33 Iconic sequencing in spoken and signed language ⊕

James H.-Y. Tai

Abstract

Saussure's Principle 1 of arbitrariness and Principle II of linearity are recast in the context of signed language. Arbitrariness and linearity are features of spoken language, in sharp contrast with iconicity and simultaneity of signed language. While arbitrariness and linearity are modality effects of spoken language, iconicity and simultaneity are modality effects of signed language. Only those properties shared by both modalities are the true design features of human language; these are: duality of patterning, conventionalized vocabulary, productivity, syntactic structures, similar timetables of acquisition, and lateralization in the left hemisphere. Furthermore, intonation and co-speech gestures in spoken language can be treated as analogous and parallel to iconicity and simultaneity in signed language. With hidden iconic motivations uncovered in the grammar of spoken language, it stands to reason that the conventionality of human communication must be supplemented with iconic motivations.

Keywords: iconicity, arbitrariness, linearity, simultaneity, modality effects, signed language

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33.1 Introduction

Signed languages had not been treated as natural languages on a par with spoken languages until Stokoe and his associates started serious research on signed languages (Stokoe 1960; Stokoe et al. 1965). Research on signed languages was further advanced through the seminal work by Klima and Bellugi (1979), Frishberg (1975, 1979), and later by Liddell (1980, 2003), Fischer and Siple (1990), Siple and Fischer (1991), Emmorey (2002), Meier et al. (2002), and Sandler and Lillo-Martin (2006), and more recently by Brentari (2019) and Kendon (2020). The research on signed languages over the past sixty years has demonstrated that signed languages are natural languages produced and perceived through gestural–visual means, yet with all necessary properties that distinguish human language from animal communication systems.

Like spoken language, signed language is a rule-governed system. It is composed of a set of symbols, and rules of concatenation and operation over these symbols. Thus, like spoken languages, signed languages have elaborated systems of phonology, morphology, syntax, semantics, and pragmatics. Neurolinguistic findings in the past four decades also suggest that the brain's left hemisphere is dominant for signed languages, just as it is for spoken languages (Cambell et al. 2008; Hickok and Bellugi 2010). In short, it is well established that there are two modalities for human language to be produced; that is, the auditory-vocal modality of spoken languages and the visual-gestural modality of signed languages. The tactile modality constitutes the third modality (Willoughby et al. 2018). But it is not within the scope of this chapter.

As signed language is visual-oriented, it allows simultaneous representation of objects and events in the three-dimensional world (Vermeerbergen et al. 2007). Thus, in the lexicon and syntax, signed language is far more iconic than spoken language (Myers and Tai 2005). Iconicity and simultaneity in signed language show that both Saussure's (1916/1959) two principles of linguistic signs—that is, arbitrariness and one-dimensional linearity—do not hold for signed language; in other words, neither arbitrariness nor one-dimensional linearity can be treated as fundamental design features of human language.

Both spoken and signed languages have discrete composing elements for building up hierarchical structures and sequencing these discrete elements. In Section 33.2, Saussure's two principles of language are re-examined. In Section 33.3, sequencing in spoken languages is sketched. In Section 33.4, sequencing is examined in terms of language typology. Section 33.5 compares linearity in spoken languages and simultaneity in signed languages. Section 33.6 discusses the parallelism between intonation in spoken languages and non-manual expressions in signed languages as closing remarks.

33.2 Saussure's two principles re-examined

Saussure's two principles (1959: 67–70) are the following:

Principle I: The bond between the signifier and the signified is arbitrary.

Principle II: The signifier (being auditory) is linear in a single dimension span.

Saussure was not aware of the existence of sign language as a natural human language. Still, within the limit of spoken languages, he qualified the arbitrariness principle with "absolute and relative arbitrariness" (Saussure 1959: 131), from 'radically arbitrary'—that is, unmotivated—to what is 'relatively arbitrary', or motivated. Thus, even in spoken languages, words may be relatively motivated. The decimal system of counting in Chinese obviously is more transparent and thus more motivated. For example, *twenty* in Chinese—*er-shi* ('two-ten')—is transparent, in contrast with the opacity of French *vingt* and with the translucent *twenty* in English. In fact, the three-way distinction, from transparent (motivated) to translucent (partially motivated) to opaque (arbitrary), was also adopted by Klima and Bellugi (1979) in their analysis of signs in terms of transparency of iconic motivations. The three-way classification has been later adapted by adding the fourth 'obscure' type of signs in sign languages in respect of their degree of iconicity (Johnston 1989: 220–1; Johnston and Schembri 2007: 237–9).

Being auditory, spoken language is essentially linear in a single dimension span, as stated in Saussure's Principle II. The spoken signifiers constitute an inventory of arbitrary symbols and their linear concatenations. The multidimensional visual imagery must be mapped onto a one-dimensional auditory signal. Naturally, the one-dimensional auditory-oral channel cannot preserve iconicity and simultaneity as much as the multidimensional visual-gestural channel. With a one-dimensional channel, the temporal sequence of events and subevents can easily be reflected by means of word order, as clearly manifested in Chinese word order (Tai

1985). Other aspects of iconicity are harder to express in spoken languages, but their remnants can still be discerned in this channel on closer examination (cf. Haiman 1980, 1985a; Tai 1993).

