-moment unfurling of semiotic resources in a sequence, as in conversation analysis, which details the mutual adjustment of communication partners to each other's gestures, facial expressions, gaze, speech, or sign.

One of the aims of this book is to provide a forum for different perspectives on how gesture is related to language—should it be considered part of language or a distinct representational form produced along with language?

1.1 Approaches to Gesture in Language

Interest in gestures dates back at least to Cicero and Quintilian, who analyzed gesture as rhetorical vehicles of influence. They viewed gesture as a universal language, a view shared by Bonifacio, Montanus, and Bulwer in the 16th and 17th centuries,

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as reported by Kendon (2004). De Jorio, one of the scholars who studied gestures in the 19th century, focused on continuities over time between gestures used in antique Greece and those used by his Neapolitan contemporaries. By contrast, in the 20th century, Efron (1941) rekindled scholars' interest in gesture by studying differences across cultures. Authors representing a wide range of fields, including biology (Darwin, 1877), philosophy (Wittgenstein, 1953), psychology (Goldin-Meadow, 2003; Kendon, 2004; McNeill, 1992; Wundt, 1912), anthropology (Haviland, 1998; Jousse, 1974), and linguistics (Calbris, 1990; Cienki, 2012; Müller, 2009), have contributed to creating a new and exciting scientific domain.

The debates about the links between gesture and language were stirred by the challenging title of McNeill's paper "So You Think Gestures Are Non-verbal" (1985). The dominant view at the time clearly dissociated gesture and language (Ekman & Friesen, 1969), as opposed to the seamless integration suggested in the late 19th century and early 20th century by authors such as Darwin (1877) and Wundt (1912). Gesture studies were given new life and propelled forward by McNeill's 1992 monograph. Thanks to McNeill, gesture was reappraised as a necessary and valuable object of study for psychologists and linguists. He presented speech and gesture as an integrated system that expresses two different types of thought (imagistic vs. propositional).

Despite his focus on the importance of gesture, McNeill still viewed gesture as having a different representational form from language. He described gestures as holistic and imagistic on-the-spot creations by speakers and language as conventionalized and categorical forms that must be learned. As Müller (2018) explained (supported by Goldin-Meadow & Brentari, 2017), this difference could be a consequence of their focus on spontaneously used gestures that are neither lexicalized nor conventionalized.

Kendon (1980), whose work had not yet been widely read but had influenced McNeill, described gesture and speech as "two aspects of the process of utterance" (p. 207). Kendon demonstrated the integration of gesture and speech by studying the temporal alignment of gesticulation and spoken units. Kendon also studied sign languages in Central Australian Aboriginal speech communities (Kendon, 1989), which inspired McNeill's (1992) formulation of "Kendon's continuum" (McNeill, 1992, p. 37). Gestural phenomena are ordered according to their degree of conventionality (among other parameters):

Gesticulation > Language-like gestures > Pantomime > Emblem > Sign language

Gesture for Kendon included the entire range of kinesic forms and functions, from gesticulation (i.e., spontaneously created forms encoding meaning in a holistic fashion) to emblems and signs. This continuum, in which emblems and signs are the most lexicalized/linguistic/symbolic, takes into account the presence or absence of coarticulated speech with gestures. However, as shown by Müller (2018),

"Kendon's continuum" does not do justice to Kendon's strong views about the historical continuity between spontaneously created singular gestures and standardized manual forms that function like words (signs). These views are in line with Wilcox (2005, 2007), who documented grammaticalization of gestures into sign in American, Catalan, French, and Italian Sign Languages. Note, however, that here we are talking about change over historical time. McNeill focused on processing change over momentary time.

Kendon (2004) also examined processing and, in these analyses, showed how gestures are integrated in the vocal utterance and used like words by making detailed analyses of conversational data and its "mixed syntax" (see Slama-Cazacu, 1976, who coined the term). These multimodal structures have been referred to as "multimodal grammatical integration" (Fricke, 2013), "composite signals" (Clark, 1996), "composite utterance" (Enfield, 2009), or, when referring to child language, "multimodal constructions" (Andrén, 2010; Morgenstern, 2014).

Gesture studies are now a dynamic emerging field in which scholars take different theoretical approaches and apply a variety of methods to the study of what Kendon (2004) called "visible action as utterance." Utterances may be constructed from speech, from gesture, or from combinations of both. Nevertheless, McNeill's (1992) original point still stands—gesture and language form an integrated system, but make use of different representational formats to do so.

This book deals with all types of gestures. *Emblems* are the most lexicalized and conventional, and can be used with or without speech. *Gesticulation* co-occurs with speech and is typically categorized into several types: *iconic* or *representational gestures*, which are the least conventional and the most imagistic, expressive, and individualized gestures; *deictic gestures* (including pointing), which index the objects, people, and places to which they refer; *beat gestures*, which play a prosodic role as they structure and punctuate the flow of speech; and *pragmatic gestures* (also called *recurrent gestures*, Ladewig, 2014), which have a high degree of conventionality and are used to regulate conversation.

Gesture theories vary with respect to their view of the relation between language and gesture, and this variability may go hand-in-hand with the type of gesture that is the focus of the theory. Kendon (2004) has studied gestures that accompany speech, as well as sign languages used in place of speech, and considers both types of behaviors to be visible action. In contrast, Singleton et al. (1995; see also Goldin-Meadow et al., 1996) made a clear distinction between co-speech gesture and language, both sign language and spoken language. They focused on representational and deictic gestures, which display either concrete or abstract properties of their referents. One reason to make a distinction between these types of gestures and the language (speech or sign) they accompany is that a mismatch between the information conveyed in gesture and the information conveyed in the accompanying language has cognitive implications—speakers who produce gesture–speech mismatches when explaining a task are ready to learn that task, and are more likely to

profit from instruction on the task, than speakers who produce only gesture–speech matches (Alibali & Goldin-Meadow, 1993; Breckinridge Church & Goldin-Meadow, 1986; Goldin-Meadow, 2003; Perry et al., 1988). The same holds true for signers who produce gesture–sign mismatches (Goldin-Meadow et al., 2012). Under this view, it is essential to make a distinction between gesture and language in order to detect mismatch between information conveyed categorically (i.e., in language—speech or sign), and information conveyed imagistically (i.e., gesture; see Goldin-Meadow & Brentari, 2017).

Other scholars insist on the tight links between action, gesture, and language, and how the gestural modality can take on linguistic properties (Capirci et al., 2005; Capirci & Volterra, 2008; Goodwin, 2017; Morgenstern et al., 2018). Following this perspective, in some studies, gestures are considered part of language, especially when the focus is on recurrent, pragmatic gestures or emblems (Ladewig, 2014; Morgenstern, 2014). Pragmatic gestures are culturally shared and grounded in conventionalized and embodied experiential frames. They are the product of experiences that have resulted in recurrent multimodal scripts over different time frames: over the history of a community of users who share a culture and a language (historical time), over each individual's development (ontogenetic time), and over time spent with interactional partners from one moment to the next in the course of one conversation or repeated conversations with many interactional partners (conversational time). These gestures may indeed have become fully conventionalized and, thus, part of language (see also Boutet, 2010, who made the same argument about beats and iconic gestures, which he argued are sketches of emblems).

