UNIVERSITY OF CALIFORNIA, SAN DIEGO

Motivation in Morphology: Lexical Patterns in ASL and English

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The Dissertation of Ryan Lepic is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

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EPIGRAPH

"I believe that we social anthropologists are like the mediaeval Ptolemaic astronomers; we spend our time trying to fit the facts of the objective world into the framework of a set of concepts which have been developed *a priori* instead of from observation…. The trouble with Ptolemaic astronomy was not that it was wrong but that it was sterile—there could be no real development until Galileo was prepared to abandon the basic premise that celestial bodies must of necessity move in perfect circles with the earth at the center of the universe."

Edmund Leach

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ABSTRACT OF THE DISSERTATION

Motivation in Morphology: Lexical Patterns in ASL and English

by

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Doctor of Philosophy in Linguistics

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Words that are systematically related in form and meaning exhibit morphological structure. A fundamental question in morphological theory concerns the nature of this structure, and the role that it serves in grammatical organization. One view of morphological structure, the *morpheme-based* perspective, characterizes complex words as constructed from smaller, independently meaningful pieces. An alternative view, the *word-based* perspective, characterizes whole words as participating in patterns that are abstracted over networks of surface words, whether "simple" or "complex". This dissertation explores the consequences of these two views of morphological structure, as they apply to the analysis of American Sign Language and English. Here I show that the morphological structure of a variety of words in ASL and in English can be analyzed in terms of *constructions*, or learned pairings of form and meaning. These morphological constructions range from simple and concrete, in the case of actually-occurring surface words, to more schematic and complex, in the case of recurring patterns and sub-patterns extracted from whole surface words. Comparing compounds, derived words, borrowed words, and lexical blends in a spoken language and a sign language reveals that though many words can be analyzed into component pieces, the identifiable pieces may do very little to determine the meaning of the particular word. Instead, word-internal structure is a reflection of the structure of the networks, or *lexical families*, that whole words participate in. This exploration demonstrates that rather than primarily compositional, and resulting from the combination of meaningful parts, word-internal structure is relational, serving to link words together, within and across families. As a construction-theoretic analysis of derivational morphology in a spoken language and a sign language, this dissertation ties together and provides a unified analysis for a range of empirical phenomena. I anticipate that this study will also provide a point of departure for future studies of spoken and sign language morphology, either together or in isolation, from a construction-theoretic and word-based perspective.

CHAPTER 1

MOTIVATION IN MORPHOLOGY

1.1 Introduction

This dissertation examines the structure of complex words; it is an investigation of morphology as the systematic co-variation between linguistic forms and their meanings. That complex words display internal structure is not controversial. However, what it means to have morphological structure, and the nature of the structure itself, have both received multiple interpretations and implementations in modern linguistic theory.

At the broadest level, the analysis of morphological structure has typically been carried out following two basic approaches, which I will distinguish here as the *morpheme-based* and *word-based* perspectives. Each approach is guided by different conceptualizations of linguistic data, and both follow different lines of inquiry regarding the nature of complex morphological structure. Accordingly, these two perspectives lead to the formulation of different research questions and to the use of different research methodologies for linguistic analysis. As alternative ways of seeing the world, the morpheme-based and word-based perspectives also prove consequential for how we talk about what we see.

This chapter provides an introduction to these two ways of looking at morphological structure, and is organized as follows: I begin with a brief orientation to the notion of word-internal structure in Section 1.2. Building from this broad characterization of morphological structure, in Sections 1.3 and 1.4 I develop analytic tools to facilitate analyses of complex word forms in a spoken language and in a signed language, from a morpheme-based and a word-based perspective. I begin each section with a description of the guiding assumptions of each approach, an implementation of these assumptions over a sample of data, and then a discussion of the consequences that each approach holds for the analysis of morphologically complex words. ASL, as a representative sign language, and English, as a representative spoken language, differ regarding the formatives that are available for creating structurally complex words; however, systematically comparing complex words in ASL and English provides insights for identifying the assumptions a theory of morphology must make, but that may not be obvious from studying either language in isolation. In this chapter and throughout the dissertation, I also focus on words and signs that have traditionally fallen outside of the bounds of the morpheme-based approach. I argue that, rather than peripheral to the development of morphological theory, these phenomena can be construed as crucial for developing a comprehensive theory that covers both the "periphery" and the "core" phenomena, guided by the same assumptions and analyzed using the same descriptive tools.

1.2 Complex word-internal structure

Morphological analysis begins with the observation that words exhibit structure that can be described in terms of recurring formative elements. For example, a simple word like the English verb *teach* can be represented as a string of phonemes,

/tič/, and the same elements can be composed differently to form the simple verb *cheat*. The phonemic structure of these simple words, following Saussure (1916/1959), illustrates the *arbitrariness of the sign*; the same set of formatives can be reused in different combinations to create words with different meanings, and so the relationship between form and meaning in these words is considered arbitrary.

Saussure observed that morphologically complex words, in contrast, are *partially motivated*: the parts that recur within them can be shown to systematically co-vary with their meanings. Accordingly, many complex words exhibit systematic relations to simple words; a complex word like *teacher* not only contains the phonemes /tičər/, but within *teacher* we can also identify the simple verb *teach* and an affix, *–er*. In *teacher*, the element *–er* is associated with a change in lexical category, from verb to noun, as well as a designation of the agent of the verb, i.e., 'one who teaches'. The recurrent element *–er* also appears in the word *cheater*, where it is similarly associated with a change in lexical category and in meaning. The presence of the formative element *–er* thus contributes in a predictable and uniform way to the meaning of these particular complex words.

A fundamental question I address in this chapter concerns the nature of the structure in these complex, partially motivated words, and how to characterize this structure within a theory of morphology. To facilitate as close a comparison between the morpheme-based and word-based approaches as possible, we will compare these alternative perspectives on morphological structure within the framework of generative grammar. The assumptions that guide generative analyses have played a central role in the development of morphological theory in linguistics, in general (e.g., Jackendoff 1975; Aronoff 1976), and the same assumptions have also typically guided previous analyses of ASL morphology by default (e.g., Supalla 1986; Liddell and Johnson 1989; Mathur 2000; Fernald and Napoli 2001). As will become clear by Chapter 2, the perspective that I adopt in this dissertation is word-based, and is situated in a construction-theoretic framework, not a generative one. Nevertheless, it is beneficial to begin by spelling out the guiding assumptions of the morpheme- and word-based approaches as they have been articulated in the framework of mainstream generative grammar.

Generative theories of linguistics have traditionally appealed to a hypothetical "evaluation measure" to facilitate selecting simpler descriptions from competing alternatives (Chomsky 1965; Chomsky and Halle 1968). However, the nature of the linguist's description can vary quite a bit depending on the notion of simplicity that is assumed. In a monograph discussing the notion of simplicity in generative morphology, Bochner (1993:16) notes that the evaluation measure, as a theoretical construct, is rarely used to actually compute relative complexity. This is because the evaluation measure is intended to apply only to linguistic descriptions that cover the same body of facts and are formalized in the same theory. In practice, competing analyses are rarely juxtaposed in exactly this way. Instead, the generative evaluation measure can be thought of as representing the set of assumptions the analyst brings to the task of describing linguistic structure.

In the following sections, I will examine the assumptions behind two formulations of the evaluation measure: the symbol-counting metric and the pattern-matching metric. Following Bochner (1993), I associate these metrics with morpheme-based and word-based approaches, respectively.

1.3 A morpheme-based approach

1.3.1 Guiding assumptions

The standard generative measure for evaluating the simplicity of a given analysis has been a symbol-counting metric, and it can be straightforwardly formulated in the following way: given two descriptions of the exact same set of linguistic facts, the simpler grammatical description is the one containing fewer symbols (Halle 1962:55). Lexical descriptions following this metric seek to reduce complexity by reducing overall symbolic length; this is often achieved by replacing all recurring information in the description, whether phonological or morphological, with what is called a "lexical redundancy rule" (cf. Jackendoff 1975:642; Bochner 1993:40). Such rules state two-way relationships between morphologically simple and morphologically complex English words, describing how the complex words are derived from the simpler ones. The morpheme-based view thus characterizes morphology as a rule-governed system in which word-internal structure consists of combinations of smaller meaningful pieces, typically called *morphemes*.

To return to an earlier example, the structure of the English word *teacher* and the related words *interpreter* and *writer* can be described using a lexical rule. These words have in common that they contain the affix –*er*, and that they denote 'one who does X'. They also have in common that the activity the agent performs is indicated in a related word: an interpreter *interpret*s, a teacher *teach*es, and a writer *write*s. While *interpreter*, *teacher*, and *writer* have complex internal structure, the meanings of the morphemes themselves, *interpret*, *teach*, *write*, and –*er*, are arbitrary and conventional. A morpheme-based analysis of the relationship between *interpreter*, *teacher*, and *writer* posits a rule that combines a verb and a derivational affix to create agentive nouns, and by stipulating lexical entries for those simple verbs which serve as bases for the derivation. This can be done as in Example 1.1, which lists an –*er* rule and three lexical entries as pairings of form and meaning.

Example 1.1. An (a) –*er* rule derives complex nouns from (b) simple verbs

a.

$$\begin{bmatrix} [x]_{\mathrm{V}} \\ \text{'X'} \end{bmatrix} \leftrightarrow \begin{bmatrix} [x]_{\mathrm{V}} + er]_{\mathrm{N}} \\ \text{'one who does X'} \end{bmatrix}$$

b.

$$\begin{bmatrix} [\textit{interpret}]_{\mathrm{V}} \\ \text{'interpret; to explain or translate'} \end{bmatrix}$$

$$\begin{bmatrix} [\textit{teach}]_{\mathrm{V}} \\ \text{'teach; to provide instruction'} \end{bmatrix}$$

$$\begin{bmatrix} [\textit{write}]_{\mathrm{V}} \\ \text{'write; to compose a text'} \end{bmatrix}$$

This sort of analysis is simpler than lexically listing all six words, for at least two reasons. First, it formally represents the regular relationships among the word pairs *interpret*◆*interpreter*[1], *teach*◆*teacher*, and *write*◆*writer*. Second, only three words and one affixation rule need be listed, a more economical solution than lexically listing six words. Under the morpheme-based approach, morphologically complex words like *teacher* are analyzed as being built from smaller, independently meaningful pieces by rule. Other recurring patterns, for example *decide*◆*decision*, can be analyzed similarly; listing an *–ion* rule accounts for the derivation of *generation* from *generate*, *relation* from *relate*, *evaluation* from *evaluate*, and so on.

Morpheme-based analyses aim to identify recurrent patterns among the words of a language in a way that permits the generation of whole words from lexical rules. Such lexical rules then account for relationships between surface words. With the appropriate morphemes and rules identified, the storage of complex words would be redundant, since they are the product of the relevant pieces and the way they combine. These considerations lead to the conclusion that morphologically complex surface words are not themselves objects of primary theoretical interest: they are lexically listed only if they cannot be straightforwardly built up from smaller pieces by rule.

With this general characterization of the morpheme-based approach in mind, I now turn to see how the assumptions of the morpheme-based approach apply to the analysis of complex signs in ASL.

---

[1] Following e.g., Arndt-Lappe and Plag (2013) I use the ◆ notation to denote two morphologically-related forms. This is especially beneficial when there is no readily identifiable affix and so a more traditional morphemic gloss is inappropriate, for example in connection to prosodic morphological operations involving truncation, as in *totally*◆*totes*, *microphone*◆*mike*, and *refrigerator*◆*fridge*.

1.3.2 A first pass at ASL morphology

In ASL it is possible to identify pairs of signs which are related to one another in the same way that *teach* and *teacher* are in English. As an example, consider the ASL sign INTERPRET. In sign language linguistics, after Stokoe (1960), it is conventional to minimally describe signs in terms of the handshape, location, and movement used to form the sign. Accordingly, the sign INTERPRET is made with the dominant and non-dominant hands configured in two F handshapes contacting one another in neutral space in front of the signer. During the articulation of the sign, both forearms alternatingly twist, causing the hands to pivot around the point of contact between them. The pairing of form and meaning in ASL sign INTERPRET can be represented as in Example 1.2:

Example 1.2. ASL INTERPRET is a pairing of form and meaning[2]

H: F_{DH}, F_{NDH}
L: contacting in neutral space
M: DH and NDH alternatingly twist $]_V$

'interpret; to explain or translate'

This representation can be interpreted as follows: like the representations of English words in Example 1.1b, the representation of the ASL sign INTERPRET in Example 1.2 is a pairing of a particular form, described as the combination of certain phonological features for handshape (H), location (L), and movement (M), with a particular

[2] The ASL sign illustration in this example is adapted from Tennant and Brown (2010:247).

meaning, 'interpret'. Like English *interpret*, ASL INTERPRET is often considered to be a simple sign, and an arbitrary pairing of meaning and form.

In contrast to the sign INTERPRET, a sign like INTERPRETER additionally contains identifiable morphological structure, and can therefore be considered a complex sign. Within INTERPRETER we can discern a truncated form of the verb INTERPRET, and an agentive affix which, like the English affix *–er,* is associated with a change in meaning, i.e., 'one who interprets'. The form of this affix can be described as two open-B handshapes simultaneously moving downward in neutral space:

Example 1.3. Complex signs like INTERPRETER contain a derivational affix[3]

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: } x \\ \text{L: } x \\ \text{M: } x \end{array}\right]_{\text{V}} + \left[\begin{array}{l} \text{H: open-B}_{\text{DH}}\text{, open-B}_{\text{NDH}} \\ \text{L: facing each other in neutral space} \\ \text{M: DH and NDH move simultaneously downward} \end{array}\right]_{\text{N}} \\ \text{'one who does X'} \end{array}\right]$$

The form of the verb INTERPRET has been truncated within the sign INTERPRETER because, in general, ASL signs are segmentally quite restricted (e.g., Perlmutter 1992; van der Hulst 1993; Brentari 1998; Aronoff, Meir, and Sandler 2005; Sandler and Lillo-Martin 2006); though there is some debate about the nature of segmental

[3] The ASL sign illustration in this example is adapted from Tennant and Brown (2000:188, 251).

phonological structure in sign language, there is general agreement that the most segmentally complex signs are typically and maximally two segments long; even segmentally complex signs like INTERPRETER often reduce in some way, as a response to this strict constraint on overall length. Accordingly, many of the formational parameters within a sign are articulated simultaneously, rather than sequentially (see Vermeerbergen, Leeson, and Crasborn 2007; Meier, Cormeir, Quinto-Pozos 2009 for discussion). This has implications for identifying sign-internal morphological structure, and for identifying simple and complex signs in ASL; perhaps the clearest example of this simultaneous morphological structure can be seen in the ASL pronoun system, in which simultaneous phonological features are associated with a variety of changes in meaning.

In the ASL pronoun system, the location of the sign co-varies with grammatical person information, whether 'first' (location is the signer's chest) or 'non-first' (location is neutral space). The movement of the sign co-varies with grammatical number, whether 'single' (a single straight point) or 'plural' (a single arc movement between two points). Finally, the handshape of the sign indicates a variety of different grammatical cases/functions: 'neutral' (a horizontal 1 handshape), 'possessive' (a vertical open-B handshape), 'emphatic/reflexive' (an open-A handshape), or 'formal/presentational' (a horizontal open-B handshape) (see Liddell 2003; Sandler and Lillo-Martin 2006; Wilkinson 2013).

These recurring formational elements and their corresponding meanings can be represented as in Example 1.4; here, the elements which combine to form the second person singular possessive pronoun YOUR(S) serve to illustrate the functions of handshape, location, and movement in the ASL pronominal system.

Example 1.4. Three discriminable elements in the ASL pronoun system, (a) the open-B handshape, (b) the location in neutral space, and (c) the single straight movement pattern, are each associated with pronominal grammatical functions[4]

a.

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: open-B}_{\text{DH}} \\ \text{L: } y \\ \text{M: } z \end{array}\right] \\ \\ \text{'possessive'} \end{array}\right]$$

b.

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: } x \\ \text{L: neutral space} \\ \text{M: } z \end{array}\right] \\ \\ \text{'non-first person'} \end{array}\right]$$

c.

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: } x \\ \text{L: } y \\ \text{M: single straight point} \end{array}\right] \\ \\ \text{'singular'} \end{array}\right]$$

The three formational elements in Example 1.4 can then be analyzed as combining to derive the form and the meaning of the individual pronoun YOURS. In ASL pronouns,

[4] The ASL sign illustration in this example is adapted from Tennant and Brown (2000:52). Additional aspects such as eyegaze and orientation of the hand/body further distinguish second-person and third-person pronouns in ASL; for simplicity, only handshape, location, and movement are considered here.

all of the formative elements that make up a given pronoun are also associated with aspects of the sign's meaning. Thus, for example, the sign ME[5] 'neutral first person singular' is articulated with a 1 handshape moving in a straight line to contact the signer's chest, and the form of the sign US 'neutral first person plural' minimally differs in that it moves in an arc from one side of the signer's chest to the other. Similarly, the sign YOU 'neutral non-first person singular' is articulated with a 1 handshape moving through neutral space toward the addressee in a single straight movement, and the sign YOURSELF 'reflexive/emphatic non-first person singular' minimally differs in that it is formed with an open-A handshape.

ASL pronouns seem to be made up entirely of morphological markers, though phonologically, they are no more complex than any given simple sign. Unlike the sign INTERPRETER, in which we can identify (part of) the verb INTERPRET and a separate agentive affix, with each of these pieces in turn being made of combinations of phonological features, the morphological markers that signal contrasts in the ASL pronoun system overlap, and are indistinguishable from individual phonological formatives. Despite the fact that the identifiable morphemes in this case are sub-segmental features, the structure of the ASL pronoun system is nevertheless compositional and regular, and the meaning of a given pronoun can be exhaustively analyzed as a function of the meanings associated with its sub-segmental component parts.

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[5] Following standard practice, in the remainder of the dissertation I primarily refer to ASL signs using English "glosses", in which a single word or a group of words separated by hyphens represents a single sign. Please see the glossary of ASL signs at the end of the dissertation for discussion and examples.

As a final example, consider the sign THINK-HEARING. Padden and Humphries refer to the ASL sign THINK-HEARING as "a novel creation formed by combining selected elements from the two signs THINK and HEARING" (1988:53). THINK-HEARING is a disparaging sign; more than simply 'thinking like a hearing person', it means 'thinking in a way that devalues deaf people', for example by not valuing ASL. Like the English words *oreo* and *banana*, which are sometimes used to describe African- and Asian-Americans who act in ways that suggest that they identify with the cultural values of the white majority, and thus, despite the color of their skin are "white on the inside", the ASL sign THINK-HEARING describes those who are deaf, but act as though they are "hearing on the inside".

Our task in developing a morphological analysis of this complex sign is to determine the nature of the structure that can be discerned within it. As Padden and Humphries note, THINK-HEARING contains formative elements that are also found in the signs THINK and HEARING. They do not refer to the sign as a lexical blend, but their description of THINK-HEARING is suggestive of its status as a blend. Lexical blending is the process of creating a new word from parts of existing words (e.g., Algeo 1977; Bauer 2012; Chapter 5). THINK-HEARING similarly reuses parts of existing signs in the service of creating a new sign. The sign THINK is articulated with a 1 handshape, an extended index finger from a closed fist, moving to touch the side of the forehead. The sign HEARING is articulated with the same 1 handshape, held horizontally and moving in small circles in front of the mouth. The blend THINK-HEARING is formed identically to HEARING, except that rather than being signed near the mouth, the sign is articulated at the center of the forehead. Thus, as can be seen in Example 1.5, the handshape and movement of THINK-HEARING are those used in the sign HEARING, and the location is associated with that of the sign THINK.

Example 1.5. Parts of (a) THINK-HEARING are also used in (b) THINK and (c) HEARING

a.

H: 1_{DH}
L: **forehead**
M: **DH moves in small circles** A

'thinking like a hearing person;
thinking in a way that devalues deaf people'

b.

H: 1_{DH}
L: **forehead**
M: DH moves to contact forehead V

'think; to have an opinion or idea'

c.

H: 1_{DH}
L: mouth
M: **DH moves in small circles** A

'hearing; not deaf'

As we will see, the apparent transparency of the sign THINK-HEARING is somewhat deceptive. In what follows, I will descriptively explore the relationship between form and meaning in this sign: we will see that though THINK-HEARING is straightforwardly decomposable into recurrent pieces, this does not mean that it can be straightforwardly derived from the composition of those same pieces.

Looking to decompose the signs in Example 1.5 into smaller meaningful pieces, we might hypothesize that the shared forehead location in THINK and in THINK-HEARING is responsible for the shared 'think' meaning between them. Similarly, the circling movement shared by HEARING and THINK-HEARING could be seen as encoding their shared 'hearing' meaning. However, this analysis immediately encounters three representational challenges, all of which stem from the fact that THINK, HEARING, and THINK-HEARING exhibit different kinds of internal structure.