In language production, sign languages also make use of the temporal dimension as done in spoken languages. As pointed out by Talmy (2003: 233), classifier predicates in signed languages are iconic with visual parsing in their representation of temporal progression of the path trajectory of an entity. We can illustrate the progression with the event 'The car drove past the tree' in Taiwan Sign Language (TSL) in Figure 33.1 within Talmy's event-frame analysis of motion events as 'Figure-Motion–Path-Ground'. The dominant hand in its pronominal form for 'car', assuming the Figure role, progresses along the Path, approaching the ↳ non-dominant Ground hand, in its partial representation of the 'tree', and finally passes the Ground hand.

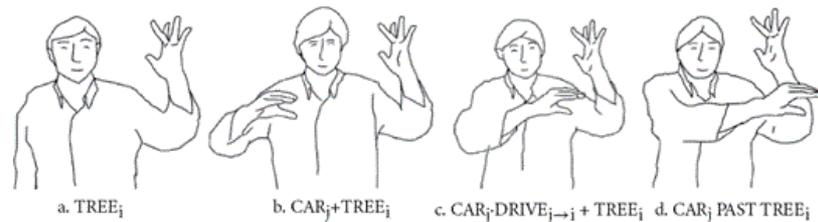p. 527

Figure 33.1 TSL utterance meaning 'The car drove past the tree'.

From Figure 33.1, we can see that the car follows the path trajectory of the event in the real world. Thus, the visual parsing of the moving Figure reflects its temporal progressing in the real world.

It is clear that the word order in the sentence 'The car drove past the tree' in English also follows the order of the temporal progression, but Talmy (2003: 233) notes that in English 'Past the tree, the car drove' is also grammatical because it allows the prepositional phrase 'Past the tree' to be placed at the beginning of the sentence. In sign languages, however, it appears to be unlikely for the classifier predicate 'past the tree' (Figure 33.1d) to be placed at the beginning of the sentence.

Note that 'Past the tree, the car drove' is also ungrammatical in Chinese due to the temporal sequence constraint. Indeed, the constraint of temporal sequence is more pervasive in Chinese than in English. For example, while both (1a) and (1b) are equally acceptable in English, only (1a) is acceptable in Chinese.

(1) a. Ta   cong tushuguan zou   dao   gongyuan.
         he   from library   walk to   park
         'He walked from the library to the park.'

     b. *Ta zou   dao   gongyuan   cong tushuguan.
         he   walk to   park   from library
         'He walked to the park from the library.'

In the Chinese sentence in (1a), the event can be divided into three temporal progressing points 'library', 'walked to', and 'park', which are ordered according to the temporal sequence in the real world.

Sutton-Spence and Woll (1999: 129–30) propose a distinction between 'syntactic' and 'topographic space' in sign language. While syntactic space is used to express syntactic relations, topographic space reflects the layout of things in the real world. Therefore, it stands to reason that when topographic space is involved, the temporal sequence must not be violated. Similarly, in using a map to describe how to get to a certain location, the geographic relationship of each reference point on the map must strictly follow the temporal sequence in the imaginary traveling route (Linde and Labov 1975). This is a kind of 'diagrammatical iconicity' that also involves isomorphic mapping.

The isomorphic mapping needs further clarification. There are three types of verbs in sign languages; that is, plain verbs, agreement verbs, and spatial verbs. Spatial verbs, which indicate the moving of an entity from one location to another, also employ topographic space. Agreement verbs, however, use syntactic space to indicate the grammatical relationship between 'subject' and 'object', or more precisely 'agent' and 'patient'. Plain verbs, which do not move in either topographic or syntactic space, use auxiliary, word order, or eye gaze to indicate the grammatical relationship.

33.3 Sequencing in spoken language

33.3.1 Temporal sequence

A few words of introduction to sequencing are necessary. First, sequencing is an umbrella term, covering the

order of paragraphs in a narrative story, turn-taking in conversation, ↳ the order of sentences in paragraphs, and the word order within a sentence. In this section, we will be concerned only with sequencing of conjoined sentences, adverbial subordinate clauses, serial verb constructions, word order of adverbial phrases, and purposive and resultative expressions in a sentence.

Second, the concept of sequencing can be distinguished from that of linearity, which is an inevitable consequence according to Saussure's Principle II: the signifier (being auditory) is linear in a single dimension span. Linearity is simply word order, which can be derived from hierarchical structures. Different syntactic theories have different projection principles and rules for deriving word order from hierarchical syntactic structures, for example, different versions of generative grammar, phrase structure grammars, GPSG, HPSG, and other formal syntactic theories. The principles and rules of linearity need not be iconic, as we have seen above with the order between main clause and adverbial clauses with temporal conjunctions such as 'before', 'after', and 'when'.

However, sequencing in general involves iconic motivations. Temporal, conditional, causal, result, and purpose clauses tend to occur in different positions relative to the main clause, depending on syntactic parsing, semantics, and discourse pragmatics. The positioning of these clauses all involves iconic motivation of temporality (Diessel 2008). Finally, it is worth noting that in the manuals of cooking, installation, maintenance, and repair, the instruction language needs to follow the temporal sequence of the procedure step by step.

33.3.2 Spatial arrangement

There are two basic ways to map the three-dimensional spatial arrangement into one- dimensional sequencing in spoken language. One way is from whole to part, and to end point. The other is from end point to part, and to whole. For example, the word order of an address in Chinese is from a street name to a section of the street and to the number (avenue, section X, number), while in English and some other languages, the word order can be reversed (number, section X, avenue). In Chinese, the word order of the temporal relationship from whole to part to point is an isomorphic mapping from the spatial relationship, thus, 2022 year, August 1, afternoon five o'clock, and twelve minutes.