Cienki (2012) proposed a widely integrated view of language. For hearing adults, speech is the default medium for expressing and sharing ideas. But other behaviors, including actions, object manipulations, nonlexical sounds, prosodic patterns, facial expressions, and gestures, may acquire symbolic or communicative value according to the affordances of the context. In Cienki's theory, language has flexible boundaries—the body segment used to communicate meaning is determined by the context, interlocutor, availability of the body parts in the situation, and activity. A meaning can migrate from one body part to another: if hands are not available, shoulders can be used, or head or both or speech, and if the rest of the body is engaged in another activity (e.g., cooking), a mouth shrug or a frown will suffice. A family of meanings is thus dynamically paired with a family of forms. An important question to explore is when and how meaning migrates from speech or sign to other body parts, and whether we can find regularities in this process.

In order not to prejudge the issues of how gesture and language relate to one another, we have chosen the title *Gesture in Language*, and we hope that this book leads to informed and informative discussions of the question.

1.2 Methods

Different methods have been used to study gesture in language across the lifespan, using either naturalistic or experimental data. Both types of methods are essential in moving forward our understanding of how gesture and language work together to create meaning.

1.2.1 The Naturalistic Approach

Adam Kendon (2004), inspired by David Efron (1941) and Wilhelm Wundt (1912), made a plea for studies of gesture in context. In grounded situations where bodies in movement interact, using multimodal approaches to language (Morgenstern, 2014) has the potential to transform not only gesture studies but also linguistic theories. Linguistic theory has long been focused on *langue* [language] and on written texts rather than *parole* [speech] (de Saussure, 1959), which in Cienki's (2012) view can include gesture as a "relevant behavior."

Video-recording tools have advanced the detailed analysis of the organization of human action and interaction (Mondada, 2019). Although the recorded sessions represent only a small portion of the participants' lives, those snippets can help us capture sediments of their past experiences, as they are reactivated in their daily activities and exchanges—what we could call their "habitus," as defined by Husserl (1931). The recorded sessions index multiple dimensions of broader interactional–linguistic practices that can be replayed, transcribed, coded, and thoroughly analyzed over and over, from a variety of perspectives.

Not only can gesture be coarticulated with speech (and sign [Lu & Goldin-Meadow, 2018], even though sign languages are themselves compositional) and coarticulated with gaze, facial expressions, and posture, but each gesture produced with one of the upper limbs is potentially composed of movements of the shoulder, arms, forearms, hands, and fingers, and is often coordinated with the movements of the other upper limb. By studying gesture in its ecological environment in interactive situations, we put a lens on the fine and complex orchestration of all our body segments and our multilinear way of expressing meaning. But each speaker's body is also coordinated with other interacting bodies, as well as with manipulable objects, during daily activities. The materiality of the body has always had the potential to shape our environment, our tools, our objects, and the spaces we inhabit (Leroi-Gourhan, 1993). By adopting a naturalistic approach, researchers can capture language in its environment and articulate its actional roots and symbolic functions. Multimodal analyses of language (Cienki, 2012; Morgenstern, 2014) informed by moving bodies might, in turn, transform our linguistic theories.

Child language research is one of the first fields in which spontaneous interaction data have been systematically collected, initially through diary studies (Ingram, 1989;

Morgenstern, 2009), and later through audio and video recordings shared worldwide, thanks to the CHILDES project (MacWhinney, 2000). Research in language acquisition has developed tools, methods, and theoretical approaches to analyze children's situated multimodal productions, as they provide evidence for links between motor and psychological development, cognition, affectivity, and language (see Morgenstern, Chapter 3, this volume, for a more detailed presentation). Longitudinal interactive data collected in home environments require the researchers' involvement in data collection and analysis over a long period of time. This process creates a useful familiarity with the participants and the situations. It allows observers to annotate various kinesic features of the gestures and identify their meanings based not only on form but also on context and speech.

However, the analysis of naturalistic data can be tedious and costly, and it provides only a small sample of communication around and with children or among adults in everyday life. Nor can naturalistic data provide compelling insight into cause. Other methods are therefore necessary to capture gesture in language throughout the lifespan.

1.2.2 The Experimental Approach

Experimental methods are essential to convincingly address certain questions. For example, naturalistic data are particularly difficult to work with if we are interested in children's language comprehension. A child who brings two sneakers back in response to mother's request to "Go upstairs and get your sneakers" may understand the plural "s" form. But it's just as likely that the child understood the word "sneakers," and sneakers typically come in pairs. Finding just the right naturalistic situation in which the child is relying on linguistic form to respond appropriately is difficult. But it is relatively easy to set up experimental situations to test particular linguistic constructions (see, e.g., Fraser et al., 1963; Johnson et al., 2005; Goldin-Meadow et al., 1976). These situations are essential to determine which linguistic forms a child understands and whether adding gesture makes it more likely that the child will respond appropriately to those forms.

Experimental methods can also be used to complement naturalistic methods. For example, Motamedi et al. (2020) asked how children learn associations between words and meanings in their early language development. They hypothesized that because onomatopoeia (e.g., *knock*, *meow*) evokes imagery of the referent, it has the potential to bootstrap vocabulary acquisition when referents are present, and when they are absent. Using naturalistic observations of caregiver–child interactions, the authors explored whether onomatopoeia is, in fact, used in caregivers' speech to children and under what conditions. Using experimental data, they tested whether children can learn from onomatopoeia. The authors found that onomatopoeia is present in child-directed language, most often at the early stages and when the referent

of the intended word is absent. They also found that children learn onomatopoeic word forms more easily than nononomatopoeic word forms. Together, the data from naturalistic and experimental situations combine to give us a more complete picture of early word-learning. Using both naturalistic and experimental studies of caregivers' use of gesture to young children will help us determine whether gesture plays a role in word learning.

Experimental evidence is best when used in conjunction with naturalistic data. We can generate hypotheses on the basis of naturalistic data and then test those hypotheses on experimental data. For example, English-speaking children ages 2½ to 3 years tend to put agents in the first position of their sentences and patients in the second position. On the basis of these naturalistic data, we hypothesize that children use animacy categories as the basis for their early ordering patterns. However, in the real world, agents tend to be animate and patients tend to be inanimate. As a result, the young child's ordering bias could be based on animacy categories (animate/inanimate), rather than semantic role categories (agent/patient). To distinguish between these two hypotheses, we need situations in which an inanimate object is playing an agent role and animate agent is playing a patient role. But these situations rarely arise in the child's world. To solve this problem, we turn to experimental data—we present children with these relatively artificial situations and ask them to talk about what happened. When we follow this plan, we find that children put inanimate objects in first position of their sentences when they play agent roles and animate objects in second position when they play patient roles (Angiolillo & Goldin-Meadow, 1982), confirming the hypothesis that children base their early ordering patterns on semantic role categories. We thus need experimental evidence to be convinced that children talk about the role an entity plays independent of its animateness and that they use role-defined categories like *agent* and *patient* to communicate these relational intentions.