First, if the forehead location means 'think' in the signs THINK and THINK-HEARING, it is not immediately clear what additional function the handshape and movement of THINK can be said to serve; because they cannot be analyzed as contributing to the meaning of the sign, we are left with no account of why they are selected in the formation of the sign THINK. Similarly, if the circling 1 handshape encodes the meaning 'hearing' in HEARING and THINK-HEARING, it is not clear what additional aspects of meaning are left over for the mouth location to contribute to the sign HEARING. A morphemic analysis of the sign THINK-HEARING therefore leads to the identification of parts which may not be morphemic in THINK or HEARING. Relatedly, though THINK-HEARING can be said to mean 'to think like a hearing person', it is not clear how the elements that mean 'think' and 'hearing' can be combined to further derive the disparagement meaning 'to think in a way that devalues deaf people' that the sign THINK-HEARING also connotes; what element of form can this latter meaning be attributed to? Finding no satisfactory way to exhaustively associate the forms and meanings of the signs THINK, HEARING, and THINK-HEARING, one might feel compelled to stipulate that THINK-HEARING is idiosyncratic, neither permitting nor requiring a more principled analysis, and hence, is simply lexically listed.

1.3.3 Assessment of the morpheme-based approach

Though the morpheme-based analysis provides an intuitive analysis of transparently compositional words in English and in ASL, in the case of a sign like THINK-HEARING it requires either additional assumptions to accommodate non-exhaustive associations of forms and meanings, or it can declare signs like THINK-HEARING to be idiosyncratic and therefore un-illuminating with respect to understanding ASL morphology. Such a declaration might then lead the analyst to lose sight of the obvious connection between the independent signs THINK and THINK-HEARING, and the near-compositional aspects of structure that they share.

Independently, and with other types of data, Bochner (1993) suggests that this latter view is inherent to morpheme-based proposals. He observes that the morpheme-based analysis does not anticipate that morphologically complex words can have, or ever develop, any characteristics that do not derive from the incremental composition of the meanings of their constituent morphemes. This issue becomes evident in the case of words ending in *–ion*: words like *evaluation* and *decision* are transparently compositional, while the related forms *generation*, *commission*, and *transmission* have idiosyncratic meanings (e.g., 'a group of people born and living at the same time', 'the amount of money paid to an agent in a commercial transaction', and 'the mechanism which powers the wheels of a car') beyond those meanings that can be predicted from the regular combination of *generate*, *commit*, or *transmit* with the affix *–ion* (i.e., 'the act of generating', 'the act of committing', and 'the act of transmitting') (cf. Aronoff 1976). Though they are all complex words, there appears to be a gradient of relatedness between these forms, ranging from complete compositional regularity in the case of *evaluation* to clear idiosyncrasy in the case of *transmission*, that cannot be attributed to the morpheme *–ion*.

Bochner's second observation, related to the first, is that any lexical idiosyncrasy inherent to a morphologically complex word, that is, the "independent information" that it contributes to the grammatical description, has to be represented somewhere. Following from Jackendoff's (1975) formulation, Bochner identifies independent information as grammatical knowledge which cannot be matched to a lexical rule, such as knowing a) that the word in question exists, b) the word's formational and semantic idiosyncrasies, and c) which other words the word in question is related to (1993:43). Bochner demonstrates that the conventional mechanism for representing independent lexical information under the morpheme-based analysis is to specify it with diacritic features on the morphemes involved. This has the effect of treating all morphological rules as though they apply without exception, and hence, are fully regular.

For example, in English, many nouns can combine with the affix *–ed* to form an adjective meaning 'having an X (or Xes)'. Some examples of words that fit this pattern are *cape*◆*caped*, as in *caped crusader*; *beard*◆*bearded*, as in *bearded lady*; *horn*◆*horned*, as in *horned lizard*; and *spike*◆*spiked*, as in *spiked helmet*.

However, the *–ed* rule is irregular, as not all nouns can undergo this derivation. For example, in English, the words *headed* and *pursed* do not seem to have the intended meanings 'having a head' or 'having a purse' (e.g., ?*headed statue*, ?*pursed lady*). That the fact that $[[\textit{beard}]_{N}\ \textit{ed}]_{Adj}$ exists but $[[\textit{head}]_{N}\ \textit{ed}]_{Adj}$ does not leaves a morpheme-based approach with three options. The first is to privilege the fact that the actually-occurring words are idiosyncratic, and to treat words like *bearded* and *caped* as lexically listed, and therefore unanalyzable and non-derived, with no formal relationship to one another or to their corresponding base nouns (cf. Kiparsky 1982). The second option is to treat the distinction between actually-occurring and non-occurring words as peripheral to the theory, and to assume that, even if some words that might be predicted to exist according to a given rule do not actually exist, they could, and the linguist's analysis should reflect this possibility (cf. Allen 1978). The third option is to privilege the fact that the actually occurring words have analyzable structure, and to use formal diacritics to specify exactly which nouns can undergo the *–ed* derivation, thereby capturing the intuition that these irregular patterns are nevertheless compositionally structured.

As Bochner explains, this final solution, the diacritic approach to lexical idiosyncrasy, involves marking simple nouns like *horn* with some abstract feature, something along the lines of "+ED", to indicate that they can combine with the affix –*ed* to form a denominal adjective like *horned*. This, he suggests, is largely a phenomenon-particular re-description of the facts, rather than a genuine explanation. This analysis is non-predictive; the diacritics exist only to get the descriptive facts right, and to facilitate putting the pieces of the original morphologically complex word back together again.

Another example in English involves the affix *–ive*, which can similarly be analyzed as only attaching to simple verbs bearing a +IVE diacritic. This provides a descriptive account of the fact that *–ive* attaches to "+IVE verbs" like *permit* to form *permissive*, but does not attach to non-IVE verbs, like *admit*, to form **admissive*, however it does so without explaining why this should be the case. The necessary use of diacritics in this way can be seen as an *ad hoc* technical solution to intriguing morphological variation; it serves as a way to maintain the hypothesis that morphologically complex words must either be transparently derived from independently meaningful parts, or listed as opaque wholes.[6]

The symbol-counting metric constrains generative morphological theories to be inherently syntagmatic; by virtue of seeking to purge redundant information from the grammatical description, and to replace recurring configurations of meaning and form in derivationally-related words with more abstract lexical redundancy rules, the symbol-counting metric is concerned with morphologically complex words only to the extent that they can lead to the identification of independently meaningful morphemes, and of rules which combine morphemes to form words.

Because they view morphological structure as rule-based and procedural,

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[6] Far from representing a "straw-man" characterization of a morpheme-based analysis, we will see a very real implementation of this diacritic-based analysis when discussing "ion-morphs" (Fernald and Napoli 2000) in ASL in Chapter 4.

morpheme-based approaches consider all morphological structure inherently compositional and typically regular, following, notably, Bloomfield (1933:274). Bloomfield adopted a view of morphology in which the lexicon is "a basic list of irregularities", containing simple morphemes that can be combined by the grammar to produce complex expressions whose meanings derive from the meanings and arrangement of their pieces. A number of post-Bloomfieldian approaches to morphology (see Blevins 2006, 2015 for discussion) follow this view, and consider the lexicon a repository for everything that is non-compositional, including affixes, morphologically simple words, and idiomatic expressions; DiScullo and Williams (1987:3), for example, characterized the post-Bloomfieldian lexicon as being "like a prison – it contains only the lawless, and the only thing its inmates have in common is lawlessness".

Following directly from the post-Bloomfieldian conceptualization of the lexicon, morpheme-based approaches share the underlying assumption that there is a sharp divide between compositional words and non-compositional words: the former are constructed, and the latter are listed. However, complex words that do not fit into the regular vs. irregular dichotomy pose a problem for morpheme-based approaches (see also Aronoff 1976; Anderson 1992; Hay and Baayen 2005; Blevins 2006). As Blevins observes, post-Bloomfieldians were keenly aware of these sorts of problems from the outset, and devised a number of technical solutions to address them:

> The segmentation of words into arrangements of formatives sometimes produced analyses in which there appeared to be a shortfall of meaning-bearing segments, and at other times produced analyses in which there seemed to be an excess of segments. … Many of the inventive solutions

> that the Post-Bloomfieldians developed to meet these challenges remain with us, in the form of the 'zero', 'empty' and 'portmanteau' morphs that still populate morphemic analyses. (Blevins 2015:1-2)

A principal limitation of the morpheme-based view of morphology, then, is that, even in more recent conceptualizations in which the morpheme as a unit of meaning has only an abstract relation to surface form (e.g., Harley and Noyer 1999; Marantz 2013), it narrowly defines morphological structure to be exclusively of one certain type.

In sum, the morpheme-based approach is primarily syntagmatic and constructive, characterizing word-internal structure as the regular, rule-governed combination of independently meaningful pieces, called morphemes. These characteristics can be summarized as in the left column of Table 1.1:

Table 1.1 Main characteristics of two approaches to morphological analysis

	Morpheme-based	***Word-based***
Primary meaningful units	morphemes	
Role of word-internal structure	to convey meaning	
Theoretical status of words	epiphenomenal	
Theoretical apparatus	morphemes, rules	
Nature of lexical organization	Compositional, constructive: Rules describe how complex words are derived from smaller meaningful parts Rules are extrapolated via lexical decomposition	

1.4 A word-based approach

1.4.1 Guiding assumptions

In contrast to morpheme-based approaches, which are essentially constructive and syntagmatic, word-based approaches are essentially abstractive and paradigmatic. These different orientations have consequences for how linguistic data is perceived and analyzed, as well as for the sorts of questions and predictions that emerge from the theory: under a word-based approach, systematically-related words are viewed as participating in a network of morphological patterns, and redundancy among complex words is a measure of interpredictability and systematicity in the lexicon (e.g., Hockett 1967; Krott, Baayen, and Schreuder 2001; Aronoff and Lindsay 2013; Ackerman and Malouf 2013; Rácz, Pierrehumbert, Hay, and Papp 2015).

Bochner's (1993) pattern-matching metric is one instantiation of the assumptions guiding this word-based approach; an advantage of Bochner's approach is his demonstration that the pattern-matching metric is more than just an alternative descriptive toolkit, as it can in principle be directly and quantitatively compared to the symbol-counting metric (1993:43, 48). Bochner's pattern-matching metric can be formulated as follows: given two competing grammatical descriptions, the simpler description will be the one that contains less independent information which cannot be matched to a more general pattern. In Chapter 2, I will explore this kind of approach using assumptions from the theory of Construction Morphology, as well (Booij 2009, 2010).

Where morpheme-based approaches derive complex words like *caped* and *decision* by rule, word-based approaches specify full entries for actually occurring words, regardless of whether they are simple or complex. As a consequence, rather than deriving *decision* from *decide* or *caped* from *cape*, the word-based approach instead treats lexical redundancy rules as a formal implementation of the intuition that these complex words "fit into" the lexicon better than arbitrary, unrelated forms with the same meanings would. This sense of "fitting in" or not is formalized as matching an existing lexical pattern; analyses that subscribe to such a pattern-matching metric achieve simplicity of grammatical description by identifying the surface patterns, and sub-patterns, that recur among the words of a language.

While the patterns identified in this way are language-particular, the hypothesis that all morphological systems are organized in this way represents a general claim about natural language morphology: the patterns that classes of words belong to are themselves situated within a larger system of patterns. Thus, while rules in a morpheme-based proposal can be augmented with conditions or diacritics to constrain their application, the patterns in a word-based proposal are instead constrained by the dynamics of the system they participate in, as a whole (see Matthews 1991, Wedel 2011, Ackerman and Malouf 2013, Ackerman and Nikolaeva 2014). This leads to a view of morphological structure where a given word, or class of words, may participate in a variety of sub-patterns, and the analyst's job is to determine how particular subsets of patterns interact within the larger system to potentiate particular observed linguistic phenomena.

The pattern-matching metric is predicated on the existence of fully derived and inflected words, over which patterned relations can be abstracted; it begins with full lexical representations of actually-occurring surface words, regardless of their morphological complexity. Under this metric, a simpler lexical representation is not one that contains less overall information, but one that contains less *unpredictable* information, and redundancy among words serves as a measure of predictability. Accordingly, because it matches a (sub)pattern that also is found elsewhere in the lexicon, i.e., *elide*◆*elision*, the noun *decision* is analyzed as containing no more independent information than the verb *decide* plus the pattern that licenses the relationship between them. In terms of formal representation, this pattern, represented in Example 1.6, looks like the lexical redundancy rule in Example 1a:

Example 1.6. The *–ion* rule

$$\begin{bmatrix} [x]_{\mathrm{V}} \\ \text{'X'} \end{bmatrix} \leftarrow\!\rightarrow \begin{bmatrix} [x]_{\mathrm{V}} + \mathit{ion}]_{\mathrm{N}} \\ \text{'the result of Xing'} \end{bmatrix}$$

However, the difference here is that under the symbol-counting metric, a lexical rule is constructive; it constructs complex words. In contrast, under the pattern-matching metric, a lexical pattern is abstractive; it is a formal statement that has been abstracted over several related (sub)patterns. For example, the rule in Example 1.6 accounts for relationships among allomorphic classes of words represented by *abstract*◆*abstraction*, *commit*◆*commission*, and *decide*◆*decision*, as well.

Under the word-based approach, a necessary counterpart to a lexical rule is the set of fully specified lexical representations whose shared structure the rule describes. Bochner adopts the convention of listing such derivationally-related groups of words, which he calls paradigms, together in curly brackets: the words whose structure is described by the *–ion* rule in Example 1.6 include {*abstraction*, *commission*, *decision*, *elision*, *evaluation*, *generation*, *transmission*, …}. Because these words can be matched to a larger pattern, their fully specified lexical representations are not analyzed as contributing additional independent information to the grammatical description. The pattern-matching metric is therefore compatible with a view of word-internal structure where morphological structure marks relationships among whole words, without requiring this structure to be necessarily morphemic, that is, without requiring it to be compositional and fully regular.

Though the word-based view does not require morphological structure to be necessarily morphemic, neither does it preclude the recognition of structural elements that may resemble traditional morphemes. Word-internal structure can be demonstrably concatenative and regular, that is demonstrably "affixational", for some structures in some languages; the problem arises, as discussed by Matthews (1991), Anderson (1992), Bochner (1993), and Blevins (2006), among many others, when morphemic structure is assumed to be the sole type of structure in morphology. The word-based perspective is not reductive in this fashion: the basic hypothesis is that word-internal structure is crucial for distinguishing between (classes of) words. Affixes like *–er* and *–ion*, as bi-unique pairings of meaning and form, are the limiting and simplest types of structures for discriminating related words.

Unlike the symbol-counting metric, Bocher's pattern-matching metric describes non-compositional patterns in the same way that it describes compositional patterns. The well-known examples of phonesthemes (Firth 1960; Bergen 2004; Kwon and Round 2015), words like {*glimmer*, *glow*, *glisten*, *gleam*, *glitter*, …} which, in this case, share an element of form *gl*– and an abstract 'light' meaning, can be described by the rule in Example 1.7. This rule states that there is a systematic re-use of *gl*– in many words pertaining to 'light', in English, without requiring that the remainder of the word be associated with some aspect of meaning. This serves to identify systematic variation among sets of English words, regardless of whether the words contributing to the pattern can be seen as having compositional structure, or as having been derived from some other form.

Example 1.7. The *gl*– rule describes a systematic form-meaning correspondence in English

$$\begin{bmatrix} [\textit{gl-y}] \\ \text{'light'} \end{bmatrix}$$

Under the pattern-matching metric, morphological analysis involves identifying groups of systematically-related words, as well as the pattern that describes their shared structure. Given the nature of the pattern-matching metric, complex words can exhibit different degrees of independent information, thereby providing a principled way to avoid the categorical distinction between regular and irregular words associated with a morpheme-based perspective. Because it treats redundancy as a measure of lexical structure, the pattern-matching metric allows for inclusion of a wider range of partially-motivated patterns among surface words, and because it treats individual lexical patterns as necessarily participating in a larger system of patterned relations, it anticipates a notion of system-internal organization in morphology.

This comparison between related patterns within a word-based approach presupposes a notion of systemic organization, within which relations between pattern can be compared. Here I assume, following e.g., Esper (1973), and Genter and Smith (2012), that discriminative learning of related patterns taps into more general cognitive mechanism of analogical reasoning a mechanism for comparing, and making inferences about, relationships between similar situation or structures. This represents an empirical claim about morphological structure, that it should be subject to the same constraints that shape other complex systems in other branches of science.

We have seen, then, that word-based approaches to morphology are primarily paradigmatic, viewing morphological structure as configurations of formatives which can be systematically distinguished form other configurations of formatives. Not only does the word-based approach provide a different view of morphological structure, compared to the more familiar morpheme-based approach, it also hypothesizes that surface words and their organization into networks of relatedness, what I will call the structure of *lexical families*, are central to the analysis of morphological structure. To complement the summary in Table 1.1, then, in Table 1.2 the defining characteristics of the morpheme-based and word-based views are displayed side-by-side.

Table 1.2 Main characteristics of two approaches to morphological analysis, revisited

	Morpheme-based	***Word-based***
Primary meaningful units	morphemes	words
Role of word-internal structure	to convey meaning	to discriminate related words
Theoretical status of words	epiphenomenal	central
Theoretical apparatus	morphemes, rules	words and lexical families, analogy
Nature of lexical organization	Compositional, constructive: Rules describe how complex words are derived from smaller meaningful parts Rules are extrapolated via lexical decomposition	Relational, abstractive: Patterns describe systematic co-variation among existing words, regardless of their complexity Patterns are extrapolated via abstraction of discriminable differences observed among whole words

1.4.2 An alternative approach to complex words in ASL and English

Comparing morphological structure across signed and spoken languages allows us to identify and capture generalizations that hold regardless of modality. The word-based analysis of the regular and compositional words that we have been examining, like *teacher* and INTERPRETER, is largely the same; as we have seen, the word-based approach does not exclude compositionality from consideration, nor does it insist that morphological structure cannot be compositional.

The word-based perspective offers, however, an alternative means of analyzing THINK-HEARING in terms of its complex internal structure. Though THINK-HEARING's structure is not morphemic, it can be motivated with respect to general mechanisms of analogy which have been argued to be fundamental to human cognition (see Gentner 1983; Gentner, Holyoak, Kokinov 2001; Blevins and Blevins 2009; Hofstadter and Sander 2013). Here we will examine only three such processes and their application to morphological analysis: iconicity, metaphor, and linguistic analogy.

Iconicity, metaphor, and linguistic analogy have in common that they are broad labels describing classes of structured relationships between concepts, between linguistic forms, and between concepts and linguistic forms. These relations and processes have long been considered useful for understanding and explaining linguistic structure, but they are also quite hard to characterize in terms of categorical rules and operations (e.g., Esper 1973; Waugh 1994; Fischer and Nänny 1999; Wilcox 2000; Taub 2001; Plag 2006; Booij 2009, among many others). Because these terms may be used in different ways by different authors, I outline here how they relate to the linguistic phenomena I will discuss:

Iconicity, following Taub (2001) is an overarching label designating connections between meaning and form, such that a particular linguistic form is motivated by the form of an image associated with the referent concept. In spoken languages like English, at the lexical level, these "images" are typically auditory; the forms of conventional sound-symbolic words like *crunch*, *drip*, and *gulp* can be understood as being motivated, if not completely determined, by auditory images associated with their referent concepts. While sound-for-sound iconic representation is a relatively common type of iconicity across spoken languages, languages with conventionalized systems of sound-symbolic elements, such as *ideophones*, can typically convey a broader range of sensations, perceptions, and inner feelings, beyond auditory images associated with concrete referents, as well (see Dingemanse 2012).

I consider *metaphor* (again following Taub 2001) in terms of connections between concepts, such that one, typically more abstract concept is discussed using linguistic forms associated with another concept, which is typically more concrete. In Section 1.2.1, we saw that in English the words *oreo* and *banana* are sometimes used in a disparaging way to refer to African- and Asian-Americans who act as though they are "white on the inside". The English words *oreo* and *banana* refer to food items, but they have been extended, on the basis of physical characteristics of the foods they denote, to describe people who metaphorically display similar characteristics.

Finally, *(linguistic) analogy* will be understood, following, e.g., Anderson (2015) in terms of associations between words as form-meaning pairings in a linguistic system, such that patterns between related words can be extended to other words that previously did not participate in the pattern. A well-known example is the English verb *edit*, which was originally coined from the independent noun *editor* based on a reanalysis of the final syllable in *editor* as an agentive affix, and on analogy to the existing pattern *teach*◆*teacher*.

The value of considering iconicity, metaphor, and analogy as motivating forces in morphology is confirmed when we consider again the ASL sign THINK-HEARING. The formation of the sign THINK-HEARING from the signs THINK and HEARING can be understood as resulting jointly from iconic, metaphoric, and analogical motivations.

In order to see how this is the case, we will begin with the ASL sign HEARING. The English word *hearing* is derived from the verb *hear*, however, though it is glossed as HEARING, the ASL sign that refers to 'people who can hear' is actually a metaphorical extension of the homophonous verb SAYING. SAYING is an iconically motivated sign; the movement of the signer's finger near the mouth in this sign evokes the movement of a speaking mouth. SAYING's form can therefore be seen as motivated by its meaning. In particular, the mouth can be seen as representing a human mouth, the 1 handshape as representing the general shape of a human mouth, and the circular movement of the hand as representing the continuously oscillating movement of a speaking mouth. By virtue of the fact that hearing people use their mouths to communicate, the sign SAYING, which literally denotes 'speaking', has been metaphorically extended to designate hearing people, and is accordingly glossed as HEARING. As a conventional ASL sign, HEARING has also become associated with other characteristics of hearing people, including and beyond their ability to speak with their mouths, and independently of the sign's iconic internal structure (cf. Wilcox 2000), such as their beliefs and prejudices about those who are deaf.