The contrast is analogous to 'zoom in' vs. 'zoom out' in photo taking. In terms of nesting image, 'nesting inwards' applies in Chinese, where a larger unit is viewed or ordered before a smaller one; that is, the smaller unit is embedded or contained within the next larger one. The effect is similar to the use of a video camera that first shows a long shot with foreground, then slowly disappears as the camera lens eventually zooms in for a close-up of the intended object. The converse then holds true for English, where the zoom lens first focuses on the object, receding to the distant background for a broad view in the final longshot of the scene.

We can also extend the container–contained relationship to the reporting of the location of an object. Again, the contrasting strategies can be illustrated by the Chinese sentence in (2) and its English equivalent in (3). Note that the elements described are in reverse order.

(2) Zai chufang-li-de   zhuozi-de   shangmian-de hezi-li   you   qian.
        1   2   3   4   5
    at kitchen-in-GEN table-GEN top-GEN   box-in   have   money

(3) There is money   in the box   on the top   of the table   in the kitchen.
        5   4   3   2   1

In addition to the mapping of container–contained relation, spatial relation can also be mapped on the cognitive axis of trajector (Figure) and landmark (Ground). Thus, both (4) and (5) represent two basic principles of spatial arrangement in Chinese.

(4) Zhuozi-shang   you   qian. (container-contained)
    table-top   have   money
    'There is money on the top of the table.'

(5) Qian   zai   zhuozi-shang. (trajector-landmark)
    money   (be)-at table-top
    'The money is on the top of the table.'

The spatial relationships such as 'front' vs. 'back'; 'above' vs. 'below' can also be metaphorically mapped onto the temporal relationship. For example, spatial conceptualization of time in Chinese is as follows:

(6) a. qian-tian (front-day) 'the day before yesterday'
    b. hou-tian (back-day) 'the day after tomorrow'
    c. shang-xingqi (above week) 'last week'
    d. xia-xingqi (below week) 'next week'

The spatial term 'qian' (front) in (6a) refers to the past in time, and the spatial term 'hou' (back) in (6b) refers to the future in time. The spatialization in Chinese in this respect is different from sign languages, where a moving hand pointing to the back refers to the past, and to the front refers to the future. Some sign languages, like TSL, use the same 'back-past/front-future' principle to express days, weeks, months, and years before or after.

33.3.3 Order of importance

Iconic sequencing also involves the order in which one mentions items in a list in terms of importance and in terms of rank in a group of people present. This holds true in both spoken and signed languages. In the real world, the most important person walks before the others, and the less important one walks after the more important one. Similarly, it is customary that we address the audience from the more important person to the less important person. However, in greetings, either 'ladies and gentlemen' or 'gentlemen and ladies' can be used in different cultural settings, which can be dubbed as 'cultural iconicity'.

33.3.4 Natural word order versus salient word order

Osgood (1980) has made an important distinction between natural word order and salient word order in spoken languages. While the former is perception-based, the latter conveys a speaker's interests, involvement, focus, and so on. Thus, while the sentence 'Because John went walking in the freezing rain, he caught a cold' follows the causal relationship in our perceptual world, 'John caught a cold because he went walking in the freezing rain'. is focused on the theme 'John caught a cold'. Thus, the temporal sequencing needs to be mitigated by the competing motivation of 'attend first to the most urgent task' (Givón 1985, 1990). In the same vein, a distinction between chronological sequencing and psychological sequencing is made in Leech and Short (2007: 188–90).

p. 530 In terms of competing motivations, there are actually three basic sequencing principles involved: (1) temporal sequence, (2) attend first to most urgent task, and (3) language-specific order structuring between main clauses and adverbial subordinate clauses. These three competing motivations will have different weights in different kinds of discourse, such as narrative or conversational ones. Biq's (1995) Chinese examples of *suoyi* ('therefore') occurring before *yinwei* ('because') are all taken from conversational discourse, in which turn-taking requires giving the result first and then the supplement with the cause or reason.

With regard to the competing motivations for the positioning of adverbial clauses, Diessel (2005) identified three factors: (1) syntactic parsing, (2) discourse pragmatics, and (3) semantics of conjunctions. Diessel (2008) further conducted a corpus-based analysis of the positioning of temporal adverbial clauses in English. The results clearly indicate that temporal sequencing has a strong and consistent effect on the linear structuring of complex sentences with temporal adverbial clauses. Thus, temporal clauses referring to a prior event precede the main clause more often than temporal clauses expressing a simultaneously occurring event, which in turn precede the main clause more often than temporal clauses of posteriority (Diessel 2008: 483–4).

Similarly, in our own pilot corpus-based study, it was found that English participle phrases also exhibit a preference for temporal sequence; that is, 'Entering the room, he found that …' is more frequent than 'He found that …, entering the room', while 'he entered the room, observing …' is more frequent than 'observing …, he entered the room'. More examples can be found in Lai (2011).

33.3.5 Temporality in child language acquisition

Iconicity plays an important role in the development of word order in child language. It was reported in Clark (1970, 1973) that when two simple sentences are placed together without the conjunction 'and', children interpret the event represented by the first sentence as having occurred before the event represented by the second sentence. This default interpretation of sentence word order is referred to as 'order of mention principle' by Clark (1970, 1973), which is iconic in that the word order corresponds to the word order of events in the real world.