As a second example from the field of gesture studies, researchers have found in longitudinal naturalistic studies that children's early gestures predict the size of their vocabularies several years later (e.g., Rowe & Goldin-Meadow, 2009). But the naturalistic data cannot tell us whether the act of gesturing plays a causal role in increasing the size of a child's vocabulary or merely reflects skills that are themselves responsible for the increase. To test this hypothesis, we need to experimentally manipulate a young child's gestures early in development and examine the child's spoken vocabulary at some later time. LeBarton et al. (2015) did just that, instructing only some children to point at objects in a picture book. Two months later, after 7 weeks of at-home experimental sessions, children who were instructed to point not only produced more pointing gestures when interacting with their parents than children who were not told to point, but they also produced more different spoken words. It is impossible to test a causal theory about gesture's role in language learning without experimental data. As an aside, it is worth noting that LeBarton et al. conducted their study in the children's homes—experimental studies need not be conducted in the lab.

1.3 Analyzing Gesture Across the Lifespan

This volume examines gesture over the lifespan by considering three developmental periods because there is evidence that gesture plays a different role during each period. Early in development, most children go through a time when they are able to communicate with others using gesture, but do not yet use speech (Goldin-Meadow, 2015)—gesture is their primary means of communication. During this period, children produce a variety of gestures that engage others in interaction. For example, they hold up or point at an object in order to bring attention to it; they extend an object in order to get their communication partners to take it and perhaps act on it; they extend an open palm to request an object. Children also produce conventional emblem gestures, which enter their repertoire either through everyday playful scripts or songs and nursery rhymes, such as "bye-bye" (waving hands), "peek-a-boo" (playfully hiding face with hands), "bravo" (clapping hands), "*ainsi font font font les petites marionnettes*" (a French song that is accompanied by hand gestures representing puppets). Emblems derive from the culture in which children are being raised and have very strong social and symbolic values.

Early gesture sets the stage for the language that is to come. Indeed, De Laguna (1927) noted that "in order to understand what the baby is saying you must see what the baby is doing" (p. 91). More recently, Zlatev (1997) suggested that sensorimotor schemas provide the "grounding" of language in experience and will then lead to children's access to the symbolic function. Infants' imitation and general production of gestures has been studied as a precursor to constructing prelinguistic concepts, as a pathway into the symbolic function of language, and as a bridge between language and embodiment. Gestures are viewed as representational structures, often constructed through imitation, which are enacted overtly and can be shared with others.

During the next period, children begin to produce single words, initially on their own and then eventually combined with gesture. Gesture-plus-word combinations mark the child's transition to a system in which gesture and speech are integrated both temporally and semantically. Prior to this point, children do produce gestures along with sounds, but those sounds are not coordinated with the stroke of the gesture, that is, they are not temporally integrated with gesture. But when children begin to combine points with meaningful words, the word *is* produced on the stroke of the gesture, heralding the onset of a semantically and temporally integrated gesture–speech system (Butcher & Goldin-Meadow, 2000). Gesture has begun to share the stage with speech/sign and must be described in relation to language. During this period, gestures (particularly pointing gestures) may be functioning like words, as they often take the place of words (e.g., the child points at his mother's hat and says "mama" to indicate who owns the hat; the point substitutes for the word "hat"). Indeed, using two modalities for two different semantic elements systematically precedes the onset of two-word speech by about 3 months (Goldin-Meadow & Butcher, 2003; Iverson & Goldin-Meadow, 2005; Özçalışkan & Goldin-Meadow, 2005). Although adults do,

at times, produce gestures (particularly emblems) that stand in for a word, for the most part, adult gesture conveys information in a mimetic form that complements the categorical information conveyed in speech/sign (McNeill, 1992). Children thus have several steps to take before they achieve the gesture–speech system used by adults.

The third period is after language is mastered and gesture has the potential to be integrated with language, as it is in adults. Gesture is a lifelong behavior, used in combination with vocal productions by all adults (H. Marcos, 1998). Pointing not only remains functional but also diversifies in form and function as children become skilled multimodal conversationalists, and continues to be used by both adult speakers and signers (Fenlon et al., 2019). Once speech has been mastered, children can use their gestures not to acquire speech, but along with speech, as adults do. Gesture and speech (or sign) work together throughout childhood and old age. Age-related decline in motor control is due to modifications in the central nervous system (Ketcham & Stelmach, 2001). The decline in motor control has an effect on everyday life and might also have an effect on the production of co-speech gestures. Older adults might also benefit from seeing others produce gesture as their hearing declines. Analysis of the use of gesture at the end of the lifespan can thus inform theories of language production and comprehension across the lifespan.

If gesture is learned in relation to the language that the child is acquiring, what happens if two languages are learned? Studying second-language acquisition allows us to explore how gestures can change in connection to language development. There is evidence that the lower the proficiency in a second language, the greater the number of gestures (Nicoladis, 2007). Bilingual people also use more gestures when they speak in their weaker language (Benazzo & Morgenstern, 2014; L. R. Marcos, 1979). In addition, languages with different language conceptualization might be complemented by different co-speech gestures (Kita & Özyürek, 2003). Studies on the use of gestures in language teaching can also be useful to understand the role of gesture in learning a second language.

We use this developmental framework to organize the chapters in this volume.

1.4 Overview of the Volume

The volume is organized in five parts. Part I focuses on the most studied gesture in the literature and a foundational communicative tool: pointing (following Kita's seminal overview, 2003), which brings together issues on the (dis)continuities between gesture and sign. We chose to begin with an exploration across space and cultures in adults before turning to the beginning of the lifespan. In Chapter 2, Cooperrider and Mesh take us on a fascinating voyage around the world, as they synthesize the many uses of pointing in gesture and sign with specific details on forms and functions across cultures. Their chapter nourishes the larger debate on similarities and differences between gesture and sign. In Chapter 3, Morgenstern takes us back to the

roots of multimodal language through an overview of the literature on early pointing, its integration in speech and sign, and the role of the adult. She then illustrates the range of uses drawing on detailed analyses of a collection of interactive sequences from longitudinal data. She analyzes pointing gestures from their various functions when used in isolation in interactive contexts to the use of multimodal constructions combining gesture, gaze, and speech. This section illustrates how one type of gesture, pointing, is a central tool across cultures and throughout the lifespan, and how it can be used productively to "refer to and conjure up visible and invisible, present and absent, actual and imaginary entities and events" (Chapter 3, this volume, p. 82).