THINK-HEARING inherits both the iconic and the metaphorical aspects of the sign HEARING, and can in turn be considered to have analogically motivated internal structure. The opposition between HEARING, which is signed near the mouth, and THINK-HEARING, which is signed near the forehead, draws upon existing, and in this case, iconically motivated, patterns in the ASL lexicon. We can see this by comparing other signs related to speaking and thinking in ASL; just as the mouth is often involved in verbs related to speaking, as in SPEAK, TELL, and SAY, the forehead is often involved in verbs related to thinking, as in WONDER, KNOW, and THINK. Moving HEARING from the mouth to the forehead to create THINK-HEARING not only recombines parts of individual signs, but also draws on a broad and systematic opposition between signs for speech and signs for thought in ASL.

The word-based analysis of the sign THINK-HEARING in ASL, then, is that each of the signs THINK, HEARING, and THINK-HEARING are to be treated, first and foremost, as whole and independently meaningful words, rather than as combinations of independently meaningful parts. Surface signs can be distinguished from one another according to the differences among them, and this analogical process is facilitated by general patterns shared among other words, such as the systematic opposition between signs articulated at the mouth and signs articulated at the forehead in ASL.

Describing the internal structure of THINK-HEARING as having been analogically motivated by the structure of other ASL signs might seem to contradict my previous assessment that THINK-HEARING was originally coined as a blend of the existing individual signs THINK and HEARING. If THINK-HEARING were indeed a combination of particular signs THINK and HEARING, we might expect that aspects of THINK would be more overtly represented in the form of the resulting blend sign. In theory, this could be accomplished in one of two ways, both taking advantage of the fact that THINK and HEARING are signed with a 1 handshape. The first possibility would be to relocate the circling 1 handshape to the side of the forehead, rather than the center. This would keep the handshape and movement of HEARING, but more faithfully preserve THINK's location, which is near the temple rather than the center of the forehead (and thereby creating a form that superficially resembles the actual sign CRAZY). The second option would be to sign THINK normally, however to also incorporate the circling movement of HEARING (and thereby creating a sign that superficially resembles the actual sign CURL).

THINK-HEARING is not formed in these ways, and, because it is signed at the center of the forehead, rather than the temple, it is not certain that THINK-HEARING is indeed a lexical blend using parts of the specific sign THINK, as opposed to coined on analogy to a larger pattern involving signs for 'thinking'. However, and regardless of whether it has been coined from THINK or as part of a larger 'thinking' pattern, it is certain that THINK-HEARING has made use of a sub-constituent of the sign HEARING to create a new sign. This may explain why THINK-HEARING is also often translated into English as "hearing minded"; HEARING is recoverable in the form of THINK-HEARING, even if the specific sign THINK is not.

THINK-HEARING, as an established pairing of form and meaning in ASL, also serves as the basis for the creation of other analogically-motivated signs, such as the sign THINK-DEAF: this sign combines THINK-HEARING and DEAF. Where DEAF is articulated with a 1 handshape contacting the cheek once near the ear, and again near the chin, in THINK-DEAF, these two contacts are instead articulated on either side of the center of the forehead as in Example 1.8:

Example 1.8. Part of (a) DEAF is also used in (b) THINK-DEAF

a.

H: 1_{DH}
L: cheek
M: **DH contacts cheek twice** A

'deaf; not hearing'

b.

H: 1_{DH}
L: forehead
M: **DH contacts forehead twice** V

'thinking like a Deaf person;
thinking in a way that is allied with Deaf people'

In the absence of other etymological evidence, my analysis of the sign THINK-DEAF is that it takes advantage of the semantic opposition between 'hearing' and 'Deaf', which is very salient for ASL signers, to create a new lexical blend on analogy to THINK-HEARING: THINK-HEARING is signed in the center of the forehead because HEARING is signed in the center of the mouth, and THINK-DEAF is signed at the center of the forehead because THINK-HEARING is signed there. Similarly, just as THINK-HEARING draws on a metaphoric sense of the sign HEARING to denote hearing people (and not, say, to represent a moving mouth), THINK-DEAF draws on the specialized meaning of THINK-HEARING. However, while THINK-HEARING is a disparaging sign, THINK-DEAF has a complimentary meaning, 'to think like a Deaf person', or 'to think in a way that is allied with Deaf people'. Accordingly, on analogy to how THINK-HEARING describes deaf people who are "hearing on the inside", THINK-DEAF can be used to describe skilled hearing signers, for example, those hearing children of Deaf adults, who, despite their ability to hear, identify with Deaf cultural values and, as a result, can be considered "Deaf on the inside".

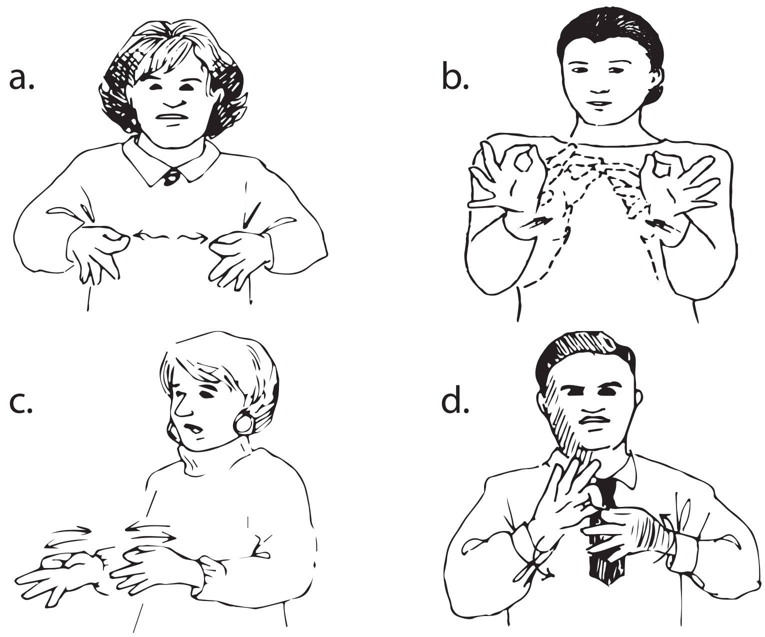
While it may not be clear whether THINK-HEARING is lexical blend, THINK-DEAF is less ambiguous: it seems to draw on the specialized semantics of the disparaging sign THINK-HEARING, and is similarly articulated at the center of the forehead, combining these parts of the sign THINK-HEARING with aspects of form and meaning from the sign DEAF (see also Chapter 5).

The sort of analogical relationship linking THINK-HEARING◆THINK-DEAF is also found among English words. An illustrative set of examples includes words that are sometimes amusingly referred to as *bromanteaux*, which are nonce lexical blends created using the English word *bro*. In December 2013, the word *bromance* was added to the Oxford English Dictionary, with a print reference from 2001, and defined as 'an intimate and affectionate relationship between men'. As an established but relatively recently coined blend, *bromance* is the quintessential bromanteau: *bromance* was created through the combination of the words *bro* 'a male friend' (itself a clipping from *brother*) and *romance* 'a feeling of excitement or companionship associated with being in love'. The relationship between *romance*◆*bromance* also provides a template that can be extended to other words to coin words like *brototype* ('a prototypical bro', from *prototype*), *brocabulary* ('the language of bros', from *vocabulary*), *brogrammer* ('men who program together', from *programmer*), and, of course, *bromanteau* (from *portmanteau*).

Far from restricted to a small set of obscure examples, many common and conventional words in ASL and in English typically display properties that cannot be reliably distilled from the meanings of their pieces. Consider the ASL signs SENTENCE, MESSAGE, and EXPLAIN. These signs are all formed with two F handshapes moving relative to one another in neutral space, and they are all semantically related, in the sense that they are in the semantic domain of 'language use'. In this group of signs, it is not possible to decompose each sign into independently meaningful pieces, as we might with the complex signs INTERPRETER or YOURS. While the handshape and location parameters in these signs seem to recur with the meaning 'relating to language use', it is not entirely clear what meaning the individual movement patterns in these signs can be said to correlate with; though systematically related, these signs are not compositionally structured.

Furthermore, this group of signs also raises an alternative analysis of the "simple" sign INTERPRET as a complex sign; as Example 1.9 illustrates, like {SENTENCE, MESSAGE, EXPLAIN}, INTERPRET is formed with two F handshapes moving relative to one another in neutral space, and its meaning is in the semantic domain of 'language use'.

Example 1.9. Like the ASL signs (a) SENTENCE, (b) MESSAGE, and (c) EXPLAIN, (d) INTERPRET is signed with two F-handshapes and pertains to 'language use'[7]



As we will see in Chapter 4, many ASL signs display non-compositional morphological structure of the sort displayed by the sign INTERPRET. Conversely, it is rare for ASL signs to exhibit the fully regular, compositional structure found in signs like INTERPRETER and YOURS. From an English-centric perspective, it might be temping to dismiss such difficult-to-decompose words as peripheral to morphological theory, however, from an ASL-centric perspective, the same might instead be said about the more familiar operation of concatenative affixation. In this way, ASL and English are each test cases for the possibilities, and limitations, of the morpheme- and word-based approaches to morphological structure.

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[7] The ASL sign illustrations in this example are adapted from Tennant and Brown (2000:245-7).

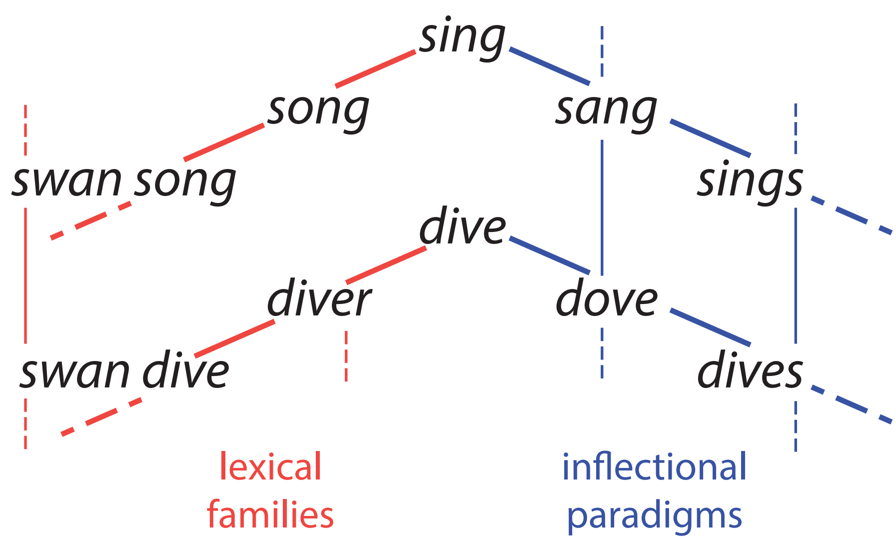
1.4.3 Assessment of the word-based approach

What mechanism can be said to relate morphologically complex words to one another, if not derivational rules? Following a tradition in word-based morphology (exemplified in Robbins 1959; Hockett 1987; Matthews 1991, see also Blevins 2015), Hay and Baayen (2005) propose to view morphological structure as analogical relationships between whole words *and* among their parts, without ascribing any special status to the parts independently of the wholes. Hay and Baayen offer evidence from psycholinguistic experiments to support their view that morphological structure is inherently analogical, rather than compositional, in nature. Here we will touch on this external support briefly, and focus primarily on the principle of *paradigmatic analogy* which Hay and Baayen propose can replace the notion of compositionality as the central motivating principle in morphology.

As Hay and Baayen use it, paradigmatic analogy is the principle which links together structured networks of words in inflectional paradigms and in derivational lexical families. Paradigms are relations between inflected, contextual variants, i.e., {*ride, rides, rode, ridden, riding, ...*}, and lexical families are relations between derived words and compounds, i.e., {*pick, picky, pick up, pick on, pickpocket, toothpick*, ...}. Like Bochner (1993), Hay and Baayen (2005) refer to *paradigm* as both a label for inflectional paradigms and lexical families. As our focus here is more derivational, I will use the term *lexical families* throughout the dissertation.

Paradigmatic networks of words can be visualized as in Example 1.10 (cf. Hay and Baayen 2005:344), in which the derivational relationships are represented on the left, and the inflectional relationships are shown on the right.

Example 1.10. Surface words are organized into networks of relatedness



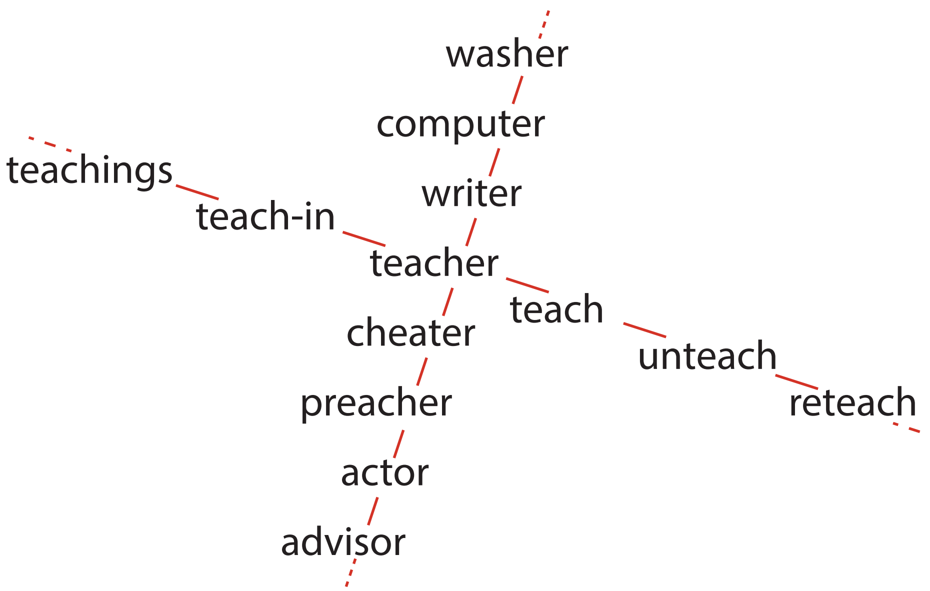
In Example 1.10, several relationships are represented, for example among words that can be considered derivationally related to *dive* {*dive, diver, swan dive, scuba dive, ...*}, or inflectionally related to *sing* {*sing, sang, sings, sung, ...*}. Other intersecting sub-patterns are also represented less prominently, for example among words derivationally related to *swan* {*swan, swan song, swan dive, trumpeter swan, ...*} and among words that are inflected for 'past tense' {*sang, dove, saw, talked, ...*}.

Paradigmatic analogy among surface words is not only a description of lexical relatedness. Hay and Baayen argue that it is central to morphological organization: a reflex of this can be seen among otherwise-unexpected patterns resulting from related whole words behaving differently from one another, though structurally they may belong to the same lexical family. For example, details of language use, such as the relative frequencies of words in the same lexical family, can predict how naïve participants (i.e., non-linguists) behave in a variety of experimentally-controlled settings. Hay and Baayen report that corpus estimates of relative frequency can predict whether complex words appear to be derived or not: they demonstrate (citing Hay 2001) that though *government* and *settlement* can both be considered morphologically complex, by virtue of the fact that they both contain a simple verb, either *govern* or *settle*, and they both contain an identifiable affix *–ment*, speakers reliably judge *settlement* to be "more affixed" than *government* (Hay and Baayen 2005:343). Hay and Baayen explain that *settlement* seems more affixed than *government* because the complex word *government* is more frequent than *govern*, while *settlement* is less frequent than the simple verb *settle*. Thus, though *government* and *settlement* are both structurally complex, the structure of *government* is relatively less parsable or accessible than that of *settlement*. Hay and Baayen argue that this frequency effect would be difficult to explain in a structural theory of morphology in which words are either derived from smaller parts or stored as opaque wholes, but follows quite naturally in a theory that is built around systematic relationships among whole words.

Hay and Baayen further argue that, having posited a notion of paradigmatic analogy, we also have a framework for understanding that many of the dichotomies that are familiar in morphology, for example *simple* vs. *complex, opaque* vs. *transparent*, and *regular* vs. *irregular*, are actually continuous and gradient concepts, rather than discrete categories. This in turn provides the basis for a richer understanding of the nature of morphological structure: whole, actually-occurring words serve as the foundation for a speaker's lexical knowledge, and paradigmatic analogy describes the links that form between surface words. Some words, based on, e.g., their frequency and the frequency of the words they are related to, may be seen as more or less complex, or more or less transparent than others. Under this view, morphological structure is inherently relational, and tied to language use (cf. Bybee 1985, 2001; Rácz, Pierrehumbert, Hay, and Papp 2015).

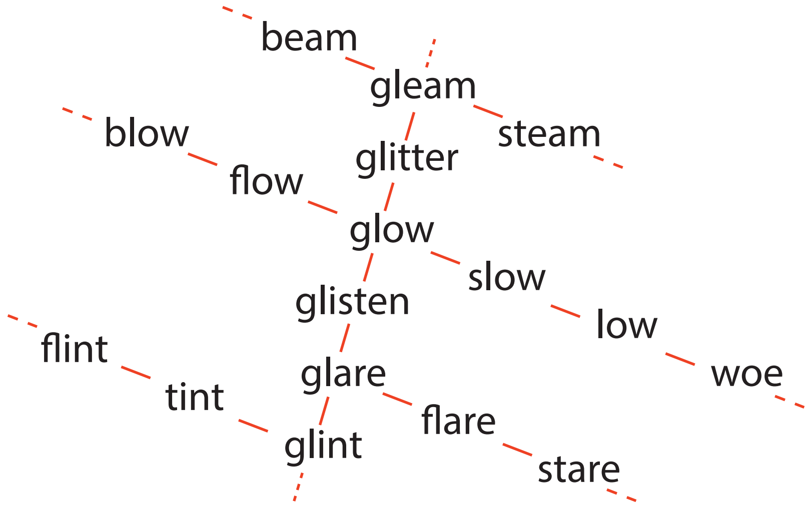
The relational mechanism of paradigmatic analogy also explains why morpheme-based and word-based approaches treat compositional-seeming words similarly. Compositionality exists at one extreme end of a continuum, where every identifiable sub-constituent of a given word can be analyzed as participating in a large and well-instantiated lexical family. To return to the example of *teacher*, we can see in Example 1.11 that both of the identifiable parts of this complex word can be situated in a lexical family of several other words:

Example 1.11. A network of surface words related to *teacher*



A non-compositional word like *glow*, in contrast, can perhaps be analyzed as participating in two lexical families as well, but it cannot be successfully broken down into independently-meaningful pieces which might combine to yield the meaning 'glow'. Such an analysis would, in effect, require that every aspect of *glow*'s meaning other than the notion of 'light' would be associated with the leftover /o/ phoneme. The network in Example 1.12 demonstrates that other *gl–* words are similarly non-compositional: these words all pertain to 'light' in some way, and some of them seem to participate in more than one lexical family, but these lexical families are smaller, and less strongly instantiated.

Example 1.12. A network of surface words related to *glow*



In this way, some configurations of lexical families lead us to identify what may superficially resemble traditional morphemes within complex words: sub-constituents of actually-occurring words, when they recur across a sufficiently large family of well-established words, may gain their own representation as meaningful elements in the language. However, these sub-constituents are not listed in an unstructured list or as independently meaningful morphemes. Instead, they are abstracted over and continually reinforced by the related whole words in which they appear. Questioning the central role of compositionality in morphology also encourages the careful consideration of other types of motivation in morphology, namely iconicity, metaphor, and analogy. With respect to the interpretation of word-internal structure, what seems theoretically important is not that words can be decomposed into meaningful pieces, but that the meanings of complex words are associated with distinctive internal structure which can distinguish meaningful word patterns from one another (e.g., Ackerman, Blevins, Malouf 2009; Blevins, Ackerman, Malouf 2015), a perspective on morphological structure that I return to in Chapter 5.

1.5 Outline of the dissertation

I began this chapter with a commonplace in morphology, the observation that ASL signs and English words contain meaningful internal structure. However, a fundamental and persistent question in morphological theory concerns the nature of the structure that can be observed in morphologically complex words. Morpheme-based and word-based approaches make different theoretical assumptions about word-internal structure, and these differing assumptions are consequential for our understanding of a number of morphological phenomena. I demonstrate in this dissertation that adopting a view of morphology in which words are the primary unit of analysis allows us to adopt a unified account for a range of morphological phenomena, from affixed words to compounds, and including more difficult to explain words, like lexical blends.

The remaining chapters in this dissertation develop, formalize, and implement the word-based view of morphology presented in this chapter. Chapter 2 introduces the framework of Construction Morphology (Booij 2009, 2010, 2013) and examines the assumptions and implications it holds for a word-based view of morphological structure. By virtue of the fact that they isolate grammatical patterns that have been abstracted over learned pairings of meaning and form, construction-theoretic approaches to grammatical analysis share a certain affinity with word-based approaches to morphological theory. I examine the details of the construction-theoretic approach to morphology over a range of compounding patterns in English and in ASL. Many conventional compounds in the two languages are often only partially compositional; they can typically be understood in terms of the meanings of their parts, but the parts alone cannot reliably predict the compound's meaning. Such compounds are not straightforwardly compositional, but they are broadly analogical. Compounds are therefore analyzed as constructions, and the construction-theoretic approach to compounding in turn leads us to ask questions about the relationship between novel and lexicalized compounds in English and in ASL which are instructive for morphological theory.