Other studies also show that children appear to understand conceptual relationships between two events—temporal, causal, and conditional (Piaget 1948; Bloom et al. 1980; Eisenberg 1980)—before they learn the meanings of temporal conjunctions such as 'before, after, when', and so on. As observed by Piaget (1948), children under seven years of age interpret 'X because Y' as if it meant 'X so that Y' or 'X and then Y'. Thus, when asked to complete a sentence such as 'He fell from his bicycle because …', the child would complete it with 'he broke his arm'. Clark (1971) also reported that preschool children often interpret a sentence such as 'He went home after he had played with Sally' as if it meant 'He went home and then he played with Sally'. Similar results were obtained by later studies (cf. Corrigan 1975; Emerson 1979, 1980; Bebout et al. 1980; White 1980; McCabe and Peterson 1985). Clearly, children interpret the sentence according to the iconic 'order of mention principle'.

How children break away from this entrenched iconic principle by acquiring the meanings of 'after', 'before', and other conjunctions, and at the same time develop adverbial clauses to be ordered before and after the main

clauses to express different concepts of temporal, logical, and conditional relationships, is indeed the main story of child language acquisition of complex syntax (Diessel 2004).

The first conjunction used by English-speaking children is the temporal 'and'. Children from three to five years old then learn the semantics of the conjunctions 'before', 'after', 'when', and others, to form adverbial clauses

and their relative order to the main clause. ↳ Thus, 'E1 (event 1) and then E2 (event 2)' and 'because E1, so E2' are both perception-based. In contrast, 'before E2, E1' is a word order of psychological sequencing. It should also be noted that children between three and five years old are also sensitive to speech acts. Sentences such as (7a) are heard more often than (7b) and (8a) more often than (8b).

(7) a. Wash your hands before you eat.
    b. Before you eat, wash your hands.

(8) a. Brush your teeth after you eat.
    b. After you eat, brush your teeth.

The speech act involved here is 'to command' or 'to request'. The main clause is ordered before the temporal adverbial subordinate clause. In Clark's terms, the theme is given first, and in Givón's (1990) term, it is 'to attend first to the most urgent task'.

33.4 Sequencing and language typology

From the viewpoint of language typology, there are two key parameters in sequencing linguistic elements. One is the distinction between 'subject-prominent' and 'topic-prominent' languages (Li and Thompson 1976). The other is the abundance of serial verb constructions in some languages (Aikhenvald and Dixon 2006). Chinese is a topic-prominent language with a variety of serial verb constructions.

33.4.1 Topic-prominent languages

In his seminal work of Chinese grammar, Chao (1968: 69) noted that "the grammatical meaning of subject and predicate in Chinese is topic and comment, rather than actor and action." Chao's original idea was implemented into the topic- versus subject-language typology proposed by Li and Thompson (1976). Topic refers to 'what to talk about', be it an entity or an event. Thus, topic is a discourse notion, and a paragraph in Chinese can consist of one topic sentence, followed by several clauses to form a topic chain (Tsao 1990). For example, the following paragraph contains one topic followed by three clauses.

(9) wo xiaoshihou-de Taiwan shenghuo tiaojian bu xiang xianzai name
    fuyu, (topic)
    I childhood-GEN Taiwan life condition not like now so
    prosperous
    'In my childhood, living conditions in Taiwan were not as prosperous as now.'

    zhu zai xiangxia guode chongshi you kuaile, (clause 1)
    live at countryside pass rich and happy
    'Living in the countryside, I had a fulfilling and happy time.'

    waipo changchang dai wo qu xili zhuo xia, (clause 2)
    grandma often take I go creek catch shrimp
    'Grandma often took me to catch shrimps in the creek.'

    cunli de xiao haizi ye meitian lai wo jia chuanmenzi. (clause 3)
    village-GEN little kid also everyday come I home visit
    'Children in the village also came to visit every day.'

As the topic concerns what to talk about, Chinese sentences such as (10)–(13) are very common.

(10) nei   chang huo,   xingkui   xiaofang dui   lai-de   kuai.
     that   CL   fire   fortunate fire   team come-DE   fast
     'That fire, fortunately the fire brigade came quickly.'

(11) yu,   wo zui   xihuan chi guiyu.
     fish I   most like   eat salmon
     'Fish, I like to eat salmon most.'

(12) na   ke shu,   yezi hen   da, hua   hen   xiao.
     that CL tree   leaf very big flower very small.
     'That tree, leaves are big but flowers small.'

(13) wu   ge pingguo lan-le   san   ge.
     five CL apple   rotten   three CL
     'The five apples, three are rotten.'

In (10), the topic 'that fire' holds no selection restriction with the comment as required in the subject–verb relationship. In (11), the topic 'fish' is not derived from topicalization. Therefore, it has to be there as the topic to begin with. In (12), the topic 'that tree' is the whole, and both 'leaf' and 'flower' are parts of the whole. Similarly, in (13), only three apples are rotten, not the topic 'five apples'. Again, the 'whole-before-part' sequencing also holds for topic-comment sentences.