Part II is centered on early gestures before children have fully entered language. Chapter 4 authors Rowe, Wei, and Salo clearly distinguish gesture and language, and explain how early gesture predicts later language development. They first present the various types of relations between gesture and language skills across children's early communicative development, and then show how gesture has the potential to reveal children's social cognitive skills. They carefully unravel the links between specific types of gestures and specific language skills, and show how analyzing early gestures may provide a better understanding of how children learn language. In Chapter 5, derived from their team's extensive research devoted to gesture, sign, and language development, Capirci, Caselli, and Volterra present a different view of the relation between gesture and language, focusing on the period between the end of the 1st year and the end of the 2nd year. They trace continuities between actions, gestures, and words, and emphasize the role of caregivers as they scaffold children's entry into symbolic meaning. They focus particularly on different categories of gestures derived from children's handling of objects. Their aim is to illustrate how language is grounded in an array of cognitive skills that are manifest in the analysis of early gestures within children's intentional and meaningful communication with their caretakers.

In Part III, the authors illustrate how gesture can be used in coordination with speech to form a system or facilitate language use. In Chapter 6, Clark and Kelly pursue the double aim of laying the foundations of the field and describing children's early multimodal communicative system. Through a historical overview of the field of language development and relevant illustrations, they highlight the role of adults and show how children's early gestures and words form an integrative communicative system that continues to be used, even once they have started producing multiword utterances with more complex multimodal constructions. In Chapter 7, Beaupoil-Hourdel's study is centered on co-speech gestures between the ages of 3 and 4 years. The combination of quantitative and detailed qualitative analyses of longitudinal data video (recorded at home) illustrates how children progressively learn to deploy all the semiotic resources at their disposal to convey negation and opposing stance through complex multimodal constructions. She focuses on co-speech gestures and how children can rely on the moment-to-moment interactive process with others and within a sequence to unfurl complex meanings. Chapter 8 authors Hall, Wakefield, and Goldin-Meadow emphasize the power of gesture in language-learning, with

a focus on verb learning. Using an experimental paradigm, they demonstrate how gesture—either the gestures children see others produce or the gestures they themselves produce—can help children overcome the challenges of verb learning. Gestures' unique representational properties lay the groundwork for children not only to learn verbs, but also to generalize those newly learned verbs to appropriate contexts.

Part IV is dedicated to the use of gesture after language has been mastered, from older children to adults. In Chapter 9, Coletta analyzes the codevelopment of gesture and monologic discourse. He asserts that "gesture contributes to the full meaning of the bimodal utterance, thanks to its pragmatic, indexical, imagistic, and structuring properties" (p. 205). The chapter reviews his unique scientific contribution to describing older children's multimodal and narrative skills in studies conducted over the past 20 years. On the basis of a large range of findings, he discusses the relation between gesture and speech over time and how gesture scaffolds children's social, discursive, and narrative skills. In Chapter 10, Wagner Cook presents candidate processes underlying gesture production and perception, and explores how these processes are used over the lifespan. She argues that uncovering the mechanisms of gesture production will require studying gestures in complex communicative situations, as they are flexible behaviors that serve a variety of functions. She proposes the use of a range of methods and approaches to capture gesture's specific features according to its use and combinations with speech/sign. Chapter 11, by Göksun, Özer, and Akbıyık, is about gesture and the aging brain. They address how the decline in cognitive skills can affect gesture, whether gesture use can help improve speech problems, and how aging adults with neurodegenerative disorders use and comprehend gesture. They discuss the implications of these studies for understanding the interaction between speech and gesture. They demonstrate that additional studies on elderly adults' language and communicative skills are needed to have a better grasp of the mechanisms underlying gesture in language.

Part V includes three chapters on the use of gesture with more than one language. In Chapter 12, Nicoladis and Smithson present an extensive overview of gesture in bilingual language acquisition and highlight the impact of both cognitive and cultural factors. As bilingual people tend to have lower verbal abilities in their weaker language, some authors have predicted that they would use more gestures than monolingual people, particularly when speaking their weaker language. However, some studies have not confirmed this hypothesis. At the cultural level, bilingual people might be expected to differentiate their gestures according to the language they are using. The authors show that the same gestures (convergence) are often used by bilingual people in both of their languages. They support their argument by describing gesture use in bilingual children and adults. They propose that there might not be significant age-related changes in bilingual speakers' use of gesture. In Chapter 13, Gullberg grounds the concept of convergence by showing how languages interact in multicompetent language users' speech and gesture. The chapter illustrates how languages do not exist in isolation. When languages come into contact, cross-linguistic influence

impacts gesture. The chapter promotes "a bimodal view of language in which speech and gesture are partners" (p. 317). The volume closes with Chapter 14, in which Stam and Tellier highlight the role of gesture in second-language learning and teaching. They posit that the study of verbal language only provides a partial picture of second language acquisition. Gesture is a powerful medium of communication in contexts of asymmetrical language proficiency, as between a native and nonnative speaker or between a learner and a teacher. As in first-language acquisition, gesture is used by experts to facilitate comprehension and to scaffold communication with novices, who themselves deploy their multimodal semiotic resources to express their communicative intent. The chapter highlights the importance of using pedagogical gestures in second-language teaching and demonstrates the value of analyzing kinesic activity in the classroom with both experimental methods and naturalistic data.

The detailed overviews and studies presented in this volume are a tribute to the role of gesture in language across the lifespan. We have, of course, given only a partial picture of the variety and complexity of the issues at stake, but we hope we have demonstrated that gesture studies form a vibrant, rich, and complex field of research that demands attention.

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I An Emblematic Gesture: Pointing

Kensy Cooperrider and Kate Mesh

2 Pointing in Gesture and Sign

2.1 Introduction

Human communication is composite (e.g., H. H. Clark, 2016; Enfield, 2009; Ferrara & Hodge, 2018; Holler & Levinson, 2019). It involves the voice, face, hands, and the rest of the body. It integrates categorical elements and gradient ones, highly conventional and ad hoc forms, and both arbitrary symbols and motivated signals. This is true of spoken communication, and it is true—in equal measure—of signed communication. Both speakers and signers stitch these different types of components into a seamless whole. Some of these components are historically considered a core part of language, others marginal, and still others are thought to be something else entirely—gestural, expressive, paralinguistic (see, e.g., Dingemanse, 2018; Goldin-Meadow & Brentari, 2017; Müller, 2018). Regardless of whether one considers the language/nonlanguage divide fundamental, fuzzy, or fictitious, there is widespread agreement that certain communicative phenomena haunt the boundaries in ways that prove revealing. Chief among these are cases where both speakers and signers make use of the same bodily raw material, but in putatively very different ways: flashes and furrows of the brow; imitations of actions; depictions of size, shape, and arrangement. Here, we analyze one of these similar-looking forms in detail: *pointing*. The case of pointing shows, first, how a single semiotic tool can be put to many uses and, second, how speakers and signers use this tool in some ways that are similar and other ways that are different.