Chapter 3 provides a more in-depth assessment of word-formation in ASL, examining initialized signs as a sub-class of borrowed words in ASL. Initialized signs are intriguing for a number of reasons; first, they are pervasive in ASL, and second, though they are morphologically complex, they are not straightforwardly compositional. Drawing on a dictionary database of initialized signs, this chapter provides the most comprehensive description of initialized signs in ASL to date. I show that initialized signs reconfigure elements from the ASL word-formation system in ways that are motivated by the structure of the ASL lexicon itself, thereby providing additional support for the construction-theoretic approach to ASL morphology.

Chapter 4 builds from the construction-theoretic analysis of initialized signs in Chapter 3, and demonstrates that lexical families of the type that initialized signs represent are ubiquitous in the ASL lexicon. Previous analyses of ASL morphology have struggled to account for lexical families, I argue, because they have adopted the morpheme-based assumptions that characterize post-Bloomfieldian approaches to morphological analysis. The construction-theoretic approach focuses on patterns abstracted over surface words, corroborating, rather than contradicting, the insights of the lexical family analysis.

Chapter 5 then pulls these analytic threads together to provide a constructionist analysis of lexical blends in both English and ASL. Having examined English and ASL compounds in Chapter 2, as well as lexical families in ASL in Chapters 3 and 4, I argue that though lexical blends have been previously regarded as peripheral or idiosyncratic anomalies, this is an assumption which follows from certain theory-internal considerations. A construction-theoretic analysis of lexical blends follows directly from the construction-theoretic analyses that account for a variety of lexical families in English and in ASL, as well. From a word-based perspective on the nature of morphological structure, lexical blends in ASL and in English can be treated as any other morphological pattern.

CHAPTER 2

A CONSTRUCTION-THEORETIC APPROACH TO COMPOUNDING

2.1 Introduction

In Chapter 1, we saw that a central question in morphological theory concerns the nature of the structure in morphologically complex words. I argued that the structuralist, morpheme-based conception of morphology overemphasizes the principle of *compositionality* in a way that constrains all morphological structure to be necessarily morphemic. Adopting an alternative, word-based view of morphology permits us to ask questions that address issues of *partial motivation* in morphologically complex words, without being troubled by the fact that many morphologically complex words are not structurally or semantically compositional.

In this chapter, I develop a construction-theoretic approach to morphology as an implementation of the word-based view, looking at compounds in English and in ASL. I demonstrate that compounding constructions provide support for the word-based view of morphology; individual compounds typically have meanings that cannot be predicted directly from the meanings of their parts. Though compounds can often be understood as having a meaning that is a function of the meanings of their parts, it is not the case that individual compounds derive one specific meaning through a deterministic rule. Instead, novel, productively formed compounds are typically ambiguous, corresponding to a range of possible meanings. As novel compounds become lexicalized, or conventionally paired with a specific meaning, they become established as conventional lexical items. These lexicalized compounds can then, in turn, serve as templates for the formation of other compounds.

A recent review, Goldberg (2013), outlines the characteristics that unite construction-theoretic approaches to grammatical analysis, and distinguish them from mainstream generative approaches: construction-theoretic approaches to linguistic analysis treat lexical items and phrasal patterns alike as constructions, or learned pairings of form and meaning. They focus on surface patterns, rather than underlying forms, and largely do away with the traditional distinction between morphology and syntax as distinct modules of grammar. Construction-theoretic approaches describe linguistic phenomena in terms of learned pairings of form and meaning; however, memorized lexical items and phrasal patterns are not considered unanalyzable, unstructured wholes. Constructions are viewed as being related to one another in dynamic and tightly organized networks (e.g., Lakoff 1987; Fillmore, Kay, and O'Connor 1988; Goldberg 1995; Bybee 2001; Booij 2010).

Construction-theoretic approaches therefore turn the traditional approach to morphology and syntax on its head; rather than characterizing morphology as a type of word-internal syntax, construction grammar analyzes syntactic patterns in the same way that word-based morphologists have always sought to analyze morphologically complex words. For the construction grammarian, syntactic constructions are viewed both in terms of their holistic properties and in terms of their internal structure. Construction-based analyses are therefore sensitive to idiomatic information about individual constructions, and to the generalizations they give rise to. In sum, construction-theoretic approaches to grammatical analysis differ from mainstream generative approaches in assuming that an individual's internal grammar is a set of generalizations abstracted over a variety of learned pairings of meaning and form.

We begin in Section 2.2 with an overview of a construction-theoretic approach to morphology. Here I build directly from the word-based perspective developed in Chapter 1; we will see, looking at Booij's (2009, 2010, 2013) theory of Construction Morphology, that construction-theoretic approaches to morphology are inherently compatible with a word-based approach. I demonstrate that thinking about morphology in terms of constructions leads to interesting questions about the emergence of individual morphological markers, and of the relationship between synchrony and diachrony in morphology. In Section 2.3, I extend the construction-theoretic view to a range of compounding constructions in English. This section serves two purposes in the dissertation; the first is to flesh out the assumptions and mechanics of the construction-based morphological analysis, and the second is to establish a basic description of compounding which will prove valuable for the discussion of lexical blends in Chapter 5. In Section 2.4, I extend the construction-based analysis of English compounding to compounds in ASL. Here we will see that productive compounding is an under-explored domain in ASL linguistics, but that the analysis of English compounds can be straightforwardly extended to a variety of compound constructions in ASL. This then sets the stage for a more in-depth discussion of one particular word-formation construction in ASL, initialization, in Chapter 3.

2.2 Construction-theoretic morphology

2.2.1 Overlap in word- and construction-based approaches

Construction-based approaches to morphological analysis, like word-based approaches, are inherently abstractive (Blevins 2006, Booij 2010): morphological patterns are conceptualized of as abstractions over related whole words. Accordingly, rather than analyzing a word like *reasonable* as the concatenation of the free morpheme *reason* and the bound morpheme *–able*, or the word *redness* as the concatenation of the free morpheme *red* and the bound morpheme *–ness*, the construction-based approach starts with families of whole words, as in Example 2.1.

Example 2.1. Simple words and complex words are systematically related

a.	*accept*	b.	*acceptable*
	rely		*reliable*
	pay		*payable*
c.	*aware*	d.	*awareness*
	dark		*darkness*
	happy		*happiness*

The words in Example 2.1b are alike in that they have a shared element of form, *–able*, and all denote the capacity to do the action expressed by the corresponding words in Example 2.1a. The words in Example 2.1d similarly share the element *–ness*, and denote the property expressed by the corresponding words in Example 2.1c. In theories of construction grammar, these kinds of similarities can be represented using abstract, partially schematic constructions like those in Example 2.2.

Example 2.2. Schematic constructions are abstractions over related words

a.

$$\left[\begin{array}{c} [[x]_{V}\ \textit{able}]_{A} \\ \text{'the capacity to X'} \end{array}\right]$$

b.

$$\left[\begin{array}{c} [[x]_{A}\ \textit{ness}]_{N} \\ \text{'the state of being X'} \end{array}\right]$$

In Chapter 1, we saw examples of word-based analyses that employ similar representations, called lexical redundancy rules, to describe recurring pairings of meaning and form in the lexicon (e.g., Jackendoff 1975; Bochner 1993). Here, the representations in Example 2.2 describe, rather than derive, the morphological structure of the conventional complex words *reasonable* and *redness*; these words are analyzed as $[[\textit{reason}]_{V}\ \textit{able}]_{A}$ and $[[\textit{red}]_{A}\ \textit{ness}]_{N}$. In this and in subsequent chapters, I call these representations in Example 2.2 "constructions" rather than "rules". This shift underscores the fact that these "rules" are abstractions of patterns, rather than incremental procedures.

Morphological constructions are abstract representations of morphological structure in existing words, and they also serve as templates for the creation of new words; new verbs and adjectives in English can fill the schematic slots of the existing constructions in Example 2.2a or Example 2.2b to create new words.

Morphological constructions superficially resemble morphemes, because they represent configurations of elements of form and meaning that recur among related words. Under a construction-based analysis, however, *reasonable* is not analyzed as deriving part of its meaning from the morpheme *–able*. Instead, it is the schematic construction $[[x]_V\ \textit{able}]_A$ that is derived from existing complex words like *reasonable*; under the construction-based analysis, actually occurring words give rise to schematic morphological constructions, which are then active in the creation of new words. As e.g., Booij (2010) has noted, there is no evidence that information is deleted or otherwise purged from memorized representations of individual complex words once a speaker has developed an abstract schema that generalizes over a set of related words. This means that actually-occurring complex words and the abstract patterns they give rise to can both contribute to the language user's lexical knowledge. Known words are learned as pairings of form and meaning, and necessarily precede patterns abstracted over groups of words, which are represented as schematic constructions.

In the remainder of this chapter, I develop a construction-based analysis of compounds in English and in ASL. For the most part, my analysis will follow from Booij's construction-theoretic analysis of compounding constructions in Dutch and English (2010, 2013). However, I will also find it necessary to deviate from Booij's theory of Construction Morphology in order to accommodate a variety of construction types. For this reason, I primarily refer to my approach as broadly construction-theoretic or construction-based. Nevertheless, the analysis in this and subsequent chapters, particularly of the general construction-theoretic view of compounding, owes much to Booij's analysis of compounding in the theory of Construction Morphology.

2.2.2 Compounding in Construction Morphology

In Construction Morphology, compounding is analyzed in terms of schematic morphological constructions. A construction for one type of compound in English, adapted from Booij (2010), is represented as in Example 2.3.

Example 2.3 A schematic compounding construction

$$\left[\begin{array}{c} [[x]_X\ [y]_Y]_Y \\ \text{'Y with relation R to X'} \end{array}\right]$$

Like the derivational constructions in Example 2.2, the compounding construction in Example 2.3 represents a pairing of a formal pattern with a particular meaning. However, the two construction types differ in terms of what information is specified as part of the construction. For this compounding construction, much of the formational and meaningful information is left unspecified and schematic. Here the relevant morphological relationships are represented by three sets of related variables: the forms x and y, the syntactic categories $[\ ]_X$ and $[\ ]_Y$, and the semantic elements 'X' and 'Y'. These variables are linked in the following way: x is a form with meaning 'X' and syntactic category $[\ ]_X$, and y is a form with meaning 'Y' and syntactic category $[\ ]_Y$. In English, many compounds share their syntactic category with the right-hand member of the compound, and this information also specified as part of this construction, through the repeated $[\ ]_Y$ variable.

Compare the construction in Example 2.3 with the construction in Example 2.4; the differences between these two representations demonstrate the relationship between the variables in an abstract, schematic construction and lexical content in a fully specified lexical construction.

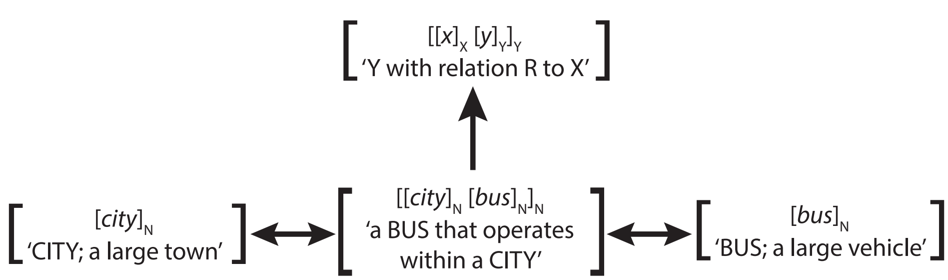
Example 2.4. A specific compound construction

$$\left[\begin{array}{c} [[\textit{city}]_N\ [\textit{bus}]_N]_N \\ \text{'a BUS that operates within a CITY'} \end{array}\right]$$

The schematic construction in Example 2.3 represents a set of generalizations about the specific construction in Example 2.4, such as the fact that, like its head noun *bus*, *city bus* is a noun, and that a *city bus* is a kind of 'bus'. The construction in Example 2.3 also represents that there is often a relationship between the meaning of the compound and the meanings of the elements of a given compound, however, it does not further specify the nature of the relationship. Instead, Booij (2010) represents this relationship with a variable, R. As we will see in Section 2.2.3, compounding comprises many different relationship types, and these relationships are always specified in individual compound constructions, but they are not necessarily encoded in schematic constructions.

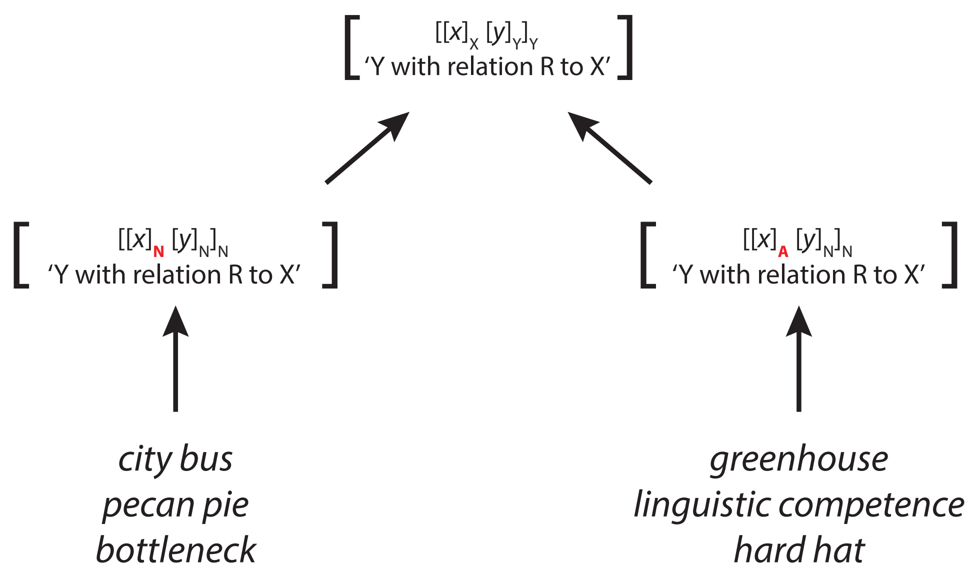
Schematic morphological constructions are abstractions over instances of specific lexical constructions. The relationship between the schematic construction in Example 2.3, the specific construction in Example 2.4, and the specific lexical constructions [*city*]$_N$ and [*bus*]$_N$ is shown in Example 2.5.

Example 2.5. Relationships among specific and schematic constructions



One implication of this view of lexical organization is the prediction that constructions can actually represent form-meaning patterns at varying degrees of abstraction. In English, the intermediate construction $[[x]_{\mathbf{N}}\ [y]_{\mathrm{N}}]_{\mathrm{N}}$, with its syntactic categories specified, describes a generalization over noun-noun compounds like *city bus*, and the schematic construction $[[x]_{\mathbf{A}}\ [y]_{\mathrm{N}}]_{\mathrm{N}}$ describes a generalization over adjective-noun compounds like *greenhouse*. These constructions exist at a level of abstraction somewhere between the more schematic compounding construction and the specific compounds that instantiate them, as in Example 2.6.

Example 2.6. Intermediate schematic constructions



In Construction Morphology, compounding is not analyzed as a deterministic process that concatenates two words together by rule, but rather the phenomenon of compounding is seen as involving configurations of constructions at varying degrees of abstraction, and several constructions work together to account for compounding sub-patterns.

The goal of a construction-theoretic analysis of compounding, then, is to identify constructions that describe observed compounding patterns, as well as relationships among the identified constructions. Booij (2013) has demonstrated this for Dutch, arguing, for example, that some compound constituents take on a specific bound meaning in compounds, as in Example 2.7.

Example 2.7. Two compounding sub-patterns in Dutch

a.	*reuze-idee*	'lit. giant idea; great idea'
	reuze-kerel	'lit. giant guy; great guy'
	reuze-mop	'lit. giant joke; great joke'
b.	*oud-docent*	'lit. old teacher; former teacher'
	oud-student	'lit. old student; former student'
	oud-strijder	'lit. old warrior; war veteran'

The Dutch words *reus* and *oud* mean 'giant' and 'old', but some compounds containing these elements do not literally refer to giants or age. In certain compounds, these elements co-occur with the meanings 'great' and 'former', respectively. The construction-theoretic analysis of these groups of compounds is that they are instantiations of partially schematic, idiomatic representations, where an element of form and an aspect of meaning is specified, as in Example 2.8. As generalizations over complex words, these schematic constructions are represented alongside the corresponding lexical constructions *reus* and *oud*, which retain their original meanings.

Example 2.8. Two partially-filled compounding constructions in Dutch

a.

$[[\textit{reuze}]_N\ [y]_Y]_Y$
'great Y'

b.

$[[\textit{oud}]_A\ [y]_Y]_Y$
'former Y'

Booij (2010, 2013) argues that generalizations of this sort, abstractions over classes of complex words in the lexicon, can also explain how parts of compounds can develop into more affix-like elements. In English, we can see this by looking at the affix *–ful*, which is diachronically related to the word *full* but is now distributionally and semantically idiosyncratic, having become a derivational affix that marks adjectives, as in Example 2.9.

Example 2.9. The distribution of *–ful*

successful	'lit. full of success; having achieved success'
beautiful	'lit. full of beauty; aesthetically pleasing'
careful	'lit. full of care; attentive to potential danger'
wonderful	'lit. full of wonder; inspiring admiration'

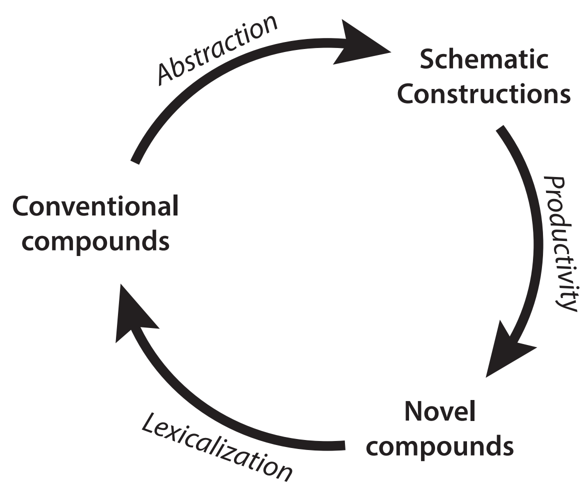
Similarly, *–able*, discussed above as Example 2.2a, is no longer synchronically related, or is perhaps only weakly related, to the word *able*, and has become a derivational affix in English. The affixes *–ful* and *–able* have therefore begun to drift away from the full words *full* and *able*, as the complex words that contain these elements have become increasingly conventional and entrenched in the lexicon, leading to the development of separate constructions (cf., e.g., Bybee 2007). The words *full* and *able* are still used alongside the affixes *–ful* and *–able*, but the existence of partially-filled constructions explains how affixes that historically derive from free words can be retained even when the corresponding free word is lost. The affix *–hood* in English, as in the words *childhood*, *likelihood*, and *brotherhood*, derives historically from an Old English word *hād*, meaning 'quality/state', however this word is no longer used in Modern English (Himmelmann 2004, Booij 2013). The explanation for this is that the construction $[[x]_X\ [hood]_A]_N$ has been retained, through conventional lexical constructions containing the affix *–hood*, even as the corresponding free word *hād* has fallen out of modern use.

Under a construction-theoretic approach to morphological analysis, compounding and other morphological patterns are analyzed as constructions at varying levels of abstraction and schematicity. A language user's grammatical knowledge about compounding includes schematic compounding constructions, fully specified and actually occurring compound constructions, and the intermediate sub-constructions that link the most abstract and most concrete constructions together. These intermediate constructions describe sub-patterns of compounds, and, for example, can account for how elements in compounds can become grammaticalized as affixes, independently of the words they are historically derived from.

2.2.3 Compounds and lexicalization

One benefit of the construction-theoretic approach that we have not yet examined in detail, but which follows from the preceding discussion of grammaticalization of affixes from compounds, is that the construction-theoretic approach provides an opportunity to discuss the difference between established, conventional compounds and productively-made, novel compounds. In a construction-theoretic approach to morphology, conventional compounds, as actual words, provide the motivation for developing abstract schematic constructions, and abstract constructions, as schematic templates, provide a recipe for the creation of novel compounds. Over time, novel compounds can become commonly accepted within a speech community, thus becoming lexicalized as a conventional pairing of meaning and form (see also Hohenhaus 2005). I have schematized this process in Example 2.10:

Example 2.10. A model of the relationship between compounds and constructions



Interestingly, though compounding has long been recognized as an extraordinarily productive word-formation process in English, many early analyses of compounds from the 1960s and 1970s focused almost exclusively on lexicalized, rather than productively formed, noun-noun compounds (e.g., Lees 1960, Zimmer 1971, Levi 1975). Noting this, Downing (1977) instead analyzes novel noun-noun compounds. In contrast to lexicalized compounds, which are frequently-occurring conventional compounds with a fixed meaning, novel compounds are not expected to have been previously encountered by the majority of speakers. They are therefore not predicted to be listed as part of a language user's grammatical knowledge, and are instead expected to be produced and interpreted according to productive compounding rules. Novel compounds provide a way to assess the principles that govern the production and interpretation of compounds, independent of any grammatical knowledge or previous experience that language users may already have concerning specific individual compounds.

Some of Downing's examples of novel compounds include combinations of nouns like *pea princess*, *pumpkin bus*, *earthquake schools*. Such novel compounds do not have set, deterministic definitions, but rather seem to correspond to a range of likely or appropriate interpretations, which are typically disambiguated, or even overtly clarified, in context. Two possible interpretations for *pumpkin bus*, for example, are a 'bus shaped like a pumpkin' or a 'bus for transporting pumpkins'. Downing demonstrates that a *pumpkin bus* could also refer to a 'bus that turns into a pumpkin at night' or even a 'bus that ran over a pumpkin', given an appropriate context, though these interpretations are comparatively less likely (1977:827, 836).