33.4.2 Languages with serial verb constructions

Serial verb constructions (SVCs) consist of a sequence of verbs or verb phrases acting together as a single predicate without overt markers of coordination or subordination. They describe what is conceptualized as one single event. SVCs are widespread in Creole languages and in the languages of West Africa, Southeast Asia, Amazonia, Oceania, and New Guinea (Aikhenvald and Dixon 2006: 1). In fact, SVCs are also very common in Sinitic languages. They can be illustrated in the following Chinese sentences.

(14) qing   jin   lai   zuo.
     please enter come   sit
     'Please come in and sit down.'

(15) tamen yong shou chi fan.
     they   use   hand eat food
     'They use their hands to eat food.'

SVCs exhibit varieties across languages, but two iconic motivations are clear. In addition to the obvious temporal sequence, SVCs also follow the contiguity principle. Thus, "the more contiguous the components of an SVC are in their surface realization, the more bound together they are, and the closer the whole construction comes to a prototypical SVC" (Aikhenvald and Dixon 2006: 4).

33.5 Linearity and simultaneity

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Saussure (1916/1959) identified arbitrariness (Principle I) and linearity (Principle II) as the essential features of human language. They are characteristic of spoken languages only. In contrast, the essential features exhibited in sign languages are iconicity and simultaneity. Just as linearity is linked with arbitrariness, simultaneity is linked with iconicity. In terms of modality effects and modality non-effects (Meier 2002), arbitrariness versus iconicity and linearity versus simultaneity are modality effects, along with modality non-effects such as (1) duality of patterning, (2) conventional pairings of form and meaning, (3) productivity in vocabulary through derivation, compounding, and borrowing, (4) parts of speech and complex sentences, (5) similar timetable for acquisition, and (6) the crucial role of the left hemisphere of the brain.

Simultaneity in sign languages is prolific in both the lexicon and syntax. In Japanese Sign Language (JSL) and historically related TSL, the thumb stands for 'male' (Figure 33.2) and the pinky for 'female' (Figure 33.3).
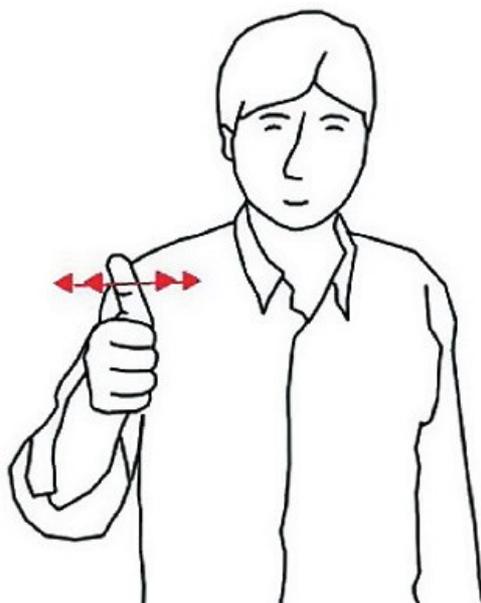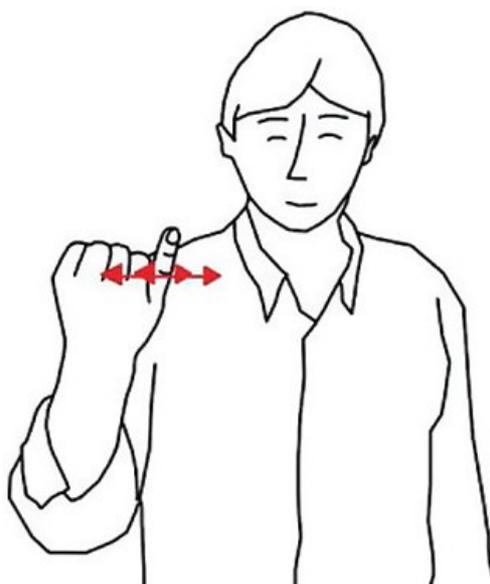

Figure 33.2 TSL sign for 'male'.

Figure 33.3 TSL sign for 'female'.