Pointing is an especially powerful and pervasive tool in the semiotic kit, used across the lifespan, across cultures, and across contexts. It's a major way that humans coordinate attention, anchor words to the world, and build common ground with each other. Following others, we here define *pointing* as a bodily movement toward a *target*—someone, something, somewhere—with the intention of reorienting attention to it (Eco, 1976; see also Cooperrider et al., 2018; Kendon, 2004). Often this gesture is done with the index finger—a preeminently "pointy" articulator that projects an imaginary vector, but it can also be done by tossing the head, pursing the lips, or extending a machete, among other ways. Pointing is a means of *indicating*—that is, of establishing attention to something by creating a spatiotemporal connection to it (Peirce, 1940; see also H. H. Clark, 2003). It is not the only way of indicating; one can also pat something or hold it up for inspection (H. H. Clark, 2003). Indicating, in turn, is one of the three major methods of meaning-making that humans have, along with *depicting* (i.e., using iconic representations) and what is sometimes called *describing* (i.e., using symbolic resources; H. H. Clark, 2003, 2016; Enfield,

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2009; Ferrara & Hodge, 2018; Peirce, 1940). (The term *symbolic* is used in many ways in linguistics and cognitive science, but here refers to meaning conveyed by rule or convention, e.g., that a green traffic light means "go.") On purely theoretical grounds, then, pointing is a basic building block of communication (Kita, 2003b). And so it is on empirical grounds, too. Pointing is an early-emerging communicative act—among the earliest, in fact (see Morgenstern, Chapter 3, this volume)—and it is found universally in both spoken and signed communication (Kendon, 2010; Kita, 2003b; Morgenstern, 2014; Pfau, 2011).

Unsurprisingly, this elemental gesture has attracted the attention of both gesture researchers and sign language linguists. However, scholars in these two traditions have looked at pointing through different lenses and have gravitated toward different aspects of it. Gesture researchers, for example, have usually treated pointing as an adjunct to language but not really part of it; sign researchers, in contrast, have often treated pointing as a core part of sign language grammar rather than as a separate, gestural component (e.g., Meier & Lillo-Martin, 2010). These differing frameworks and foci contribute to an impression that—superficial similarities notwithstanding—pointing gestures and pointing signs are, deep down, fundamentally different. Recently, however, there has been a new push to compare pointing gestures and pointing signs directly, using similar data sets and similar analytical criteria. These direct comparisons underscore the fact that pointing gestures and pointing signs share many commonalities, and help sharpen our understanding of where exactly the differences lie.

Pointing may be a basic, foundational communicative tool, but—as we emphasize here—it is also a multifarious one. We thus examine pointing in all its formational, functional, contextual, and cultural variety. We begin by looking closely at the major foci of research on pointing in gesture studies (Section 2.2) and in sign language linguistics (2.3). We then review recent efforts to directly compare the two (2.4). A major refrain throughout is that, contrary to its assumed simplicity, pointing is multiform and multifunctional in both gesture and sign.

2.2 Pointing Gestures

Though there is a rich tradition of research on pointing in children (e.g., Bates, 1976; Cochet & Vauclair, 2010; Tomasello et al., 2007; see also Morgenstern, Chapter 3, this volume), research on adult pointing gestures has been more sporadic and diffuse. It has originated from diverse disciplinary quarters, including anthropology, psychology, linguistics, and conversation analysis. Despite this diversity of approaches, these efforts have had a few recurring foci, including (a) the variety of uses of pointing, with some uses considered primary and others secondary; (b) the relationship of pointing to spoken language; (c) how pointing varies in form from one use to the next; and (d) how pointing varies across cultures. We now consider these foci in turn.

2.2.1 Primary and Secondary Functions of Pointing

One focus of research in gesture studies has been the variety of functions pointing serves in communication. By definition, pointing always serves the function of drawing attention somewhere. But, under this broad umbrella, pointing has certain uses that are widely considered *primary* (Enfield et al., 2007), *prototypical* (Langacker, 2008), or *canonical* (Cooperrider, 2014), and others that are usually considered *secondary*.[1] The primary use of pointing, in these treatments, involves indicating something in the real world—such as a star in the sky, a mountain on the horizon, a fish in an aquarium—and, in doing so, inviting a listener to look at that something. Such points occur in many contexts, including ostension-based language learning (e.g., E. V. Clark & Estigarribia, 2011), direction giving (e.g., Kita, 2003a), sightseeing (e.g., Kendon, 2004), museum visits (Dimitra, 2012), and a variety of other joint activities (e.g., Bangerter, 2004). By definition, primary points not only invite listeners to reorient their gaze, they also convey crucial information about where something is or which of several is meant (Enfield et al., 2007). Without the information conveyed by such gestures, the communicative message would be incomplete.

But pointing is also used in a number of other ways that are often considered secondary, even within the category of real-world points to entities or places (see Figure 2.1). One example is when people point to something or somewhere, but without necessarily intending to redirect listener gaze and without relying on the point to communicate message-critical information. Enfield et al. (2007) described pointing in such cases as a kind of pragmatic safety net; it is used when the speaker thinks the listener knows the referent but is not entirely sure. Relatedly, speakers point in cases where the listener is already attending to the pointed-to target and where the referent is perfectly clear. A good example is seen in points to the self (Cooperrider, 2014). When speakers point to their own bodies along with pronouns like "I," "my," or "mine," they are drawing attention but not necessarily reorienting listener gaze—according to the norms of conversation, listeners should already be looking at the speaker, and the referent of "I" is rarely ambiguous. Similarly, when pointing to the listener with "you" or "yours," listeners know where they are and the referent is usually not ambiguous. In these cases, pointing serves to reorient discourse attention but not visual attention per se; it adds emphasis but does not contribute message-critical information.

Another type of secondary pointing occurs when people point to one thing to refer to another. In the above examples, what the speaker points to—the *target*—is recognizably

1 "Primary" and "secondary" are, of course, theoretically loaded terms, inviting the question: Primary in what sense? One idea is that primary points are more frequent—as far as we know, there is no work suggesting this. Another idea is that they loom larger in folk theories of pointing—this has been claimed, but without any direct evidence. A third idea is they are learned first. This seems likely to be the case, but, again, we are not aware of direct evidence.

Fig. 2.1: Examples of points to real-world entities in gesture (top row) and sign (bottom row). (A) An English speaker points to an array of novel creatures while carrying out a referential communication task. (B) A Yupno (Papua New Guinea) man, far right, asks a "where" question, and his three interlocutors point as part of their answers: a nose point (far left), an index finger point (man behind, face occluded), and another nose point (middle). (C) A deaf signer of San Juan Quiahije Chatino Sign Language (Mexico) points to a plant while he explains its various uses. (D) A deaf signer of Israeli Sign Language points to a foam block on the table in front of him while carrying out a referential communication task. We thank Wendy Sandler and the Sign Language Research Lab at the University of Haifa for granting permission to use this image.

the same as what is referred to in speech—the *referent*. This is sometimes called *direct pointing* (Le Guen, 2011). But, at other times, the pointed-to target is associated with the referent but not identical to it (e.g., Borg, 2002; H. H. Clark, 2003; Le Guen, 2011). This phenomenon has gone by different labels, including *metonymic pointing*, *deferred ostension*, and *indexical chaining*. A classic example involves pointing to a speedometer to refer to a car's speed (Quine, 1960); other examples include pointing to the chest to refer to a "we" (Cooperrider, 2014) or pointing to a house to refer to one of its occupants (Levinson, 2006).