Reviewing previous taxonomies of compound relationship types, as well as her own results from a battery of interpretation tasks involving novel compounds, Downing argues that it is futile to attempt to "enumerate an absolute and finite list of compounding relationships" (1977:828). Instead, many novel compounds are reducible to, but crucially not derived from, a set of prototypical relationships, such as relationships of 'purpose', 'composition', and 'comparison'. For the compound *pumpkin bus*, for example, these three relationship types might indicate 'a bus used for transporting pumpkins' (purpose), 'a bus made from a pumpkin/of pumpkins' (composition), and 'a bus shaped/colored like a pumpkin' (comparison).

Although the relationships relevant for novel compounds do not constitute a finite list, it is also not the case that compound formation is completely random or that all compounds are completely idiomatic. Downing finds that a small set of relationships are typically favored in noun-noun compounds, arguing that the appropriateness of a given relationship in a given context depends on the semantics of the head noun, as well as the predictability and permanence of the relationship between the two nouns (1977:828). Downing demonstrates that in classificatory compounds, where the non-head noun modifies the head noun, certain relationship types also align with certain kinds of classification: synthetic objects are typically classified with a 'purpose' relationship, for example a *banana fork* 'fork for eating bananas', while natural objects are typically classified with a 'composition' relationship, as in *cow hair* 'hair from a cow', and plants are typically classified with a 'comparison' relationship, as in *trumpet plant* 'plant shaped like a trumpet' (Downing 1977:831).

Instead of constituting derivational rules, then, prototypical compounding relationships can be viewed as emergent generalizations that are abstracted from commonly encountered compound types. At a very abstract level, an overarching compounding construction states only that compounds are defined by some relationship between the compound's constituent words, though the relationship itself is unspecified, as we saw in Example 2.3.

Though focusing primarily on novel noun-noun compounds, Downing's study also demonstrates that the relationship between lexicalized and novel compounds is not as straightforward as the labels "novel" and "lexicalized" might suggest. Lexicalized compounds differ from novel compounds along several dimensions, and a given compound may be subject to several related processes, including "acquiring a unitary character, surrendering to some extent its original semantic decomposability, and becoming a potential model for the creation of new compounds" (Downing 1977:839). Accordingly, we will find it necessary and instructive to revisit the relationship between novel and lexicalized compounds in Section 2.4.4, after discussing compounds in English and in ASL.

In this section, I have laid out the basic assumptions of a construction-based analysis of compounding. In the next section, I extend this framework to account for a sample of compounding sub-types in English. A taxonomy of compounding sub-types requires a range of compounding sub-constructions, as anticipated by the construction-theoretic approach. Compounding sub-constructions, in addition to representing generalizations over known compounds, also serve as templates for the formation or interpretation of novel compounds, in much the same way that derivational constructions abstracted over complex words do.

2.3 English compounds

2.3.1 Classificatory compounds

A broad definition of compounding in English is that compounds are complex constructions created through the combination of two independent words, and that, though their meanings can be somewhat opaque, compounds can typically be construed in terms of a relationship between the meanings of their constituents (see e.g., Lieber and Štekauer 2011; Bauer, Lieber, and Plag 2013, part 4). However, here I demonstrate that an analysis of compounding must also be sensitive to words which structurally resemble compounds, in that they contain two identifiable word forms, but there is no clear relationship between the meaning of the compound and the meanings of its constituent words. Similarly, there are words in English which appear to be compounds, however one element is not actually an independently occurring word. Although compounds are varied in English, patterns among compounds are nevertheless analyzable in terms of constructions as abstractions over related words, or as products resulting from productive use of such abstractions.

As we have already seen, perhaps the most familiar and widely discussed kind of compounding in English is a classificatory noun-noun structure in which the right element is the head, and is modified by the left, non-head element. These compounds are also often referred to as endocentric compounds, because the referent is identified inside the compound itself (e.g., Benczes 2006; Guevara and Scalise 2009), or hyponym compounds, because the compound as a whole serves as a hyponym, or a more specific instance of, the head noun (e.g., Allen 1978; Rosenberg 2010). Some examples can be seen in Example 2.11.

Example 2.11. Classificatory compounds in English

a.	*math class*	d.	*dog house*	g.	*fireworks factory*
b.	*philosophy class*	e.	*clubhouse*	h.	*sock factory*
c.	*history class*	f.	*henhouse*	i.	*computer factory*

In each of the examples in Example 2.11, the entire compound denotes a 'kind of Y' relationship, where Y is the head of the compound. A *math class* is 'a class where students learn math', a *fireworks factory* is 'a factory where fireworks are manufactured', and so on. Note that, though the compounds in Example 2.11 all denote a similar 'kind of' relationship, they do not denote the same relationship. The nature of the relationship between the compound's constituent nouns appears to be directed by the head nouns themselves: because *factories* make things and *houses* accommodate things, and because *sock factories* manufacture *socks* and *clubhouses* accommodate *clubs*, it follows that *x factories* 'make Xes', and *x houses* 'accommodate Xes'.

This intuition is formalized in a construction-theoretic approach as follows: compounds like those in Example 2.11, when encountered with sufficient frequency, instantiate more schematic constructions, where one element is held constant, as in Example 2.12a. These constructions are in turn instantiations of a more abstract and schematic compounding construction, as in Example 2.12b:

Example 2.12. Compound constructions in English

a.

$$\left[\begin{array}{c}[[x]_N\ [\mathit{class}]_N]_N \\ \text{'a CLASS where students learn X'}\end{array}\right]$$

$$\left[\begin{array}{c}[[x]_N\ [\mathit{house}]_N]_N \\ \text{'a HOUSE where Xes are accommodated'}\end{array}\right]$$

$$\left[\begin{array}{c}[[x]_N\ [\mathit{factory}]_N]_N \\ \text{'a FACTORY where Xes are manufactured'}\end{array}\right]$$

b.

$$\left[\begin{array}{c}[[x]_N\ [y]_N]_N \\ \text{'Y with relation R to X'}\end{array}\right]$$

We have seen the construction in Example 2.12b already; in Example 2.5, the constructions for noun-noun and adjective-noun compounds were viewed as instantiations of a more schematic compounding construction, and were themselves instantiated by more concrete constructions. The construction-theoretic view considers the lexicon to be structured at varying levels of abstraction, and the noun-noun compounding construction is a generalization over many different types of classificatory compounds. However the compounding construction we have been working with is also an instantiation of a more general pattern.

2.3.2 Plant and animal names

In English, there are many plants and animals with common (that is, non-scientific) names that superficially appear to be compounds, but nevertheless cannot fruitfully be analyzed in terms of the meanings of their parts. This may be because the meanings of the compound's constituent words are not entirely relevant for the meaning of the compound, because the words are selected on the basis of some metaphoric motivation, or because one of the elements is not actually a word in English. Consider the examples in Example 2.13, which can all be analyzed as compounds, or at least as combinations of two word-like elements, by virtue of the fact they all contain at least one element which is also found as an independently meaningful word, and the "leftover" elements are not identifiable affixes:

Example 2.13. Compound plant and animal names in English

a.	*foxglove*	d.	*crawfish*	g.	*cranberry*
b.	*eggplant*	e.	*whale shark*	h.	*pineapple*
c.	*watercress*	f.	*Gila monster*	i.	*passionfruit*

The most straightforward of these examples, *eggplant* and *whale shark*, can perhaps be described in terms of the classificatory compound construction defined in Section 2.3.1: an *eggplant* is 'a plant shaped like an egg', and a *whale shark* is 'a shark that is large like a whale'. In order to maintain this strategy for *Gila monster* or *pineapple*, it becomes necessary to describe these compounds in terms of their individual etymologies, as well. A *Gila monster* is a lizard that lives in the American southwest, and is named after the Gila River. *Gila* is an understandable anomaly, a borrowed word in English that only appears in compounds relating to this particular geographical location. In the same vein, a *pineapple* is not 'an apple which grows on a pine tree', but instead means 'a fruit with spines like a pinecone'. It is therefore possible to describe many of these examples either in terms of their actual etymologies, or, failing that, in terms of a reasonable folk etymological description; whether or not *foxglove* is actually named because its blossoms resemble 'gloves a fox might wear', English speakers seem willing to accept this as a reasonable "just so" explanation.

However, for *crayfish* and *cranberry*, this strategy of attempting to define compounds in terms of their parts becomes intractable; even though it is possible to identify internal structure within these words, *cray–* and *cran–* are not English words. The internal structure of these classic examples can *only* be understood etymologically. The English word *crayfish*, for example, was originally borrowed from French and then restructured in terms of English morphology. The French word *écrevisse* was reanalyzed as *crayfish*, based on phonological similarity to the word *fish* and the fact that, like a fish, a *crayfish* lives underwater (cf. Downing 1977; Hockett 1987). As a result of this reanalysis, however, the remaining left element, *cray–* does not correspond to an English word.

Presumably, naïve English speakers do not normally have access to this kind of etymological information. Instead, it must be the case that they learn these compound-like words as whole units. The question is whether speakers are sensitive to the compound-like structures of words like those in Example 2.13. It seems reasonable to suggest that, on the basis of other fruits whose names end in *berry* and other animals whose names end in *fish*, that *cranberry* and *crayfish* can be construed as instantiations of abstract constructions like $[[x]_X\ [berry]_N]_N$ and $[[x]_X\ [fish]_N]_N$. Indeed, this is a prediction of the constructionist approach, which, as we saw in Section 2.3.1, is structured around recurring patterns of parts and wholes, rather than characterizing complex words in terms of their internal parts alone.

The fact that not all of the words from Example 2.13 lend themselves to a folk etymological analysis suggests that we may posit a quite abstract construction for compounding in English which specifies only that two words (or word-like elements) are combined to yield a complex word, but states nothing specific about the meaning of the word, as in Example 2.14.

Example 2.14. A semantically schematic compounding construction

$$\begin{bmatrix} [[x]_{\mathrm{X}}\ [y]_{\mathrm{Y}}]_{\mathrm{Z}} \end{bmatrix}$$

The schema in Example 2.14 reflects the intuition that many common plant and animal names may have had some original motivation, or that a folk-etymological motivation can be constructed based on the compound's constituent words, but also that this is not always the case, and that a compound name alone may do very little to derive the identity its meaning, or in this case, the referent plant or animal. Instead, the meanings of these words must simply be learned as lexical constructions, and, though they may have analyzable internal structure, they need not be construed in terms of the meanings their parts.

Outside of plant and animal names, the schema in Example 2.14 can also be used to describe the structure of other compound-like words in English. The classic example of *understand* (and the related word *withstand*) presents an interesting case: *under* and *stand* are independently meaningful English words. *Understand* is also likely to be morphologically related to *stand*, because both verbs undergo the same irregular past tense inflection, *understand*◆*understood*, *stand*◆*stood*. A similar pattern can also be seen with *become*◆*became* and *come*◆*came*. However, the meaning of *understand* cannot be described in terms of the meanings of the words *under* and *stand*, just as the meaning of *become* does not derive from *be* and *come*. Instead, the meaning of *understand* is specified as part of its lexical construction, and the *understand* construction can be seen as an instantiation of the quite general schema in Example 2.14, which does not relate the meaning of a compound to the meanings of its internal elements. Like the plant and animal names in Example 2.13, then, words like *understand*, which have internal morphological structure but lack compositional semantics, provide support for viewing complex words, not in terms of derivation and compositionality, but rather in terms of relationships among parts and wholes at multiple, varying degrees of abstraction.

2.3.3 "Affixoids" are schematic compounding constructions

In Section 2.2.2, we saw two examples that seem to straddle the border between a word and a derivational affix: the Dutch elements $[[\textit{reuze}]_N\ [y]_Y]_Y$ and $[[\textit{oud}]_A\ [y]_Y]_Y$. These constructions derive from the Dutch words meaning 'giant' and 'old'. Words containing these elements therefore resemble compounds, but also have idiomatic, bound meanings that make them seem more like affixes. Booij (2010) notes that these elements have sometimes been called *semi-affixes* or *affixoids*, but also demonstrates that the need for special terminology to describe these cases is an artifact of modular approaches to word-formation: the gradient behavior of "affixoids" only presents a problem in a theory that assumes a strict divide between compounding and derivation. Under a construction-based analysis, the difference between an affix, and affixoid, and a compound is one of degree, rather than kind. All three phenomena are described using schematic morphological constructions. Here we will look at two relatively novel English affixoids to illustrate this point.

In English, the word *pornography* refers to the depiction of sexual subject matter for the purpose of sexual arousal. However, here we are only interested in the word *pornography* because a shortened form of the word, *porn*, has also become an affixoid in English. Consider the following examples in Example 2.15:

Example 2.15. *porn* is an "affixoid" in English

a.	*food porn*	b.	*inspiration porn*
c.	*book porn*	d.	*shoe porn*
e.	*wardrobe porn*	f.	*car porn*

Crucially, none of these words, in the senses relevant here, are used to denote human sexuality or sexual subject matter. These words instead all refer to glamorized, consumerist representations of cars, books, shoes, and so on. The metaphorical motivation for this use of *porn* is clear: these representations are like pornography in that they glorify and stylize the target material, often in compilations of multiple images, and are intended to arouse a covetous response. A Google search (at one's own risk) reveals that *food porn* refers to vivid images of exotic or tantalizing food, that *wardrobe porn* refers to photographs of arrangements of trendy and expensive clothing, and that *inspiration porn* refers, disdainfully, to the public consumption of inspiring stories and the corresponding objectification of the people whose lives those stories are culled from. This idiomatic behavior points to the fact that *porn* in English has become an affixoid with a specialized, bound meaning. The construction to represent this affixoid is shown in Example 2.16:

Example 2.16. The *porn* construction in English

$$\begin{bmatrix} [[x]_N\ [porn]_N]_N \\ \text{'glorified and stylized (non-sexual) images of X'} \end{bmatrix}$$

The construction in Example 2.16 represents an abstraction over actually-occurring complex words, but also describes how new words can be formed. For example, given this construction, it is possible to correctly interpret a novel compound like *word porn*: this novel compound likely refers, not to written erotica (that is, 'pornography made from words'), but rather to images or depictions that glorify or stylize words themselves, such as typographic art, eloquent quotes, and interesting etymologies.

As a description of existing structures and as a recipe for creating new words, the *x-porn* construction behaves exactly like other compounding constructions in English. It describes structures that are morphosyntactically and semantically right-headed, and the left element describes the 'kind of' images that are denoted by compounds that instantiate this construction. Next we examine a left-headed compounding construction in English, corresponding to a different, somewhat unusual affixoid.

Normally in English, noun-noun compounds containing the word *team* behave exactly like canonical classificatory compounds, as can be seen in Example 2.17. As the left element in a compound, *team* modifies the head of the compound, and as the right element, it serves as the head itself; *teamwork* is 'work done by a team', and a *soccer team* is a 'team forming one side in a soccer match'.

Example 2.17. Compounds containing the word *team*

a.	*team sports*	b.	*sales team*
c.	*teamwork*	d.	*soccer team*

However, it is also possible to use *team* in a left-headed compound, as in Example 2.18, for a very specific purpose. The right element in these *team-y* compounds identifies a proper name or cause, and the meaning of the compound of the whole is interpreted as 'a group of people who are united by/enthusiastic about Y':

Example 2.18. *team* is an "affixoid" in English

a.	*team Edward*	b.	*team Jacob*
c.	*team Rand*	d.	*team Nigella*
e.	*team internet*	f.	*team food*
g.	*team delusional*	h.	*team groom*

This suggests a corresponding construction $[[\textit{team}]_N\ [y]_Y]_N$ which is semantically left-headed; *team Edward* is not a kind of person named Edward, but rather a group of people that support him. Similarly, *team food* is not a kind of *food*, but a group of people who have enthusiasm about their food in common. Though the individual examples in Example 2.18 are not predicted to be familiar to many speakers, they are all findable through a Google search. This points to the productivity of the pattern; though few language users are expected to have encountered the same instantiations of the *team-y* construction, those who use it are nevertheless are in agreement about the pattern itself.

A Google search also reveals that many instances of the *team* construction occur in part of a longer string: *I'm on team* [*y*]. This can perhaps explain where the *team* construction gets its bound meaning of support and solidarity from; the *team* construction has been extracted from a declaration of solidarity and self-identification. Though it can be used with regular nouns, the *team* construction is also often used with proper nouns, and perhaps gets its atypical order from other constructions ending in proper nouns, like *the brothers Grimm* and *the family Stone*.

Like the *x-porn* construction, the *team-y* construction is relatively new, and likely represents something of a fad pattern. However, and crucially, this pattern represents a phenomenon that can be accounted for quite straightforwardly by a theory that is built around constructions at varying degrees of schematicity.

2.3.4 Schematic vs. analogical compounding

In construction morphology, derivational constructions like $[[x]_V$ *able*$]_A$ can be viewed as abstractions over sets of existing, frequently occurring, complex words, as we saw in Section 2.2.1. However, I suggested in Section 2.3.3 that, though speakers agree about the structure and meaning of the $[[\textit{team}]_N\ [y]_Y]_N$ construction, it is perhaps less clear where this construction has come from, and whether speakers who use this construction have developed it based on the same set of complex words. This section seeks to examine how constructions emerge in more detail.

Here I find it helpful to start with Booij's (2009) distinction between an *analogical formation*, which is prototypically based on a single form, and a *schematic formation*, which is prototypically based on a construction that has been abstracted over a set of related constructions. These are not necessarily intended to represent exclusive options, but instead characterize opposite ends of a scale of schematicity (cf.

Booij 2013). Analogical compound formations in English typically involve selecting an existing, fully specified compound construction, and replacing one of its elements with another word. Paradoxically, this can perhaps best be seen with conventional patterns involving paradigmatically-opposed words, which have themselves likely achieved a more schematic representation (a "second-order" construction, Booij and Masini 2015, see also Chapters 4 and 5). For example, many compounds that conventionally contain the element *man* can serve as the basis for forms containing *woman* or *person* instead, as in Example 2.19.

Example 2.19. The *man~woman~person* alternation

a.	*chairman*	b.	*chairwoman*	c.	*chairperson*
	councilman		*councilwoman*		*councilperson*
	ombudsman		*ombudswoman*		*ombudsperson*

Similarly, some complex words that conventionally contain the element *mother* (*mother tongue, mother land*) seem to have served as the basis for forms containing *father* (*father tongue, father land*). Though they also represent instantiations of a more general contrast between semantically-related words, here there is some sense of directionality, in that the *father* words are coined on analogy to the existing construction containing *mother*. This sense of directionality is also quite clear with the word *hamburger*, which has a fairly well-understood etymology and has also served as the basis for several new words ending in *burger*. In these analogical formations in Example 2.20, the reanalyzed item *ham* is replaced with the name for a different kind of food:

Example 2.20. *burger* is an "affixoid" in English

a.	*buffalo burger*	b.	*veggie burger*
c.	*salmon burger*	d.	*cheeseburger*

(Ham)burger represents a well-known example, and the compounding pattern here is productive enough that *burger* has also become established as an independent word in English. Another more novel example of a family of analogical compound formations can be found in Example 2.21. Here the compound *blackface*, which refers to the offensive practice of non-black performers using black makeup and stereotypical behavior to inhabit a black role, has served as the input for other compounds referring to typically offensive portrayals of another social group by someone outside that group:

Example 2.21. *face* is an "affixoid" in English

a.	*redface*	'portrayal of Native Americans by non-Native Americans'
b.	*yellowface*	'portrayal of Asians by non-Asians'
c.	*whiteface*	'portrayal of Caucasians by non-Caucasians'

The shift from an analogical formation based on the specific construction *blackface* to a more schematic formation based on the schematic construction $[[x]_X\, face]_N]_N$ can be seen with the words *Jewface*, *Arabface*, and *gayface*, which also refer to offensive portrayal of a social group by someone outside that group. However, perhaps because these groups are not stereotypically or conventionally associated with a metonymic color, and the practice of performing those groups' identities is not as heavily tied to colored makeup, the construction $[[x]_X\, face]_N]_N$, abstracted over compounds coined on analogy to *blackface*, denotes an offensive portrayal, without connoting the face makeup literally.

The preceding discussion has been comparing more schematic and more analogical compound formation examples. The clearest cases of an analogical formation are novel compounds that have been coined on the basis of a single, already existing compound. However, the only time it is certain that a compound has been coined on the basis of another compound, and not through the more general and schematic process of compounding, is when the novel compound borrows an idiosyncratic semantic pattern from a single, established compound.

One candidate for such a creation is the term *weed fairy*. In May 2014, Time.com ran an article with the following headline: "'Weed Fairy' Hands Out Free Marijuana Around Seattle". The article does not comment on the origin of the name *weed fairy*, however, it seems almost certain that this novel compound is an analogical formation on the conventional compound *tooth fairy*. The *tooth fairy* is a benevolent, folkloric figure who is said to visit children in the night and take recently lost teeth from under their pillows, leaving money in exchange. The novel compound *weed fairy* also shares this sense of a benevolent figure who leaves something desirable behind. However, while a *tooth fairy* takes unwanted teeth, and leaves money, the *weed fairy* apparently takes nothing but leaves marijuana. It therefore seems plausible that, on the basis of the shared element of meaning 'leaving something beneficial', that *weed fairy* is formed on analogy to *tooth fairy*.