The sign for 'to marry' is expressed by putting the thumb of one hand and the pinky of the other together simultaneously (Figure 33.4). In contrast, the sign for 'to divorce' is to separate the thumb and the pinky by moving the two hands away from each other simultaneously (Figure 33.5).
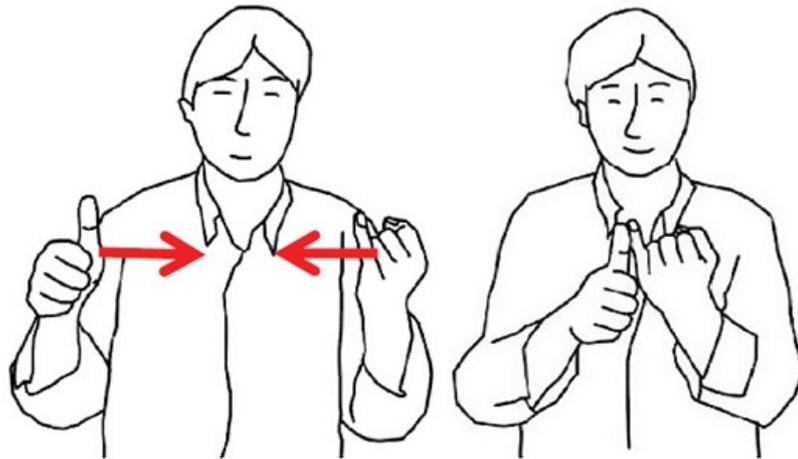
Figure 33.4 TSL sign for 'to marry'.
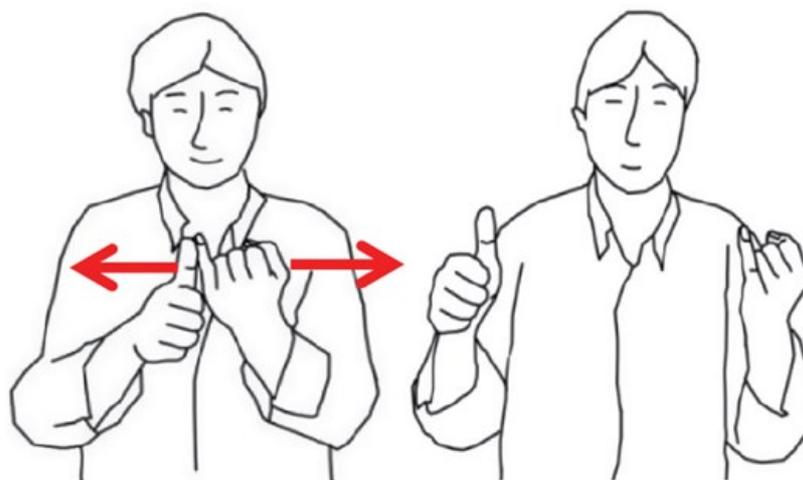
Figure 33.5 TSL sign for 'to divorce'.

Pointing is a very powerful device in both oral and visual communication (Kita 2003). To refer to a person or an object nearby, a speaker or signer can conveniently point to that person, object, or location. Pointing in spoken languages simultaneously acts as a co-speech gesture with deictic words such as 'this', 'that', 'here', and 'there'. In sign language, ↳ pointing to a certain point in the signing space can stand for a pronoun. Thus, in JSL and TSL, the sign for 'he' is expressed by pointing the index finger of the dominant hand (the left hand of a left-handed signer) to the thumb of the non-dominant hand (Figure 33.6). In contrast, pointing to the pinky of the non-dominant hand means 'she' (Figure 33.7).

Figure 33.6 TSL sign for 'he'.

Figure 33.7 TSL sign for 'she'.

Sign language has both simultaneous and sequential word formations. Thus, while 'to marry' and 'to divorce' are formed through simultaneous compounding in JSL and TSL, 'husband' and 'wife' are formed through sequential compounding. Thus, 'husband' and 'wife' in both JSL and TSL are signed as 'marry+male' (Figure 33.8) and 'marry+female' (Figure 33.9), respectively.

Figure 33.8 TSL sign for 'husband'.

Figure 33.9 TSL sign for 'wife'.

Because of different iconic motivations, an entity can be signed simultaneously or sequentially. For instance, 'apple' in TSL can be signed simultaneously by 'brushing the fruit on the sleeve' (to brush away the dirt before eating), or sequentially as 'red+fruit'. Yet, to eat a 'banana', one needs to peel the skin, and, therefore, in TSL, it is signed with the middle finger (banana) plus repeated peeling actions.

Compounding can be highly productive, and thus is analogous to derivation in spoken languages. For instance, in TSL the sign 'place' can be signed sequentially after the sign for 'train' to mean 'train station', and after the sign 'doctor' to mean 'hospital'. Similarly, the thumb in TSL stands for 'head of an institution', thus the sequential signing of 'nation+head' stands for 'the president of a country' and sequential signing of 'school+head' stands for the 'principal'.

Static spatial relationships in sign languages such as 'in', 'on', 'at', 'above', 'below', 'inside', and 'outside' are generally expressed simultaneously and isomorphically to the physical world. The non-dominant hand serves as the 'Ground' and the dominant hand as the 'Figure'. Thus, sign languages do not have 'preposition' as a part of speech. As a matter of fact, the spatial relationships in signed languages can be expressed in a more fine-grained manner than the closed form class of 'preposition' in spoken languages. Moving from one location to another in sign languages is also isomorphic to the layout of the physical world, making use of the topographic space in signing space.

Classifier predicates (or constructions) form the most complicated system of sign languages. They form the core of sentences in sign languages in the form of [X, Y, ($X_{pro}{\rightarrow}Y_{pro}$)], where X and Y represent two entities in the event in their lexical form, and X_{pro} and Y_{pro} refer to the proforms of X and Y, respectively. The arrow in $X_{pro}{\rightarrow}Y_{pro}$ represents the subject-to-object relationship between the two entities. The proforms have a function akin to pronouns. They are either partially reduced from the lexical forms, or assume new forms which happen to have classificatory functions, thus, classifiers. We can say that all the classifiers in classifier predicates are proforms, but some proforms do not have a classificatory function (Chang et al. 2005).

p. 535 For the purpose of the illustration of proforms, Figure 33.1 is repeated here. ↳
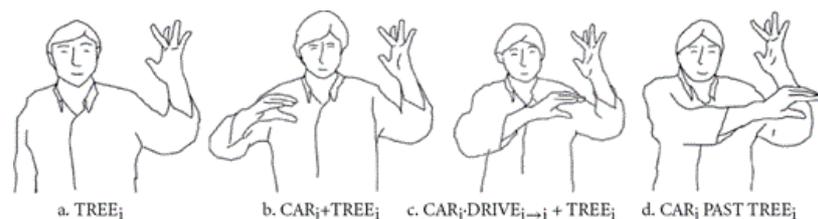

Figure 33.1 TSL utterance meaning 'The car drove past the tree'.