People also point to things that, strictly speaking, are not there. This phenomenon is commonly known as *deixis am phantasma* (Bühler, 1934/1990) or *abstract deixis* (Stukenbrock, 2014), and it takes a number of different forms. In some cases, people

point metaphorically, such as to a temporal landmark like "tomorrow," which has no physical location in space (Cooperrider et al., 2014). In other cases, people point to empty locations to invest them with meaning (see Haviland, 2000, on *baptismal pointing*), a behavior that has been studied in storytelling situations (McNeill, 1992) and in joint activities (Bavelas et al., 2011). This general technique of assigning referents to empty locations in space has been the subject of direct comparisons between speakers and signers, as discussed later. Finally, people also point to apparently empty space when they are gesturing *under transposition*: During storytelling, people may point as if from some imagined there–then rather than from the actual location here–now of the speech event (Haviland, 1993, 2003).

All of the uses of pointing considered so far serve *referential* functions—they serve to draw attention to a person, place, object, or idea being overtly referred to in the discourse. But points sometimes also serve more narrowly *interactive* functions. This often involves pointing to present people. For instance, speakers taking over a turn may point to the last speaker as a way of showing agreement with what they just said, even though that speaker goes unmentioned in the discourse (Healy, 2012). Similarly, in multiparty conversations such as meetings, people point as a way of tacitly citing others present (Bavelas et al., 1992). Conversely, pointing to the addressee is also used to mock (Sherzer, 1973) or scold (Andrén, 2014). Generally, such social functions of pointing have not been as widely examined as the more prototypical referential uses. Note that these interactive functions still involve the same overarching function of orienting attention to a region of space—in the case of the person being agreed with, cited, mocked, or scolded—but take on a richer meaning in context. Moreover, even a point that is prototypically referential—such as a point to someone while addressing them—may do important social work, as when it conveys authority or reprimand.

2.2.2 Coproduction With Speech

Another focus for gesture researchers has been how pointing is organized in relation to spoken language. Importantly, pointing does sometimes occur on its own, without accompanying speech—early in development but also in adult communication. Generally, like depicting gestures, points can occur on their own, in sequence with speech, or overlapping with speech (H. H. Clark, 2016). When pointing does overlap with speech, it is most prototypically associated with a distinctive class of words known as *demonstratives*—including, in English, "this," "that," "these," "those," "here," and "there" (Diessel, 2006). Indeed, demonstratives have sometimes been dubbed "pointing words" (Diessel, 2012). This is partly because demonstratives commonly co-occur with pointing—some describe pointing as obligatory when demonstratives are used (e.g., Levelt et al., 1985)—and partly because both serve to indicate something in the world. Going further, Cooperrider (2016) emphasized that demonstratives and pointing are designed in relation to each other, or *co-organized*. In particular, the

choice of whether to point to an entity is entwined with the choice of whether to use a demonstrative and, if so, whether to use "this" or "that," "here" or "there" (or their parallels in other languages; see Mesh, 2017, in press; Piwek et al., 2008).

Pointing also commonly co-occurs with spoken language beyond demonstratives, of course. Because points are often used for conveying "where" or "which" information, pointing is regularly used along with location or feature descriptions (Bangerter, 2004). In fact, the range of spoken referents that pointing can partner with is essentially unbounded. By making use of metonymy, metaphor, and imagination, speakers can talk about a wide world of possible referents—nonpresent, invisible, nonphysical—while simultaneously directing attention to regions of space in the here-and-now (Cooperrider, 2014).

2.2.3 Variation in Pointing Across Contexts

Gesture researchers have also examined how points vary in form from use to use and context to context. Such variation is usually not assumed to be arbitrary, but rather to reflect fine-grained differences in function. Some aspects of this variation stem from culture-specific conventions, as discussed later, but others may reflect general principles. For example, Kendon (2004) described how different pointing handshapes are tailored to different discourse purposes. He noted that when British and Italian speakers indicate something for the purposes of presenting it for "inspection" (p. 224) they tend to point with the palm open and facing up. In other cases, variation in pointing handshape reflects the incorporation of iconic features, thus fusing indicating and depicting elements (Cooperrider, 2014; Goodwin, 2007; Kendon, 2004). Recently, Talmy (2018) analyzed in detail such deviations from the prototypical case of index finger pointing, creating a typology of how different ways of pointing evoke targets that are static or moving, 2D or 3D, punctate or extended (see also Hassemer & McCleary, 2018).

Beyond incorporating iconic features, pointing gestures also vary from use to use in how much effort the speaker puts into them. Drawing on interviews with Lao speakers, Enfield et al. (2007) observed that points serving the primary function of conveying location information involved greater arm extension and were more likely to involve speaker gaze to the target; the secondary points they observed, in contrast, were smaller in form. Relatedly, Bangerter and Chevalley (2007) observed that *communicative points*—produced when speaker and listener were visible to each other—were more likely to involve arm extension than *noncommunicative points*—produced when a barrier separated the participants. These and other findings suggest that pointing gestures embody varying degrees of effort. They also suggest a candidate general principle that merits further investigation: The more central a pointing gesture is to the message at hand, the more effort the speaker will put into it.

2.2.4 Variation in Pointing Across Cultures

A final focus has been on how pointing varies from one culture to the next. Pointing, by all accounts, is a human universal (e.g., Cooperrider et al., 2018), but it varies in several ways across communities. Some of this variation is due to particular conventions of pointing form. Speakers of Arrernte, an Indigenous Australian language, have several pointing handshapes that are codified for particular purposes—for instance, an open hand with palm facing to the side is used when indicating the direction of an absolutely oriented path (Wilkins, 2003). Some communities have a conventional practice of raising the height of the pointing arm to reflect the distance of the target—the higher the arm, the farther away the target (e.g., Eco, 1976). People in Mesoamerica show an especially exaggerated version of this far-is-up strategy, sometimes using a near-vertical point to indicate distant referents (Le Guen, 2006; Levinson, 2003; Mesh, 2017, in press). Different communities also have different conventions for pointing nonmanually, with the head and face. Some form of pointing with the head—such as tossing, thrusting, tilting—appears to be universal (e.g., McClave, 2007). In certain cultures, however, there are also conventional facial pointing actions. These include *lip-pointing*, which consists of protruding, funneling, or pursing the lips (Enfield, 2001; Mihas, 2017; Sherzer, 1973), and *nose-pointing*, which consists of scrunching the nose (Cooperrider & Núñez, 2012). Both of these types of facial points are usually accompanied by a meaningful shift of gaze in the direction of the target (Adone & Maypilama, 2014; Enfield, 2001). Ethnographers have frequently claimed that such facial gestures are a major—or even preferred—form of pointing in the communities where they are used (e.g., Sherzer, 1983). In one case, this claim has been borne out quantitatively. Using a referential communication task, Cooperrider et al. (2018) found that people in the Yupno valley of Papua New Guinea, where nose-pointing is used, were just as likely to point nonmanually as manually.