Interestingly, the Time.com article concludes, "Now, if only if a Popchips Fairy would start doing the same thing. Make it happen, somebody"[1]. The author of

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[1] http://time.com/135851/seattle-weed-fairy-gives-out-free-marijuana/

this article was able, on the basis of the novel compound *weed fairy*, to create an analogical compound *Popchips fairy*, demonstrating the speed with which a small pattern can emerge on the basis of an analogical extension.

In this section we have seen that novel compounds in English can be made either on analogy to an existing compound, or by following a schematic construction that describes a generalization over related compounds. We have also seen examples that suggest that there is no firm line between analogical formations and schematic formations; instead, it seems that repeated analogical formations from the same established construction lead to the creation of increasingly abstract schematic constructions. I return to this relationship between schema and analogy, regarding the emergence of morphological constructions concerning lexical blends in Chapter 5, as well.

In the next section, I extend the constructionist analysis of compounding to ASL compounds. Like English compounds, a range of compound patterns in ASL can be profitably analyzed in terms of schematic constructions. However, I also identify sub-constructions which result from a combination of different word-formation systems within ASL. This demonstrates that the construction-based approach is well equipped to handle commonalities across languages, but, by virtue of viewing abstract patterns as emerging from language-particular phenomena, is equally well-equipped to describe language-particular patterns, as well (cf. Croft 2001; Goldberg 2013).

2.4 ASL compounds

2.4.1 Lexicalization in ASL

A recurring theme throughout this chapter has concerned the relationship between lexicalized, actually-existing words and novel, productively-formed words. In Section 2.2.3, for example, I reviewed Downing (1977)'s proposal that it is not enough to study only well-established compounds; if we wish to learn about the processes that govern productive compounding, we must examine the interplay between lexicalized compounds as conventional pairings of meaning and form, and novel compounds as examples which test the possibilities of the productive word-formation system.

It is interesting to note, then, that previous analyses of compounding in ASL, like early analyses of English compounds, have also been focused almost exclusively on lexicalized compounds. As a result, few studies have examined the productive processes through which compounds can be formed in ASL (cf. Vercellotti and Mortensen 2012; Lepic 2015). Moreover, due to the way that the term *lexicalization* has been used in sign language linguistics, *lexicalized* is typically understood to mean 'formally reduced', rather than the definition I have been using, 'conventionally paired with a specific meaning' in discussions of sign language structure (see e.g. Brentari 1998; Johnston and Schembri 1999).

Accordingly, here I begin with a short overview of how the term *lexicalized* has traditionally been used in sign language linguistics. This will helpfully lead the discussion through various word-formation processes in ASL, and will then facilitate a more targeted review of productive compounding constructions in ASL.

In sign language linguistics, lexicalization is typically discussed in connection with three different construction types: lexicalized fingerspelled words, lexicalized classifier signs, and lexicalized compounds (see e.g., Brentari 1998; Johnston and Schembri 1999; Sandler and Lillo-Martin 2006). The first construction type, lexicalized fingerspelled words, are conventional signs that have been derived from the ASL fingerspelling system. ASL fingerspelling is a contact phenomenon that links a fixed set of ASL handshapes with written English letters, and is commonly and productively used to borrow English words into ASL. Beyond lexical borrowing, fingerspelling serves many functions in ASL: fingerspelled words are used for personal or brand names, for signifying English word forms in ASL, for naming concepts for which there is no conventional ASL sign, for code-mixing, and for emphasis (e.g., Wilcox 1992; Kuntze 2000; Padden 2006).

Battison (1978) provides the first description of lexicalized fingerspelled words, analyzing several individual fingerspelled words that have been restructured, or "relexicalized" (1978:342) to become simple ASL signs. Crucially for Battison's study, because lexicalized signs differ systematically from their transparent and productively composed counterparts, they also provide insights for studying phonological constraints in ASL (1978:166). In general, lexicalized fingerspelled words have been simplified both in their number of handshapes and their movements to more closely resemble simple signs (see also Akamatsu 1985, Wilcox 1992, Brentari 1998).

Following Battison, lexicalized fingerspelled signs are typically transcribed with a #; a lexicalized fingerspelled sign transcribed as #WHAT[2] can be thought of as corresponding to a productively fingerspelled sequence transcribed as W-H-A-T. However, though #WHAT and W-H-A-T are both borrowed, fingerspelled forms of the English word *what*, they are quite different forms: #WHAT is signed with the palm up, and with smooth transitions from W to A and from A to T, while W-H-A-T is signed with the palm facing away from the signer, with four clear handshapes and only minimal co-articulation between each pair of handshapes. Other commonly-cited examples of lexicalized fingerspelled signs include #OR, #NO, #OFF, #YES, and #BACK. As a class, and compared to their fully fingerspelled counterparts, lexicalized fingerspelled words have fewer handshapes and fewer, larger movements, having become more like native ASL signs (see Brentari and Padden 2001, Cormier, Schembri, and Tyrone 2008).

The second class of lexicalized constructions, lexicalized classifiers, are similar to lexicalized fingerspelled words in that they too are often viewed as simple signs deriving from a productive process. In many sign languages, classifier constructions are used productively to iconically express spatial predicates of movement, shape, action, and location. Classifier constructions represent a relatively well-studied domain in sign language linguistics (see Supalla 1986; Emmorey 2003; Benedicto and Brentari 2004; Cormier, Quinto-Pozos, Sevcikova, and Schembri 2012); they have garnered a great deal of analytic attention because their iconic

[2] Readers unfamiliar with ASL are reminded to consult the ASL glossary at the end of the dissertation for examples of ASL signs.

properties and use of the body make them superficially similar to co-speech gesture or pantomime, though they also exhibit systematic and constrained linguistic patterning (cf. recent discussions of ideophones, which also display systematic yet iconic properties simultaneously, e.g., Dingemanse 2012).

Two defining characteristics of the ASL classifier system are that it is highly compositional as well as highly iconic; the classifier system is therefore characterized by two overlapping layers of transparency. In a productive classifier construction, the two hands, their handshapes, their orientations, their movements, and their locations can all contribute simultaneously to the meaning of the whole construction. For example, in a classifier construction meaning 'the man walked past the car' (CAR CL:'vehicle located here', MAN CL:'person moves past vehicle'), both hands are used. The non-dominant hand represents the car with a 'vehicle' classifier handshape, the 3 handshape, and the dominant hand represents the man with a 'person' classifier handshape, the 1 handshape. The location and orientation of the hands in space are selected and configured to symbolically represent the locations and orientation of the corresponding referents, while the movement of the hands conveys information about the movement of the referents: a single punctuated movement marks the location of stationary vehicle, and a longer path movement shows the movement of the person.

Classifier constructions are characterized by their productivity and morphological compositionality, but lexicalized signs derived from classifier constructions are "frozen"; though they retain analyzable internal structure, they are no longer interpreted primarily in terms of their parts, and instead tend to drift toward a more holistic meaning (Aronoff, Meir, Padden, and Sandler 2003; Morford and MacFarlane 2003; Sandler and Lillo-Martin 2006). Compared to productive classifier constructions, then, lexicalized classifier signs are more idiomatic and conventional. Two well-known examples of "frozen" classifier signs are FUNERAL and FALL in ASL (Emmorey 2001; Valli, Lucas, and Mulrooney 2005). For example, the sign FALL is produced with the dominant hand in an inverted 2 handshape, representing human legs, turning and optionally making contact with a flat non-dominant hand, representing the ground. This conventional sign is homophonous with a more transparent classifier construction, CL:'two-legged entity falling over (on a flat surface)'. However, while the productive classifier refers only to two-legged referents, the lexicalized classifier can be used more abstractly; as a lexical verb, FALL can serve as the input for the creation of other signs, as has happened with the verb SHED. This verb reduplicates the movement of the dominant hand in FALL on both hands, and can be used to describe hair falling from an animal's body or pieces of fruit falling from a tree, even though strands of hair and pieces of fruit are not two-legged entities.

The third and final kind of lexicalization we will discuss here involves lexicalized compounds. One of the earliest and most widely-cited discussions of "compounds" in ASL, Frishberg (1975), investigates lexical sign structure from a historical perspective, examining, among other things, historical change in compounds as two-part signs. Frishberg demonstrates that there is a strong tendency for two-part signs to reduce down to one-part signs over time. This reduction happens either by blending the two parts of the compound together to the size of a single sign, or by simply deleting either the first or second part of the compound.

Frishberg's discussion of compounds as historically two-part signs and, in particular, as signs that reduce or simplify by blending their two constituent parts together, set the tone for subsequent analyses of compounding in ASL (e.g., Liddell and Johnson 1986, Sandler 1993, Brentari 1993). An example of a blended two-part sign, then, is INFORM, which is etymologically derived from the signs KNOW and OFFER. Compared to the two-part sign KNOW+OFFER, the one-part sign INFORM is articulated with a smooth, single movement between two locations, during which both of the hands simultaneously open (Frishberg 1975:707). The resulting sign INFORM no longer has synchronically transparent morphological structure; its former constituents have been obscured. Another, very advanced example of this blending reduction is HOME, which is originally derived from a two-part sign, EAT+BED. Even though HOME originated as a two-part sign diachronically, it has become so uniform and opaque that no synchronic features remain to distinguish it from other morphologically simple signs (Frishberg 1975:707).

Though studies of phonological reduction in these heavily lexicalized compounds have largely overshadowed morphological analyses of compounding in ASL (cf. Vercellotti and Mortensen 2012), early descriptions of compounding in ASL also mention synchronically transparent compounds, which are made by combining existing signs (Klima and Bellugi 1979, chapter 9; Bellugi and Newkirk 1981). For example, Bellugi and Newkirk provide MACHINE COPY 'photocopier' and LIGHT FLASH 'strobe light' as examples of synchronically transparent compounds, in contrast to GOOD+ENOUGH 'barely adequate' and SURE+WORK 'seriously', which are analyzed as examples of lexicalized, or diachronically reduced compounds.

Here we have very quickly touched on three different construction types as illustrations of how previous analyses have treated lexicalization in ASL. Though the fingerspelling system, the classifier system, and productive compounding all represent quite different grammatical systems in ASL, they all have in common that they can be used to productively create constructions which can then become conventionally paired with a particular meaning, and then subsequently reduce in form in a way that can obscure their original transparent internal structure.

In the remainder of this section, I develop schematic morphological constructions to account for a variety of productive compounding types in ASL. Surveying a range of compounding constructions, many of them originally described by Bellugi and colleagues (Klima and Bellugi 1979; Bellugi and Newkirk 1981), I will demonstrate that compounding in ASL combines signs, classifiers, and fingerspelled words to create transparent, two-sign units. Accordingly, ASL compounds can be analyzed both in terms of the compounding constructions I have already identified for English, as well as in terms of language-specific sub-constructions for ASL.

2.4.2 Signed compounds

In this section, I describe three compounding constructions which combine ASL signs productively. The first examples of compounds I discuss are classifier compounds, which were noted early on in the literature on compounding in ASL (Klima and Bellugi 1979, Bellugi and Newkirk 1981). Classifier compounds, as Bellugi and colleagues demonstrate, combine a lexical sign with a classifier which typically functions to specify the size and shape of the referent.

Example 2.22. Classifier compounds in ASL

a.	RED CL:'rectangular'	'brick'
b.	MEASURE CL:'long/thin'	'ruler'
c.	TIME CL:'upright disk'	'wall clock'

The morphological structure in the classifier compounds in Example 2.22 can be straightforwardly represented with the schematic morphological construction in Example 2.23: like previous constructions we have seen, this construction is mostly schematic, but specifies a relationship between the two elements of the construction.

Example 2.23. A classifier compound construction

$$\left[\begin{array}{c} [[x]_X\ [y]_Y]_Y \\ \text{'an X thing that is shaped like Y'} \end{array}\right]$$

Consistent with Frishberg's (1975) discussion of how certain compounds may eliminate one constituent in order to reduce to a single-unit sign, once these compounds become more established and conventional, either the first or second element may be dropped. For example, the sign RULER can also be signed as MEASURE without the 'rectangular' classifier in modern ASL. This is perhaps similar to how the compound noun *newspaper* in English can be referred to simply as (the) *paper* in colloquial speech; by virtue of having appeared in a conventional compound, one of the elements of the compound can shift to stand in for the compound as a whole.

Also noted by Bellugi and colleagues (Klima and Bellugi 1979, Bellugi and Newkirk 1981) are what have been variously referred to as coordinate compounds (Arcodia, Grandi, and Wälchli 2010) and dvandva compounds (Meir, Aronoff, Sandler, and Padden 2010), but which I will refer to as hypernym compounds, because they combine signs for multiple items to denote the hypernym, or superordinate category term, for that particular class of items. These hypernym compounds typically combine three signs, followed by an optional ET-CETERA (ETC). The signs in Example 2.24 are again from Bellugi and colleagues.

Example 2.24. Hypernym compounds in ASL

a.	APPLE+ORANGE+BANANA+ETC	'fruit'
b.	BEANS+CARROTS+CORN+ETC	'vegetables'
c.	CHAIR+TABLE+LAMP+ETC	'furniture'

Though hypernym compounds do not appear to be very frequent in contemporary signing (cf. Meir, Aronoff, Sandler, and Padden 2010), either because they are blocked by a single hypernym term in ASL, like FRUIT or FURNITURE, or because it is common to borrow hypernym terms from English via fingerspelling, I have personally observed some hypernym compounds used to denote 'tools', for which there is not a single standard ASL sign, and 'dessert', as in Example 2.25.

Example 2.25. Additional hypernym compounds in ASL

a.	RAKE+BROOM+#MOP+ETC	'tools'
b.	ICE-CREAM+CAKE+PIE+ETC	'dessert'

Though Bellugi and colleagues' descriptions are often cited in the literature, I do not know of any subsequent studies that further test the properties of these hypernym compounds. To the extent that hypernym compounding is productive in modern ASL, however, it can be described using an abstract schema that links three elements, as in Example 2.26.

Example 2.26. A hypernym compound construction

$$\left[\begin{array}{c}[[x]_X\ [y]_Y\ [z]_Z\ (\text{ETC})]_A \\ \text{'A such that the set of A things includes X, Y, and Z'}\end{array}\right]$$

Finally, in ASL we also have compounds which are made by juxtaposing two full signs, in much the same way that English compounds juxtapose two words (see Perlmutter 1996; Vercellotti and Mortensen 2012; Lepic 2015). Some examples of sign-sign compounds can be seen in Example 2.27:

Example 2.27. Sign-sign compounds in ASL

a. NAME SIGN 'name sign'
b. FORMAL ROOM 'living room'
c. NUMBER STORY 'number story'
d. DEAF CULTURE 'Deaf culture'

These sign-sign compounds all denote a 'kind of" relationship: a 'number story' describes an ASL language game where the signer constructs a story using a fixed set of numerical handshapes, and 'Deaf culture' describes the cultural practices of Deaf people who use ASL. Accordingly, like the classificatory compounds we have already seen in English, the morphological structure in these conventional ASL compounds can be described using the familiar morphological construction in Example 2.28, which specifies only that there is a relationship between the two elements of the compound:

Example 2.28. A schematic compounding construction

$$\begin{bmatrix} [[x]_X\ [y]_Y]_Y \\ \text{'Y with relation R to X'} \end{bmatrix}$$

In this section I have briefly discussed three examples of compounding constructions in ASL which combine ASL signs to create new lexical constructions. We have seen that the construction-based approach that we have been developing can be extended straightforwardly to describe the structure of various ASL compounds. In the next section, I examine two additional constructions which combine ASL signs with fingerspelled words borrowed from English.

2.4.3 Fingerspelling-sign compounds

Fingerspelling is a productive mechanism for borrowing English words into ASL; in this section, I discuss two additional compounding constructions that pair a fingerspelled word with either a classifier or an ASL sign. These two fingerspelling-sign compound constructions are referred to here as *fingerspelled compounds* and *chain compounds*, respectively. Though they are structurally similar, these two constructions differ in their functions: fingerspelled compounds are two-sign loan translations of English words, and so the structure of the compound in ASL is motivated by the structure of an existing English compound. Chain compounds, in contrast, are used to ground a single borrowed English word in ASL, and so pair a fingerspelled English word with a synonymous ASL sign.

Fingerspelled compounds are calques of English words, such that one element of the calque is an ASL sign, and the other element is a fingerspelled word.

Fingerspelled compounds were first identified by Padden (1998), who discusses fingerspelled compounds as part of a larger argument about the status of English-influenced vocabulary in ASL. According to Padden's analysis, whereas ASL's "native" vocabulary includes classifiers, verbs of location and motion, verb and adjective inflectional paradigms, pronouns, and derivational processes, the "foreign" vocabulary includes initialized signs, to be discussed at length in Chapter 3, as well as abbreviation signs, lexicalized fingerspelled signs, and name signs, all of which are influenced by English, through ASL fingerspelling. As part of the foreign lexicon, Padden identifies compounds in which a sign is followed by a fingerspelled word, as well as a fingerspelled word followed by a sign.

Example 2.29. Fingerspelled compounds in ASL

a.	SUN B-U-R-N	c.	P-R-O-O-F READ
b.	PAY R-O-L-L	d.	S-T-O-C-K MARKET

Padden suggests that the determining factor for whether a word will be fingerspelled within a borrowed compound concerns the compatibility of the semantics of the borrowed compound's constituent words and of the available ASL sign translations. For example, the second element of *payroll*, when borrowed into ASL from English, is fingerspelled because the ASL sign most commonly glossed as ROLL refers to circular movement, but not a list, as it does in English. Similarly, the first element of *proofread* is fingerspelled because the ASL sign PROOF refers only to evidence, rather than a preliminary print to be examined for errors, as it can in English.

Fingerspelled compounds, then, are internally structured according to an existing English compound, and the use of fingerspelling is driven by overlap, or rather by misalignment, between form and meaning among English words and ASL signs. This suggests that fingerspelled compounds exist as individual constructions that are calqued into ASL from English. However, it is less clear what kind of abstract schema, if any, unites fingerspelled compounds; this question depends on the psycholinguistic status of fingerspelled words in ASL. It seems reasonable to assume, especially following the discussion in of lexicalized fingerspelled words in Section 2.4.1, that certain frequently or commonly fingerspelled words have a lexical representation as ASL signs (e.g., Padden 2006). However, it is unclear to what extent ASL signers have a lexical fingerspelled representation for all the English words they know. If a fingerspelled word like S-T-O-C-K is represented as a learned and conventional pairing of meaning and form in ASL, then the fingerspelled compound S-T-O-C-K MARKET is no different from any other compound, and can be viewed as being an instantiation of a very general compounding construction, for example the schematic compounding construction we started with in Section 2.2.1, and ended with in Section 2.4.2. However this matter awaits further external testing regarding the psychological reality of fingerspelled English words in the ASL lexicon (see Chamberlain and Mayberry 2000; Padden and Ramsey 2000; Emmorey and Petrich 2012; Emmorey, McCullough, and Weisberg 2015).

A related phenomenon, in that it also results from ASL's extensive contact with English, is chain compounding. Humphries and MacDougall (1999) identify *chaining* as a pedagogical tool that overtly links English and ASL vocabulary. They demonstrate that chaining is used in educational settings where Deaf, ASL-fluent students are learning English from a signing teacher, and that in these environments, skilled teachers tend to link English and ASL vocabulary by alternatingly writing the English word on the chalkboard, indicating to the word, fingerspelling the word, and additionally denoting the concept with a synonymous ASL sign. An example that Humphries and MacDougall (1999:90) discuss involves the English word *duty*, which in their data is represented as a written word, as a fingerspelled word, and as an initialized sign:

Example 2.30. Chaining in ASL

duty	(point)	DUTY	D-U-T-Y	DUTY
printed word	pointing to word	initialized sign	fingerspelled word	initialized sign

Though it is not identical, and conversational rather than pedagogical, a similar phenomenon I have observed in ASL is fingerspelling a borrowed word from English, and then signing either a classifier or lexical sign with a similar meaning, or by first signing a lexical sign or classifier, and then the fingerspelled English word. In these chain compounds, as in Example 2.31, the two units together function as one name for the target concept, one for which there is an established English word but apparently no single, widespread, and conventional ASL sign. In my observations, it seems these chain compounds also have the effect of establishing the signed element as the sign for the intended English word in a particular discourse setting.

Example 2.31. Chain compounds in ASL

a. P-R-O-S-O-D-Y CL:'wave'
b. A-B-S-T-R-A-C-T SUMMARIZE
c. CL:'4x4 grid' P-A-T-T-E-R-N
d. CUTE Q-U-A-I-N-T

Unlike fingerspelled compounds, where the structure of the compound is driven by an existing English compound, chain compounds are used to link a specific English word with a reasonable ASL translation or a signed synonym. To my knowledge this type of compound has not been discussed in the linguistic literature on ASL compounding or English-ASL contact. I have observed chain compounds primarily in university settings, among college-educated Deaf people, so it is very likely an effect of bilingualism and English's position as a more standardized and academic language, relative to ASL. For example, many of the instances of these chain compounds that I have observed relate to linguistics jargon, for which there are few conventional and widely-standardized ASL signs.