Figure 33.1a is the 'proform' of 'tree'. In Figure 33.1b, it stays still as the Ground, while the proform of 'car' (also the classifier for 'vehicle') comes into the picture. In Figure 33.1c, the car moves toward the tree. In Figure 33.1d, the car passes the tree. Note that the proform of 'car' and the proform of 'tree' are simultaneously articulated by the dominant hand (the Figure) and the non-dominant hand (the Ground), respectively. The direction of movement is isomorphic to our perceptual world. When the discourse context is clear, the full form of X and Y need not be signed. The classifier predicate ($X_{pro}{\rightarrow}Y_{pro}$) itself expresses the grammatical relationship between X and Y, thus forming a proposition in meaning. Also note that neither 'car' nor 'tree' is in their lexical forms. Therefore, both the 'proform' and the 'classifier' are morphemes in status. Only when they act in tandem simultaneously do they form a proposition.

Let's take two more examples from TSL for illustration. The sentence in (16) can be expressed in either O_i–S_j–$V(j{\rightarrow}i)$ or S_j–O_i–$V(j{\rightarrow}i)$ order in TSL, as shown in Figures 33.10 and 33.11, respectively.

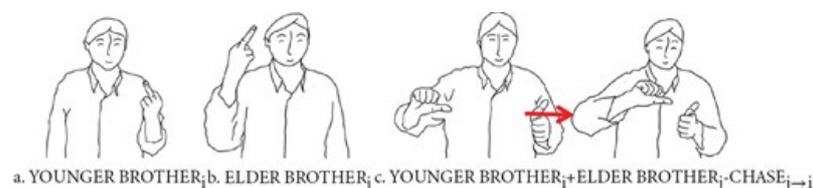(16) Elder brother chased younger brother.

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Figure 33.10 TSL utterance with OSV order meaning 'Elder brother chased younger brother'.

a. ELDER BROTHER$_j$ b. YOUNGER BROTHER$_i$ c. ELDER BROTHER$_j$+YOUNGER BROTHER$_i$-CHASE$_{j \to i}$
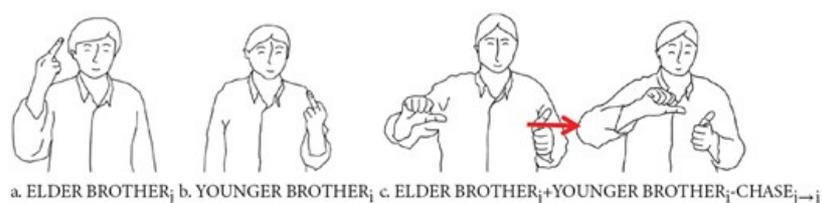
Figure 33.11 TSL utterance with SOV order meaning 'Elder brother chased younger brother'.

Around 1980, the consensus was that the basic word order in American Sign Language (ASL) is SVO (Fischer 1975; Liddell 1980). In the same vein, Smith (1989, 1990) has also proposed SVO for TSL. However, as noted in Sandler and Lillo-Martin (2006: 288), in different pragmatic contexts, ASL also has OSV, SOV in a sentence with reversible subject and object. In irreversible subject–object relationship, even OVS and VSO are found, such as 'ice-cream like boy', 'like ice-cream boy'. Later, in research on ASL and Quebec Sign Language (Bouchard and Dubuisson 1995; Bouchard 1996), the proposal that sign languages have no set sentence word order is resurrected. Compared with spoken languages, basic word order (Subject, Verb, Object) is much more flexible in sign languages due to the pointing nature of 'agreement verbs', zero anaphora, and topicalization (Fischer 2014).

There seem to be three main reasons for the relative flexibility of word order in sign languages. First, real-world knowledge plays a role in word order. This is true in ASL (Fischer 1975), BSL (British Sign Language; Sutton-Spence and Woll 1999), and TSL (Tai and Tsay 2015). In other words, the word order SVO is not used to stand for the agent–patient relationship in the symbolic system of signed languages. Interestingly, the role of real-world knowledge in word order also holds true for some spoken languages such as Chinese and creoles (Tai 2013).

The second reason is that typologically, sign languages are also topic-prominent languages. "The topic sets up a spatial, temporal or individual framework within which the predication takes place" (Sutton-Spence and Woll 1999: 59). Therefore, the topic chain, as observed in Chinese, also appears frequently in sign languages. Thus, when the topic is in the individual framework, a sentence in sign language assumes the form of [X, Y, $(X_{pro} \to Y_{pro})$], where X and Y are both topics, and the $(X_{pro} \to Y_{pro})$ is the predicate in which the proforms of X and Y are signed simultaneously in classifier constructions.