Pointing also varies across cultures by virtue of being bound up with broader communicative practices and cognitive patterns. For example, Blythe et al. (2016) described how pointing becomes an especially critical communicative resource in Murrinhpatha conversation because of cultural taboos on naming certain people and the places associated with those people. Elsewhere, pointing is recruited into a conventional practice for referring to the time of day. The best-studied case is found in the Brazilian Amazon (Floyd, 2016). Nheenghatú speakers will point to an accurately oriented arc of the sun, running east to west, in order to refer to particular times (e.g., noon, by pointing directly overhead) or to more extended intervals (e.g., all afternoon, by sweeping a hand over the corresponding segment of the arc). Similar practices are found much more widely in speaking communities (see also Le Guen & Pool Balam, 2012), as well as in some village sign languages (de Vos, 2014). Finally, it is reported that people in some Indigenous communities remain absolutely oriented and maintain accurate cognitive maps as they move through the world (Levinson, 2003). There is thus a cultural expectation in such groups that people will point accurately, even to

distant, unseen locations (Haviland, 1993; Le Guen, 2011). In Western cultural groups, there appears to be no such expectation; Americans, for instance, sometimes point with comic inaccuracy, even to familiar locations (e.g., Schegloff, 1984).

A final source of variation across cultures is taboos that regulate how you can point or what you can point to. In Ghana, for instance, pointing with the left hand is considered impolite, and this prohibition has consequences for direction-giving (Kita & Essegbey, 2001). Among Indigenous Australians, where avoidance registers are used during certain social interactions, speakers will often point in a more constrained fashion by using a fist or the elbow (Green, 2019; see also Adone & Maypilama, 2014). Elsewhere, taboos govern what you can point to. Famously, in some cultures, it is unacceptable to point to rainbows (Lee & Fraser, 2001); in many Western cultures, it is considered rude to point to people, though this norm is unevenly observed and commonly violated (e.g., Jarmołowicz-Nowikow, 2015).

2.3 Pointing Signs

Signers, like speakers, point prodigiously. Every sign language documented thus far—whether used by a deaf child without access to a sign language model (i.e., a *homesigner*), a group of deaf people in an urban or village setting, or even by hearing people as an alternative to speech—relies heavily on pointing to serve multiple functions. Despite this fact, research on sign languages has historically focused on only a small subset of the many functions of pointing signs. When sign linguistics arose as a field of study in the 1960s, its practitioners were intent on demonstrating that sign languages are not merely elaborate gestural systems, but instead exhibit the same structures found in spoken language (see, e.g., Klima & Bellugi, 1979). As a result, early research on pointing signs focused on those features that could be directly compared with speech and sidelined pointing features with analogues in gesture. Only relatively recently has a welcome sea change begun: more and more, sign linguists are attending to the full set of features of pointing signs, taking interest in the many features that are shared with pointing gestures. The major foci of research on pointing signs include (a) similarities between pointing signs and spoken pronouns, demonstratives, and locative expressions; (b) uses of pointing signs to establish and maintain reference; (c) other uses of pointing, some analogous to secondary pointing gestures; and finally, (d) cross-linguistic comparisons of pointing signs. We now discuss each in turn.

2.3.1 Pronouns, Demonstratives, and Locatives: Analogues to Pointing Signs?

Signers, of course, point toward the objects, spaces, and people around them; pointing is as fundamental to their communication as it is for speakers. However, the push to

compare sign with speech led sign language linguists to largely focus on just one type of real-world pointing: points toward present people. These were compared systematically with pronouns, the most basic resource for referring to persons in speech. There was a rich set of comparisons to be made, first in terms of function: Both pointing signs and pronouns refer, that is, they identify speech act participants and track reference to those participants throughout the discourse (e.g., Engberg-Pedersen, 1993; Liddell, 1996; Lillo-Martin & Klima, 1990; Meier, 1990; Petitto, 1987; Senghas & Coppola, 2001; van Hoek, 1992). In addition, signed points to persons can take different forms based on whether the target is the signer, addressee, or another present person—and whether that target is singular or plural—a fact that many sign linguists take as evidence for the grammatical person- and number-marking that is found on pronouns (e.g., Meier & Lillo-Martin, 2013). Moreover, person-referring pointing signs are subject to the same principles that determine the placement of pronouns in spoken languages, including the so-called binding conditions on anaphora (for discussion, see Meier & Lillo-Martin, 2010). In accounting for this evidence, sign linguists have disagreed, sometimes quite contentiously, about whether person-referring pointing signs are true pronouns, or can even be called *linguistic*. At the heart of the argument is the question of whether a language's lexicon needs to contain a finite, listable set of forms. Some authors claim that because some features of pointing are gradient—in particular, the direction of the point, which may be modified in indefinitely many ways—signed points should be understood as *gestural* components of the language (i.e., formed at least partly from gradient features) rather than *linguistic* (i.e., organized around a finite set of categorical oppositions, e.g., Liddell, 2000, 2003; Liddell & Metzger, 1998). Other authors argue that pointing signs are organized in a way that makes them linguistic, but the types of distinctions they encode are limited and are thus closer to a simplified demonstrative system than to a pronominal one (Ahlgren, 1990; Koulidobrova & Lillo-Martin, 2016; McBurney, 2002). Still others argue that the person- and number-marking features seen in some sign languages' person-referring points justifies treating them not only as linguistic but also as clear pronouns (see Cormier et al., 2013). A growing trend in the discipline is to sidestep the debate altogether and not worry as much about categorizing pointing signs as linguistic or gestural. Such treatments focus instead on identifying similarities and differences between pointing signs and pronouns or demonstratives on the one hand, and pointing signs and pointing gestures on the other (see Cormier et al., 2013; Johnston, 2013a, 2013b); or they focus on the cognitive processes that account for how speakers and signers use points (see Wilcox & Occhino, 2016).

Of course, signers point toward not only people in the world around them but also objects and locations. Pointing signs targeting objects have been described as *demonstrative expressions* (Koulidobrova & Lillo-Martin, 2016; McBurney, 2004), while pointing signs targeting locations have been called *locatives* (e.g., de Vos, 2013; Padden, 1983; Shepard-Kegl, 1985). Notably, signers appear to distinguish points toward locations from points toward people by modifying two formational features

of points: palm orientation and handshape. Points toward locations are typically formed with the palm facing downwards, whereas points toward people are more often formed with the palm facing to the side; this observation has been made for a number of the world's sign languages (for a review, see Pfau, 2011), including in a quantitative analysis of British Sign Language (BSL, Fenlon et al., 2013). Studies of American Sign Language (ASL) and of BSL have also shown that points toward locations are produced more often with an index finger (Bayley et al., 2002; Fenlon et al., 2013). Notably, in the ASL and BSL studies, signers were more consistent in how they formed points toward locations and showed more variation in their points toward people. Fenlon et al. (2013) suggested that this result is due to different patterns of coarticulation with the surrounding signs—a possibility that underscores how closely pointing signs are prosodically integrated with the signs surrounding them.