However, note that chain compounding, as a contact phenomenon, is not unique to ASL/English. Similar bilingual compounds were attested, for example, in Pennsylvania German (Schach 1951), and are interesting because they also use synonymous Pennsylvania German and English words together to denote a single concept. Schach reports that some speakers used the Pennsylvania German word, the English word, and the bilingual compound interchangeably, and others used the Pennsylvania German/English compound for a more specific meaning, only:

Example 2.32. Pennsylvania German bilingual compounds

a. *barrel-fass* 'barrel; a large barrel'
b. *doll-bop* 'doll; a ragdoll'
c. *quilt-depic* 'quilt; a bedspread'

Of course, in English we also have examples of borrowed word + native word compounds, as in *chai tea* (*chai* meaning 'tea' in Mandarin and Portuguese) and *panini* *sandwich* (*panini* being the plural form of *panino*, 'a kind of bread/sandwich' in Italian). The difference between the English examples and the ASL examples, however, is that the English borrowings are idiosyncratic compounds, while in ASL this borrowing strategy is productively used to link ASL signs with English words in a given context. This can be analyzed under a construction-based approach as a schematic construction which specifies that fingerspelled words and signs can be combined, in either order, on the basis of some overlapping element of meaning.

Example 2.33. A chain-compounding construction in ASL

$$\left[\begin{array}{c} [[x]_{X}\ [y]_{Y}]_{Y} \\ \text{'Y/X in English and X/Y in ASL} \\ \text{are (roughly) synonymous'} \end{array}\right]$$

The construction in Example 2.33 represents a first attempt at coordinating information about English words and ASL words in a single representation. However, as we saw with fingerspelled compounds, this can be a fraught issue, and I will leave the exact form of the construction approximate for now. This coordination of ASL and English will factor heavily into the discussion of initialized signs in Chapters 3, but for now, the important point is that chain compounds represent a productive compounding mechanism in ASL, and so can be analyzed using a schematic construction that links ASL signs with fingerspelled English words.

From this survey of compound types in ASL, we can see, in addition to lexicalized compounds which have been intensively studied in the phonological literature, that ASL has many productive compound types that are not often considered, and even then, are not often considered together, as compounds. More than just a formal exercise, thinking about compounding from a construction-theoretic perspective has led us to consider the relationship between conventional, lexicalized compounds, and novel, productively made ones. I conclude this section, then, with a final discussion of lexicalization and compounding, in light of the English and ASL examples I have been discussing in this chapter.

2.4.4 Compounds and lexicalization revisited

Throughout this chapter, I have been touching on the phenomenon of lexicalization, contrasting lexicalized constructions with those that are made according to productive word-formation processes. However, as Himmelmann (2004) points out, *lexicalized* is typically meant to mean 'having become a part of the lexicon', and so the notion of lexicalization necessarily changes depending on the notion of the lexicon that is adopted. Himmelmann identifies three broad characterizations of the lexicon to illustrate this point. The *grammarian's lexicon* is a lexicon in the Bloomfieldian sense: a repository of every form-meaning pairing which cannot be derived by productive rules, including affixes, simple words, and idioms. The *lexicographer's lexicon*, on the other hand, is more like a dictionary, as it includes conventional and commonly-used form-meaning pairings, regardless of their morphological complexity. Finally, the *psychologist's lexicon* is characterized in terms of the processes that take place when stored form-meaning associations are activated during language production or comprehension, as well as the processes for analyzing and producing new ones. These three characterizations are quite general, and like Himmelmann, I appeal to them here only to illustrate different characterizations of the process of lexicalization: for the structuralist grammarian, lexicalization is the process by which forms with complex morphological structure become opaque or idiomatic. For the lexicographer, lexicalization is the process by which novel forms become conventional and commonly accepted in the community. Finally, though it will not be as relevant for the discussion here, for the psycholinguist, lexicalization is the process by which an utterance coheres into a single processing unit.

These differing senses of lexicalization point to several interrelated sub-processes, and accordingly, a variety of authors have proposed a variety of terms to refer to different aspects of lexicalization (see Lipka 2002, Himmelmann 2004, Hohenhaus 2005, Brinton and Traugott 2005). In developing a construction-based theory of the lexicon, and interpreting the examples we have been examining in this chapter, I find it useful to refer to just three of these processes that are typically subsumed under the broader label of "lexicalization".

The first is *univerbation*, the process of distilling a single word from a collocation of two or more words. Univerbation is a process of formal reduction that affects frequently co-occuring words, such as items like *don't*, or even *dunno*, which retain remnants of analyzable internal structure, and items like *orchard* (from Old English *wyrt* 'herb' + *geard* 'yard'), which no longer retain any analyzable internal structure. The second process, *fossilization*, is related to univerbation, but instead refers to a loss of productivity or semantic motivation. Fossilization describes the structure of a lexical item like *forget-me-not*, which is frozen in a synchronically unproductive order, and of an idiom like *shoot the breeze*, which is a fixed, holistic pairing of form and meaning that cannot be analyzed in terms of the meanings of its constituent words. Of course, univerbation and fossilization reinforce and overlap with each other. The word *holiday* historically results from the combination of the words *holy* and *day*; however, compared to *holy day*, *holiday* has undergone a semantic change, denoting a day off from work, rather than a strictly religious day, as well as a phonological change that obscures *holiday*'s relationship to the word *holy*.

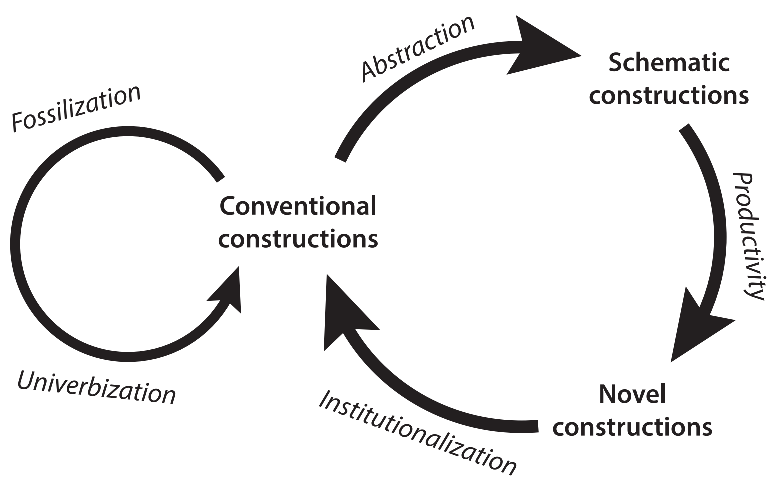
Univerbation and fossilization are diachronic changes that affect existing words, while the third sub-process associated with lexicalization, *institutionalization*, refers to the more synchronic process by which novel forms come to be accepted and used within a community. Institutionalization necessarily precedes univerbation and fossilization; words can only really develop idiosyncratic characteristics once they have become established as conventional lexical items in a speech community. By definition, then, conventional and frequently-occurring words have been institutionalized. However, as Hohenhaus (2005) points out, institutionalization is an inherently sociolinguistic concept: it is often necessary to define the speech community that a particular lexical item has become institutionalized in. This can be seen most clearly with acronyms and jargon terms, which can be quite common in one speech community, but quite opaque to outsiders. Two terms that are institutionalized in the linguistics community, for example, are *the OCP* and *subjacency*. These words have established meanings, but only for (certain kinds of) linguists.

Recall that in in Section 2.4.1, I suggested that in sign language linguistics, *lexicalized* is typically used to mean 'formally reduced'. Thus, lexicalized fingerspelled words like #WHAT, lexicalized classifier constructions like FALL, and lexicalized compounds like PARENTS (from MOTHER+FATHER) all have in common that, compared to other productive constructions, they are formationally reduced, having become single "prosodic words" (Brentari 1998; Sandler 1999). This suggests that sign language linguistics has primarily been thinking about lexicalization as univerbization and, to a lesser extent, fossilization. However, in this chapter I have shown that this view of lexicalization overlooks the related process of institutionalization which necessarily feeds the processes of fossilization and univerbation.

Crucially, institutionalization, fossilization, and univerbation are processes that affect collocations, compounds, and derived words alike. In this chapter I have been dealing primarily with compounds, however, it has long been known that derived words like English *transmission* and *computer*, by virtue of having specific, unpredictable meanings ('car gearbox' and 'machine with a central processor', respectively) that go beyond the literal meanings of their parts, must also be listed as fossilized units in the lexicon (e.g., Aronoff 1976).

Words like English *computer* and signs like ASL FALL can both be analyzed in terms of their meaningful internal structure, but, because they have meanings that cannot be predicted from the sum of their parts alone, these words are also fossilized to some degree. The English word *don't* and the ASL sign #WHAT, in contrast, are more accurately described in terms of how their phonological forms have reduced to form a single word; these words are univerbized to some degree. Finally, English *orchard* and ASL HOME can be understood as having been affect by both univerbization and fossilization; these words historically were construed as having motivated internal structure, but have now become morphologically simple, with very few, if any, remaining traces of synchronic structure. Univerbization and fossilization, together over time, rob morphologically transparent words of their original motivation. This leads to a view of lexicalization like the one in Example 2.34:

Example 2.34. A revised model of lexicalization



In this model of lexicalization, conventional constructions, the words of a given language, are central to lexical organization. These conventional lexical constructions are learned as specified pairings of meaning and form, and, through the process of abstraction, give rise to schematic morphological constructions that describe systematic correspondences of meaning and form in the lexicon. These schematic morphological constructions also serve as templates for the productive formation of novel constructions. Novel constructions, when coined, are somewhat ambiguous, with a range of possible meanings, but as they become commonly paired with a particular meaning, thereby becoming institutionalized in a given speech community, they in turn become conventionalized constructions in the language. Conventionalized constructions, through repeated use, also typically become fixed, or fossilized, in form, remaining the same even as the corresponding schematic constructions that once formed them may change or drop out of use entirely. Concurrently with fossilization, the process of univerbation constantly erodes the phonological forms of frequently occurring conventional constructions, sometimes to the point that their original relationship to other words is lost completely.

2.5 Conclusion

I began this chapter by adopting the construction-theoretic view of compounding advocated by Booij (2010, 2013) as part of the theory of Construction Morphology. Two lines of inquiry arose from this exercise: the first concerned how to account for the internal structure of English and ASL compounds in a construction-based theory of morphology, and the second concerned the relationship between novel and conventional lexical items in the construction-theoretic lexicon. I have shown in this chapter that English and ASL compounds can both be analyzed as instantiations of abstract patterns that arise from the actually-occurring words of a language. Furthermore, looking at a range of examples, I have demonstrated that, rather than a single compounding "rule", compounding patterns in English and ASL are most profitably analyzed as overlapping constructions at varying levels of abstraction.

This discussion of English and ASL compounds has also led us to seriously consider the status of conventional complex constructions in the lexicon. I have developed a view of morphology and of the lexicon which splits the monolithic notion of *lexicalization* into several sub-processes which are vital to a construction-based analysis. Institutionalization, fossilization, and univerbation all act on individual novel and conventional constructions, obscuring their relationship to the productive processes that created them in the first place. As a result of these processes, new morphological patterns can arise and serve as the analogical basis for the formation of additional new words. In effect, the constructionist lexicon is a dynamic system characterized by constantly shifting alignments of form and meaning, driven primarily by conventional whole words.

In this chapter, I reviewed several word-formation and compounding processes in ASL relatively quickly, drawing on only a few examples in each case. Accordingly, the next two chapters examine word-formation in ASL in much greater detail. I begin with a dictionary study of a single word-formation process, initialization, in Chapter 3; the consequences of this in-depth analysis in turn inform our understanding of the ASL lexicon as a whole, to be discussed in Chapter 4.

CHAPTER 3

INITIALIZED SIGNS IN ASL

3.1 Introduction

In Chapter 2, I laid out the assumptions of a construction-theoretic approach to morphology, and examined the mechanics and implications of a construction-based analysis of compounding in English and in ASL. Construction morphology seeks to describe lexical patterns as constructions, or learned pairings of meaning and form. Lexical constructions can either be specific, actually occurring words, or more schematic generalizations that have been abstracted over related whole words.

The construction-theoretic approach I have adopted is word-based, providing an alternative to the structuralist, morpheme-based view of morphology, which seeks to build all morphologically complex words from smaller, independently meaningful pieces. Shifting to a construction-based view does not preclude us from talking about meaningful word-internal structure of the sort that is familiar from more structuralist approaches to morphology. However, because the construction-based approach focuses on learned patterns without imposing semantic decompositionality on words with complex structure, it can provide a unified account for a range of word structure types. These structures can range from quite transparent, where the meaning of the whole can be seen as a function of the meaning of its parts, to relatively opaque, where the meaning of the whole may only be associable with a constructional pattern shared among words.

This chapter extends this approach to one word-formation process in ASL, initialization, which has not yet been studied in-depth. Initialization is a borrowing strategy that is frequently used to import English words into ASL. Though we will see in this chapter that this definition requires some modification, initialized signs in ASL are generally characterized as existing ASL signs that have incorporated a handshape that is prototypically used in the fingerspelling alphabet, such that the ASL sign is formed with the handshape that corresponds to the initial letter of its English translation. The mapping between meaning and form in initialized signs raises interesting challenges for morphological theory; a key question concerns the nature of the handshape in a given initialized sign, and the exact role that these formative elements play in morphology.

As an example, the ASL sign YESTERDAY[1] is formed with an open-A handshape that contacts the cheek once near the mouth and again closer to the ear. YESTERDAY is an iconic sign whose backward movement aligns with a metaphorical timeline in which the past is behind us. The related signs TOMORROW and EVERYDAY similarly are articulated with an open-A handshape near the cheek, however with different movements: TOMORROW begins near the chin, and moves forward, off of the face, metaphorically placing 'tomorrow' in front of the body, while EVERYDAY repeatedly brushes the cheek, evoking the sense of something happening 'day after day after day' (Frishberg and Gough 1973/2000:123). YESTERDAY, TOMORROW, and EVERYDAY are systematically related in form and meaning, and so form a lexical

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[1] Readers unfamiliar with ASL are reminded to consult the ASL glossary at the end of the dissertation for examples of ASL signs.

family in ASL.

The sign YESTERDAY also has an initialized variant which replaces the open-A handshape with a Y handshape from fingerspelling. This sign is glossed as Y̲ESTERDAY, the underlined letter representing the correspondence between the handshape used to articulate the sign and the initial letter of the sign's English translation. Y̲ESTERDAY is an initialized sign, and other than their handshapes, YESTERDAY and Y̲ESTERDAY are identical.[2] However, attempting to break YESTERDAY and Y̲ESTERDAY down into independently meaningful pieces proves a challenge: it is not clear what meanings the two identifiable handshapes open-A and Y can be said to encode, especially if the shared location and movement between these two signs is to account for the shared 'yesterday' meaning between them.

Initialization has not yet been studied in detail, in part because acknowledging English influence in ASL is a sensitive issue (cf. Padden 1998), and in part because initialized signs defy more traditional analyses which seek to break complex words down into independently meaningful pieces. However, here I argue that it is important to focus on initialized signs because they are at once quite remarkable and also completely unremarkable: initialized signs can be very salient as "English words" in ASL, but they are also related to one another, and to other signs, in ways that are completely consistent with the patterns that characterize the rest of the ASL lexicon. I

[2] The initialized sign Y̲ESTERDAY could be analyzed as allophonically related to the sign YESTERDAY, resulting from a regular process of pinkie extension (e.g., Hoopes 1998). However, this analysis raises the question of why pinkie extension affects only YESTERDAY and not TOMORROW or EVERYDAY; these two signs do not alternate between the open-A and Y handshapes, and so the change in handshape in the initialized version Y̲ESTERDAY disrupts the relationship among the signs {YESTERDAY, TOMORROW, EVERYDAY}. This provides support for considering Y̲ESTERDAY an initialized sign, rather than simply a phonological variant of YESTERDAY.

therefore analyze initialized signs as constructions that are potentiated by the structure of the ASL lexicon itself.

Here I examine the morphological consequences of initialization in ASL through a construction-theoretic lens, concluding that individual initialized signs are specific lexical constructions that together license more schematic initialization constructions in ASL. The chapter proceeds as follows: Section 3.2 provides an overview of initialized signs, reviewing their general properties as they have been described previously. Section 3.3 describes the methodology used to compile a database of initialized signs from a dictionary, and presents some findings that emerge from the dictionary study. Drawing from examples in the dictionary database, I also elaborate the traditional definition of initialization to identify metonymic relationships that link initialized and native signs in ASL. Section 3.4 presents a construction-theoretic analysis of initialized signs, arguing that initialized signs exploit possibilities afforded by the ASL word-formation system. Section 3.5 provides a brief conclusion, noting that initialized signs, as hybrids of English and ASL, recombine existing components of two separate word-formation systems in ASL, and they do so in a way that is completely expected, given the characteristics of these component systems.

3.2 Background

3.2.1 English or ASL?

Initialized signs are common in ASL; initialization has long been recognized as a strategy for borrowing words into ASL from English (Stokoe 1960), and some signs with initialized handshapes are the canonical signs for common concepts, for example FAMILY, PEOPLE, WATER, and CULTURE. Initialized signs for French words are found in French Sign Language, from which ASL and its fingerspelling system are descended (Padden and Gunsauls 2003), and so initialized signs for English words, mediated through the fingerspelling system, have likely been a part of ASL for as long as ASL has been in contact with English.

Despite the fact that initialized signs are well-entrenched in ASL, signers and linguists alike are sometimes wary of initialized signs and of the process of initialization.[3] This wariness partially stems from the relative sociolinguistic status of ASL and English in the United States. English is the dominant language in the United States, while ASL is a minority language, and so ASL signers are often also necessarily proficient in English. Within this diglossic context, ASL and English are in continuous contact, and English exerts tremendous influence on ASL. Initialized signs are one outcome of this influence (Battison 1978; Sutton-Spence 1999).

Wariness about initialization also stems from the role that initialized signs played in so-called "Manual English" programs of the 1970s (e.g., Gustason 1983). Among other things, the Manual English programs sought to take advantage of the existing process of initialization to link ASL signs with English words, and promoted manufacturing initialized signs to re-create lexical distinctions that exist in English but

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[3] One example of this metalinguistic awareness of and self-consciousness about initialization appears in an ASL vlog posted to YouTube: the signer describes an upcoming family trip, and says, "My grandmother has a cabin, we sign 'cabin' like this, some other people sign it this way, to each their own… I sign 'cabin' with these two C handshapes, but wow that's a very English sign, huh?" ("GRANDMA HAS C-A-B-I-N CABIN SOME SIGN CABIN THEIRS$_a$ THEIRS$_b$ THEIRS$_c$ I SIGN CABIN C-C PHEW VERY ENGLISH SIGN OH-WELL"). The signer then fingerspells C-A-B-I-N for the remainder of the vlog. (https://www.youtube.com/watch?v=jmfRR9nTiqs)

not in ASL. These systems for restructuring ASL to match English can be quite awkward and unnatural, for example when artificially-created initialized signs violate phonological constraints on well-formed ASL signs (Klima and Bellugi 1979, Supalla 1991). A well-known example is the sign TOTAL-COMMUNICATION, the name for a philosophy that promotes producing ASL signs while speaking English. This sign is initialized, based on the native ASL sign DIALOGUE. DIALOGUE is signed with two 1 handshapes alternatingly moving toward and away from the signer's mouth, but in TOTAL-COMMUNICATION, the 1 handshapes are replaced with a dominant T handshape and a non-dominant C handshape. However, few, if any, other lexical signs in ASL involve both hands moving independently with each hand specified for a different handshape. Though TOTAL-COMMUNICATION is easy to articulate, it is an exception in the ASL lexicon (Battison 1978, Channon 2004).

The Manual English programs were primarily concerned with helping Deaf students access and master English. However, the way that these programs promoted the practice of initialization, combined with widespread and fundamental misunderstandings about ASL structure in the 1970s and 1980s, created sociological competition between conventional ASL signs and artificial Manual English signs. In the 1980s and beyond, increased awareness of Deaf culture and increased ASL pride has lead to varying degrees of pushback against English influence on ASL, and against initialized signs (e.g., Woodward 1980; Johnson, Liddell, and Erting, 1989).

Even when considered separately from the Manual English movements that popularized them, initialized signs seem to contribute to enduring myths and anxieties about the relationship between spoken and signed languages, and between English and ASL. As Padden (1998) notes, even though fingerspelling is pervasive in ASL, acknowledging English- and fingerspelling-influenced vocabulary in ASL might seem to contradict the fact that sign languages are natural human languages, rather than derived manual codes for spoken languages. Because of these social factors, and because borrowed words in general can sometimes be neglected in general studies of sub-lexical structure, initialized signs have only infrequently been directly studied as part of the ASL lexicon (although see Padden 1998, Fernald and Napoli 2000, Brentari and Padden 2001), or indeed in any sign language lexicon (although see Miller 2001 for Quebec Sign Language and Hendriks and Dufoe 2014 for Mexican Sign Language).

Synchronically, then, the process of initialization facilitates borrowing and adapting English words into ASL, as commonly happens among languages in contact. However, initialization has also become somewhat stigmatized in modern ASL. This naturally leads to questions about what kind of role initialized signs play in natural, contemporary signing; for example, in what social situations are initialized signs used more frequently, and what factors, whether formal, social, or otherwise, make certain initialized signs more acceptable than others for ASL signers? Given that no reference grammars or large-scale corpora yet exist for ASL, it is also difficult to assess, even descriptively, the status of initialized signs in the ASL lexicon. Furthermore, from a theoretical standpoint, relatively little has been said about the process of initialization itself, for example regarding the morphological status of initialized handshapes.