The third reason has to do with the use of 'pointing' to indicate the grammatical relationship between the actor and the recipient of an action. Verbs such as 'hit', 'chase', 'give', and 'receive' have been referred to as 'agreement verbs' in early research on sign languages, but more recently as 'indicating verbs' (Liddell 2000; Fenlon et al. 2018). Generally speaking, in sign languages, the basic word order can be parametrized by three types of verbs; that is, plain verbs, indicating verbs (agreement verbs), and spatial verbs. As noted in Sutton-Spence and Woll (1999), spatial verbs such as 'put' and 'move', which express the movement of an entity from one location to another, use the topographic space in signing space, and the movement is isomorphic to the layout in the real world. In contrast, the movement in indicating verbs employs the syntactic space to indicate the grammatical relationship between the actor and the recipient of an action. Nonetheless, the 'pointing' or 'indicating' verbs are iconic in that the pointing is from the actor to the recipient. The pointing can only be directed to the addresser in the case of 'receiving' verbs. Still, this backward pointing in receiving verbs is iconic in that the addresser is the recipient of the action. Thus, in both deictic pronouns and indicating verbs, the pointing plays a key role in meaning construction of sign languages (Liddell 2000, 2003).

The third type of verbs in sign languages is referred to as 'plain' verbs. While spatial verbs and indicating verbs involve the movement in the signing space from one point to another, plain verbs are mostly body-anchored, and thus are unable to move around in either topographic space or syntactic space. Plain verbs therefore often employ SVO order to indicate the grammatical relationship of subject–object, as in (17a). In addition, because

the object can be topicalized, plain verbs can have OSV word order (17b). See Figures 33.12 and 33.13 for illustrations.

(17) a. My older sister is afraid of mice.
      b. Mice, my older sister is afraid of.
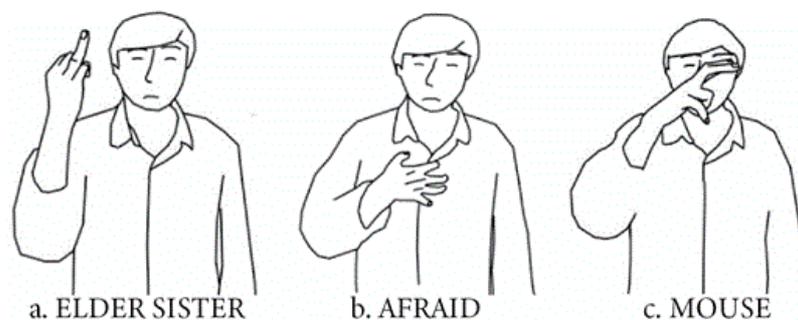
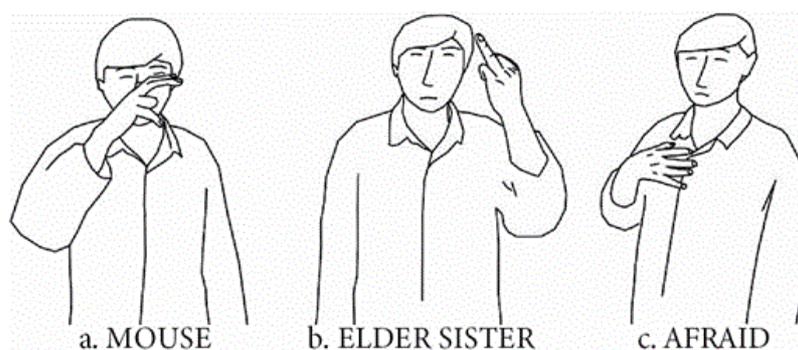**Figure 33.12** TSL utterance meaning 'My older sister is afraid of mice'.

Figure 33.13 TSL utterance meaning 'Mice, my older sister is afraid of'.

It appears that the topic–comment framework and the three types of verbs have rendered SOV and OSV as the predominant word order, with the exception of SVO for plain verbs.

33.6 Concluding remarks

One crucial aspect of spoken language discourse is intonation (Bolinger 1975, 1986). Intonation includes pitch range, loudness, rhythm, and tempo, and conveys emotions and attitudes of the speaker. These various aspects of intonation are suprasegmental and gradient in nature. Thus, they are simultaneously articulated with the linear elements in spoken languages. In addition, co–speech gestures accompany spoken language discourse (McNeill 1992, 2000; Goldin–Meadow 2003; Kita 2003; Kendon 2004). Co–speech gestures consist mostly of iconic and metaphorical gestures. Aspects of intonation are also iconic. Iconic motivations are also pervasive in the linear structure of spoken languages (Haiman 1980, 1985a, c). Thus, it is reasonable to think that spoken languages are largely iconic except in the area of the lexicon.

Parallel to intonation in spoken language are the non–manual signals in signed languages. These non–manual signals (including eye gaze, head nods, head shaking, and mouth actions) are signals for grammatical structures, in addition to emotional states (Liddell 1980, 2003; Sandler and Lillo–Martin 2006). In sign languages, gradient gestures accompany discrete signs. For instance, classifier handshapes for shape and size are categorical but can be manipulated to express analog information (Emmorey 2002: 84). These gradient

gestures are also employed to indicate degrees of distance, intensity, and aspectual modulations. They are abundant in classifier predicates as well (Duncan 2005). Furthermore, there is a symbiotic symbolization by hand and mouth in sign language. While speakers gesture with their hands, signers gesture with their mouths (Sandler 2009).

Sign language and spoken language constitute two different modalities of human language, exhibiting both modality non-effects and effects. For the function of communication, the two modalities employ whatever mechanisms are available to them (Sandler and Lillo-Martin 2006: 477–501). It appears that both signed languages and spoken languages are largely iconic, though structured in different components but in analogous manners. If language is a reflection of the mind (Chomsky 1972), the human mind is certainly not arbitrary but mirrors natural conceptualization of the real world.

Acknowledgments