2.3.2 Pointing Signs to Establish and Maintain Reference

Some of the most interesting features of pointing in sign language arise when the point is directed toward nothing at all. Signers sometimes *anchor* a referent in space by first naming the referent and then pointing to a location in the empty space in front of them (Barberà & Zwets, 2013). An ASL signer recounting a story about her pet, for example, could introduce the animal with the lexical sign DOG, preceded or followed by a point. The noun-accompanying point appears to share the function of spoken language determiners, and its presence and ordering relative to the noun provides information about whether the reference is definite (*the* dog) or indefinite (*a* dog; MacLaughlin, 1997; Zimmer & Patschke, 1990). Crucially, this type of point toward empty space—with or without an accompanying noun—has a second function: It associates the referent with the selected empty space (often called a *referential locus*, or *R-locus*), making it possible to point toward this same space later to refer back to the same referent. The ASL signer from our example points alongside the sign DOG, and in so doing, associates the notion of the dog with a specific location in the space in front of her. It is thus possible for her to continue to point to this same location throughout her narrative, referring again and again to the dog as she narrates his adventures (see Cormier et al., 2013; Perniss & Özyürek, 2015). Once a signer has associated a referent to a given R-locus, they can use a variety of deictic mechanisms beyond the point to refer back to the referent. Many sign languages contain a specialized set of main verbs that are produced using movements to or from R-loci, conveying that the subject or object of the verb is the referent associated with that space (e.g., Padden, 1983; see also Hou & Meier, 2018; Schembri et al., 2018). In our ASL example, the signer might modulate the location and movement of the verb BITE, making the starting-place of the moving hand the dog's R-locus (and thus identifying the dog as the biter) or moving the hand toward the dog's R-locus (identifying the dog as the bitee). *Spatial agreement* or *spatial modulation* of the kind exemplified by

the movement of the verb BITE in this example is dependent on the meaningful association of referents with empty space, and this association is most often established by an initial pointing act. In this way, a seemingly marginal function of points—to establish reference to nonpresent entities—becomes foundational for verb inflection processes in many sign languages.

2.3.3 Other Pointing Phenomena in Sign Languages

Across signing communities, points are also regularly used metonymically—that is, points toward real-world spaces are used for referents that are not in those spaces, but are conceptually related to them (see Table 2.1). This, of course, is analogous to the metonymic pointing gestures described earlier. In Yolngu Sign Language and Kata Kolok, languages used in small-scale communities where the location of everyone's home is common knowledge, a signed point toward a particular home refers to the

Tab. 2.1: Overview of Studies on Uses of Pointing in Gesture and Sign

	Gesture	Sign
	Direct points to real-world entities	
Objects	Bangerter, 2004; Cooperrider, 2016	Koulidobrova & Lillo-Martin, 2016; McBurney, 2004
Locations	Enfield et al., 2007; Mesh, 2017, in press; Wilkins, 2003	de Vos, 2013; Padden, 1983; Shepard-Kegl, 1985
Persons	Cooperrider, 2014; Jarmołowicz-Nowikow, 2015	Cormier et al., 2013; Meier & Lillo-Martin, 2010, 2013
	Metonymic points	
Locations for person reference	Levinson, 2006	Bauer, 2014; Butcher et al., 1991; de Vos, 2013
Locations for temporal reference	Floyd, 2016; Le Guen & Pool Balam, 2012	de Vos, 2013; Le Guen, 2012
Body parts for experiential concepts	Cooperrider, 2014	Evans & Wilkins, 2000; Kendon, 1980; Östling et al., 2018
Body parts for colors	*not attested*	de Vos, 2011; Woodward, 1989; Zeshan & Sagara, 2016
	Points to empty space	
Referential loci	McNeill, 1992; Perniss & Özyürek, 2015	Cormier et al., 2013; Engberg-Pedersen, 1993; Liddell, 2003
Metaphorical	Cooperrider et al., 2014	Yano & Matsuoka, 2018
Transposed targets	Haviland, 1993	Liddell, 2003
Interactive functions of pointing	Bavelas et al., 1992; Healy, 2012	Ferrara, 2020

person who lives in it (Bauer, 2014; de Vos, 2013). Among not only speakers of Yucatec Maya but also signers of Yucatec Maya Sign Language, a point to the sky refers to the time of day when the sun is at that location (Le Guen & Pool Balam, 2012; see also de Vos, 2013). In young sign languages and more established ones alike, points to the hair, teeth, and lips are regularly used to refer to the colors black, white, and red (de Vos, 2011; Nonaka, 2004; Woodward, 1989; Zeshan & Sagara, 2016). The human propensity toward developing metonymic reference is so great that even when homesigners get little exposure to metonymic pointing in gesture, they nevertheless develop it. Using this strategy substantially expands the communicative potential of pointing (Butcher et al., 1991).

Sign languages also incorporate pointing into fully lexical signs. For example, in ASL and other sign languages, body parts terms are most often formed by a pointing movement toward the body part. Often these are not simply prototypical points with an index finger extended, but involve different handshapes (e.g., open hand) or motion (e.g., reduplication) (Pyers, 2006). Indeed, many lexical signs, while not obviously "pointy," are articulated in relation to parts of the body—such as the head, face, or abdomen—and thus motivated, in part, by metonymic indexicality (Cooperrider, 2014; Kendon, 1980). For instance, words related to cognition are often articulated near the head (Evans & Wilkins, 2000; Kendon, 1980); in contrast, words related to hunger may be articulated near the stomach, and words related to eating may be articulated near the mouth (Östling et al., 2018).

2.3.4 Pointing Signs in Crosslinguistic Comparison

When discussing the variety of functions for pointing signs, it can be easy to forget that the sign languages in which pointing is found are themselves remarkably diverse. There is no one context for "pointing in sign language"; rather, pointing signs are found in sign languages young and old, in urban and rural environments, with high or low numbers of users in a variety of different social configurations. What is common to the pointing signs found in all of these environments is that they are frequent and indispensable. For homesigners still in the process of conventionalizing vocabularies, pointing is a reliable tool for identifying not only present objects but also the properties that they embody (Coppola & So, 2006; Torigoe & Takei, 2002). For signers of more established sign languages, pointing takes on additional functions (Pfau & Steinbach, 2006) and in at least some contexts it is used even more frequently than in homesign (Coppola & Senghas, 2010). There are certainly aspects of variation in pointing across sign languages. For example, pointing signs draw attention to the physical environment in ways that reflect the different topographies and direction-giving traditions where sign languages emerge (de Vos, 2013; Mesh, 2017, in press; Nonaka, 2015), and they direct attention beyond the here-and-now in ways particular to the narrative practices of specific cultures (Green & Wilkins, 2014). Just how uniformly pointing is integrated into different sign languages, and how much diversity there may be in sign language pointing practices, are promising areas for further study.