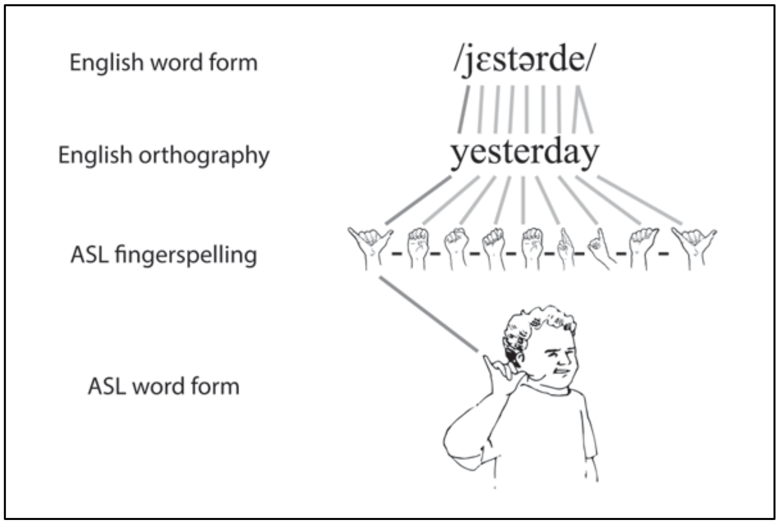
In Section 3.3, I present a database of initialized signs to begin to answer some of these questions. This dictionary study provides the first quantitative estimate of the prevalence of initialized signs in ASL. The remainder of this section, then, describes properties of initialized signs, as well as how signs were analyzed from *The American Sign Language Handshape Dictionary* (ASLHD, 2nd edition, Tennant and Brown 2010) to allow for the creation of a suitable database of initialized signs.

3.2.2 Properties of initialized signs

Typically, studies mentioning initialized signs do so briefly, in the context of a broader investigation, such as providing a general description of the ASL lexicon or characterizing the relationship between ASL and English. The systematic co-variation of form and meaning found among initialized signs can be very intuitive for English-speaking second-language learners of ASL, or for ASL signers who are also quite proficient in English as a second language, and it is often sufficient to provide only an informal description of the process of initialization, along with a small selection of familiar, representative examples, to illustrate the process of initialization.

Early linguistic studies of ASL (e.g., Stokoe 1960, Frishberg and Gough 1973/2000, Battison 1978) define initialized signs as a class of ASL signs that are articulated with a handshape that corresponds to the initial letter of the sign's English translation. This correspondence actually involves several links, from the spoken English word form to a written form, from the written form to a fingerspelled representation, and from the fingerspelled representation to a phonological handshape in a lexical ASL sign. Initialization makes use of handshapes from the fingerspelling system; however, just because a given handshape is used both in the lexical sign system and the fingerspelling system does not mean that all signs made with that handshape are initialized signs. Identifying a sign as initialized requires taking not only the form and meaning of the sign, but also the form of a spoken language word with a related meaning, into account. To return to the example of YESTERDAY, the English word meaning 'the day before today' has the form /jɛstərde/, which in turn has the written form *yesterday*. This English word is fingerspelled in ASL as a sequence of nine segments, Y-E-S-T-E-R-D-A-Y. The handshape used in the initial segment of this fingerspelled sequence, a Y handshape, is also the handshape that is used to form the sign YESTERDAY, which denotes roughly the same meaning as the English word /jɛstərde/, 'the day before today'. Because each of these correspondences can be constructed between the English and ASL words in question, YESTERDAY is considered an initialized sign, as schematized in Example 3.1.

Example 3.1. Initialization is a set of correspondences[4]



Another well-known property of initialized signs is that they form clusters or families of signs that are systematically related in form and meaning. This typically happens in one of two ways: first, an initialized sign can co-exist alongside the native, non-initialized sign for the same concept. We have already seen this pattern with YESTERDAY◆YESTERDAY. Another example can be seen with the signs LONG◆LONG: LONG is formed with a 1 handshape moving along the top of the non-dominant arm, and its initialized counterpart LONG is identical, except that it is signed with an L handshape.

Second, initialized signs denoting related rather than synonymous concepts also often differ from one another only by their handshapes, which also co-vary with the initial letters of English words. An example that we have already seen is TOTAL-COMMUNICATION, an initialized variant of the related sign DIALOGUE. Some other well-

[4] The illustration of ASL YESTERDAY comes from the American Sign Language Handshape Dictionary (Tennant and Brown 2010:125), and the fingerspelling font used in this diagram comes from http://www.cuhk.edu.hk/lin/Faculty_gladystang/handshape2002-dec.TTF.

known examples are listed in Example 3.2. Signs within these three groups denote related concepts, and have in common that they have taken their location and movement from an existing, semantically related ASL sign, which is also listed to the left of each group. However, the initialized sign forms differ by their handshapes, which correspond to the underlined letter in the English gloss.

Example 3.2. Groups of semantically-related initialized signs

a. FIGURE-OUT: ALGEBRA, CALCULUS, TRIGONOMETRY, MATH

b. LIST: LAW, RULE, PRINCIPLE

c. GROUP: ASSOCIATION, CLASS, FAMILY, GROUP, ORGANIZATION, TEAM

Padden (1998) proposes that initialized signs are a means for creating a link between ASL signs as known or familiar vocabulary, and English words as technical or foreign vocabulary. Padden also points out that some singleton initialized signs have no native ASL counterpart, an example being the sign WATER, and that even groups of signs can exist without a corresponding native ASL sign, such as signs for 'traits', like {CHARACTERISTIC, PERSONALITY, NOBLE, LOYAL}. This family of initialized signs is articulated with a circling and contacting movement over the contralateral side of the chest, but without a phonologically related non-initialized sign with a related meaning.

For some of these examples of initialized signs formed without a native counterpart, there is still a sense that they can be construed in terms of existing form-meaning associations in the ASL lexicon. However, these associations are typically and necessarily more vague. For example, the sign WATER is articulated near the mouth, and is likely related to other native ASL signs relating to food and drink such as FOOD, DRINK, CONSUME, and BAR. Similarly, the group of signs denoting 'traits' are all articulated on the chest, and could be related to other native ASL signs relating to personal feelings or habits which are also signed on the chest, such as TENDENCY, FEEL, ACCEPT, and INHERENT. However, these assessments of which signs fit the pattern and which do not can be rather subjective; the nature of the relationship shared among these signs, if indeed there is one, is not always so clear.

Furthermore, there are some very common groups of initialized signs, such as some color terms, BLUE, GREEN, PURPLE, and YELLOW, and the days of the week, every day except SUNDAY, that are related to one-another but cannot be said to correspond, even remotely, to a semantically relevant native sign. Indeed, the most semantically relevant native signs in these particular cases, COLOR and DAY, are completely phonologically unrelated to the initialized sign groups for 'colors' and 'days of the week'.

Though initialized signs are also often discussed in terms of their relationships to other signs, it is has not yet been established what kinds of relationships are typically observed among initialized signs, or how relationships among initialized signs are to be accounted for in morphological theory. In Section 3.3, I address these questions by examining a database of initialized signs collected from an ASL dictionary.

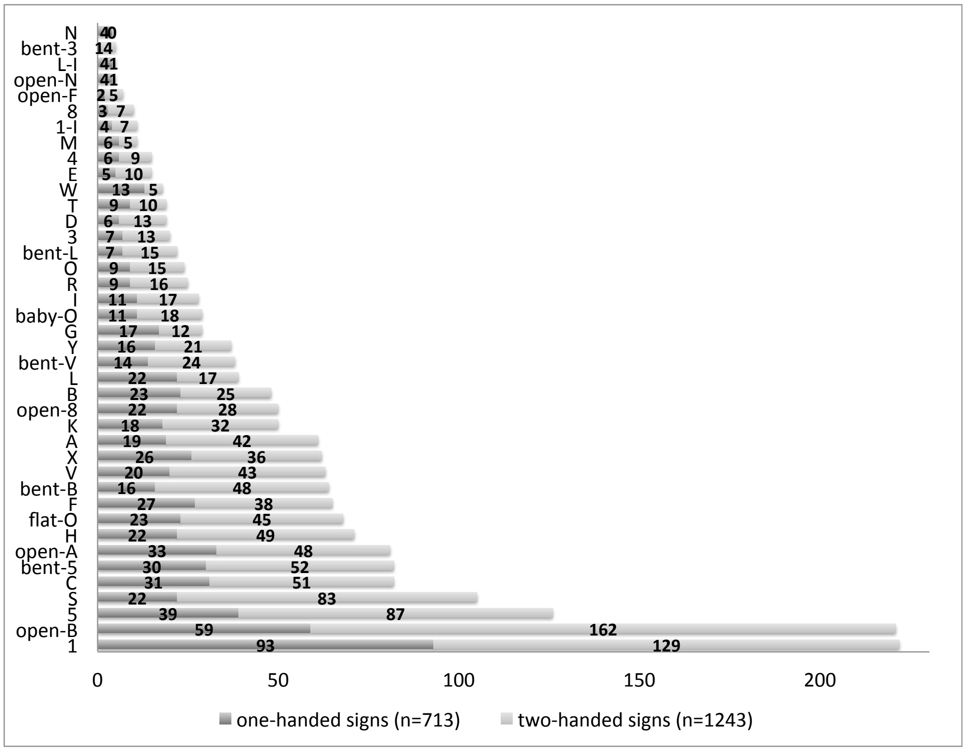
3.2.3 *The American Sign Language Handshape Dictionary*

This section describes the contents of the *American Sign Language Handshape*

Dictionary, henceforth ASLHD, as necessary preliminary work for identifying initialized signs from the dictionary. Unlike many other ASL dictionaries, which sort signs into broad semantic categories or organize them alphabetically according to the spelling of their English translations, the ASLHD categorizes signs following basic principles of ASL phonology. Signs are first split based on whether they are signed with one hand or two, then further organized by the dominant handshape in each sign. Within handshapes, signs are secondarily sorted by how the hands move in articulating the sign. This use of handshape features to organize the dictionary makes the ASLHD a uniquely useful resource for studying initialized signs.

As we have seen, initialized signs are articulated with handshapes that are also used in fingerspelling. However, these fingerspelling handshapes are only a subset of the possible handshapes in ASL; the ASLHD contains 1,956 signs, and divides these signs among 40 handshape contrasts. Here I first discuss all 40 handshapes together, before zooming in to only those handshapes that are relevant for initialization in Section 3.3.1. The overall distribution of signs per handshape in the ASLHD can be seen in Table 3.1; here handshapes are sorted by overall frequency. Within handshapes, the number of signs is additionally broken down into the number of one- and two-handed signs.

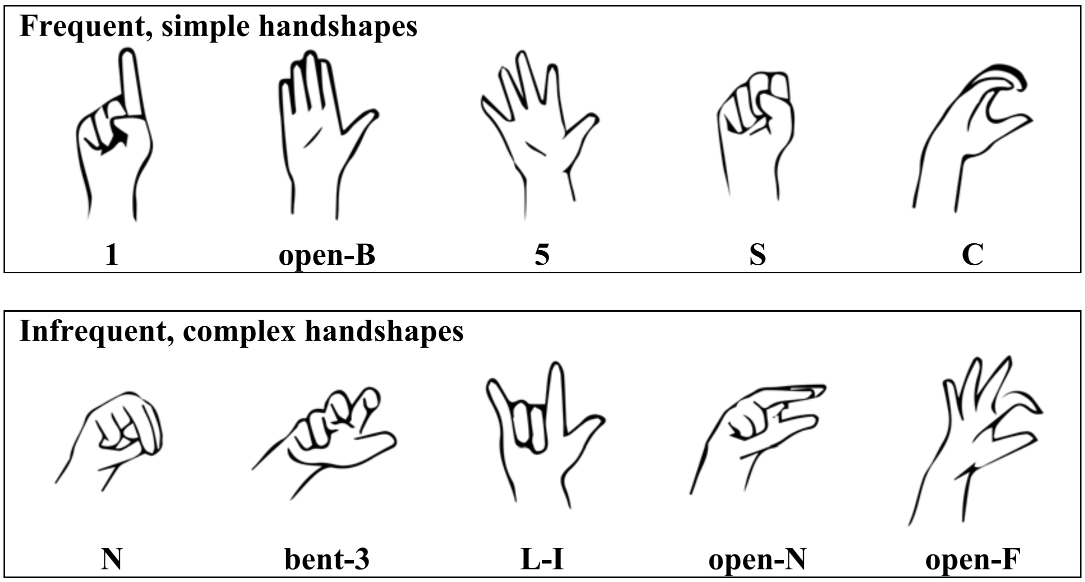
Table 3.1. Count of signs in ASLHD, by handshape (n=1956)



The ASLHD is composed of roughly 1/3 (36%) one-handed signs, and 2/3 (64%) two-handed signs. To the extent that the ASLHD is a representative sample of signs in the ASL lexicon, this distribution also suggests that not all handshapes are used with equal frequency in lexical signs. However, the approximate ratio of one- to two-handed signs appears to be relatively consistent across handshapes.

The handshapes in Table 3.1 are distributed among lexical signs along a steep curve, with physiologically simple handshapes like 1 (an extended index finger), open-B (a flat palm with all fingers together), and 5 (a flat palm with all fingers spread) used most frequently in lexical signs. These handshapes can be seen in Table 3.2. In contrast, physiologically complex handshapes which separate the fingers into groups, like N (thumb separating index and middle finger from ring finger and pinkie), bent-3 (thumb, index, middle fingers extended and bent), and L-I (a closed fist with thumb, index, and pinkie fingers extended) are used relatively infrequently (Battison 1978; Boyes-Braem 1990; Shick 1990; Ann 1996; Morgan and Mayberry 2012).

Table 3.2. Handshape frequency/complexity in ASL[5]



Now we begin to restrict our scope to only those aspects of the dictionary that are relevant for initialization. Of the 40 handshapes listed in the ASLHD, only 21 are used for fingerspelling and, accordingly, for the creation of initialized signs. These 21 handshapes correspond to the 26 letters of the Latin alphabet used in English orthography; the ASLHD collapses the distinction between the G and Q handshapes, the H and U handshapes, and the K and P handshapes, which all differ only by the orientation of the hand, rather than the configuration of the fingers, as well as the I and J handshapes, which differ only in that J is fingerspelled with a characteristic swooping movement. The last letter of the English alphabet, Z, is not relevant for

[5] The handshape illustrations in this diagram are adapted from the ASLHD (Tennant and Brown 2010:26-27).

initialization, as it is identified by its characteristic zig-zag movement, rather than its 1 handshape alone. Focusing only on these 21 handshapes used in fingerspelling, A, B, C, D, E, F, G, H, I, K, L, M, N, O, R, S, T, V, W, X, and Y, we find that out of the 1,956 signs in the ASLHD, 875 (45%) are articulated with an "alphabetic" handshape.

Other than Z and J, which require a characteristic movement, all fingerspelling handshapes in ASL are static, and signed without any inherent internal movement. Because fingerspelled letters are articulated with a static handshape, signs that have an internal handshape change are unlikely[6] to be initialized signs (Padden 1998, Brentari and Padden 2001). Accordingly, signs with a listed handshape change in the ASLHD, either a broad opening or closing, as in DROP (from a closed S fist to an open 5 hand), or even between two fingerspelled letters, as in the sign LINGUISTICS (from an L hand with thumb and index finger extended to a closed S fist) are therefore excluded from further consideration in constructing a database of initialized signs. However, signs like LINGUISTICS, so-called "abbreviation" signs, are of course very closely related to initialized signs, as sub-classes of English-influenced vocabulary in ASL (Padden 1998, Brentari and Padden 2001). I will compare these two construction types in Chapter 4. Finally, signs with usage notes from the ASLHD discouraging their use are also excluded from further study here. These are few in number and typically are artificially-created Manual English-type signs, such as ARE; these signs are listed with usage notes in the ASLHD specifying that they are only used in "Signed English".

[6] I say " unlikely" here only because I am aware of a single counterexample, the sign WEIRD, which in the ASLHD alternates between a W handshape and a "bent-W" handshape. However, the bent-W handshape is not used in any other lexical sign. This is because the sign WEIRD has an internal bending and unbending movement, rather than actually transitioning between two independent handshapes.

Accordingly, while they are sometimes initialized signs, signs like AR̲E are not analyzed as ASL signs here.[7]

After narrowing the scope of the dictionary study to only those handshapes that are relevant for fingerspelling, and additionally excluding signs with a listed handshape change, we are left with 748 signs in the ASLHD (38% of the entire dictionary) that could potentially be initialized signs. These signs are considered potential initialized signs in the sense that they are articulated with a handshape that is also used in ASL fingerspelling that could possibly correspond to an English letter. However, in order to determine whether any of these signs are indeed initialized, we must take their meanings, and their English translations, into account. This then facilitates a more in-depth analysis of the phonology and semantics of initialization in ASL, which is the topic of the next section.

3.3 Dictionary study

3.3.1 Identifying initialized signs in the ASLHD

Identifying initialized signs in the ASLHD requires deciding whether each of the 748 signs in the ASLHD that are signed with an alphabetic handshape also have a handshape that matches the first letter of the sign's English translation. However, even among this smaller subset of signs in the ASLHD, there are some signs that meet this

[7] AR̲E is also interesting because it is the second letter of the English word, rather than the first, that provides the letter/handshape for the initialized sign. The only other sign I know of that is initialized based on the second letter of an English word is a variant sign for TH̲URSDAY, signed with an H handshape (and the related sign EVERY-TH̲URSDAY). Both AR̲E and TH̲URSDAY are initialized based on the second letter of the English word because otherwise no formal feature would distinguish them from the initialized signs A̲M and T̲UESDAY.

criterion but nevertheless seem unlikely to be initialized. These are signs that are formed with a relatively common handshape and appear to be lexicalized classifiers, or signs for which many English translations exist, and one translation, coincidentally, starts with the letter that matches the sign's handshape. For example, the sign COUGH in ASL is a one-handed sign with a C handshape rocking up and down on the chest. It is likely that in this sign, the C handshape is not representing the fingerspelled letter C, but rather a rounded tube, perhaps the esophagus or trachea, in the chest. Consider, for example, that the C handshape plays a similar role in representing 'a long neck' in the ASL sign GIRAFFE. The sign COUGH is therefore not considered to be initialized here. Another example is the sign SORRY, a one-handed sign with an A handshape moving against the chest in a circular motion. This sign has several English translations listed, including *sorry*, *regret*, and *apologize*, and it seems to be a coincidence that one of the English translations, *apologize*, has an initial *a* that matches the A handshape in SORRY. Unlike the form-based criteria used to restrict the scope of the study in Section 3.2.3, these criteria for excluding possible initialized signs are subjective; however, the more aggressively they are applied, the more conservative the database will be. I return to this issue of overlapping functions of different handshapes in ASL in Section 3.4, and in Chapter 4 I show that, under a construction-theoretic analysis, there is actually no *a priori* reason to assume that these handshape functions are necessarily mutually exclusive.

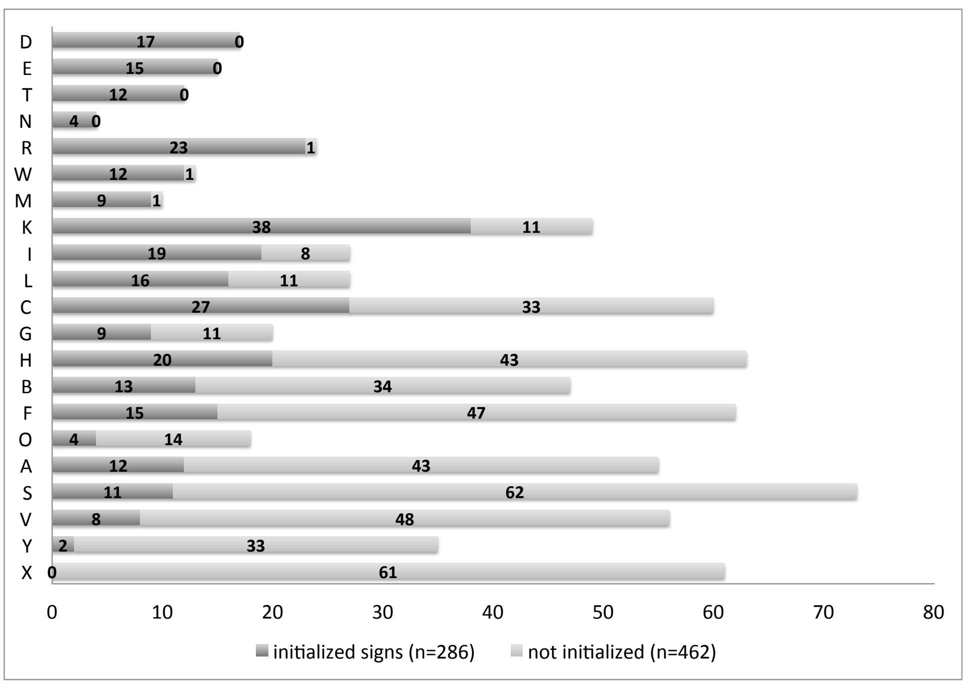
The signs COUGH and APOLOGIZE may be excluded as "false positives", then, but here it is also important to consider "false negatives"; several signs in the ASLHD could arguably be categorized under handshapes which differ slightly from the one listed in the ASLHD, and therefore could actually be initialized. This seems especially likely considering that there is a great deal of inter-signer and regional lexical variation in ASL (e.g., Lucas, Bayley, and Valli 2003), and that several different handshapes could be analyzed as allophonically related depending on numerous theoretical or phonetic factors. Signs that could thus be seen as "misclassified" under a minimally different handshape, such as ADDRESS, which is listed in the ASLHD as being formed with an open-A rather than an A handshape, the two differing only by the degree of thumb extension, or NURSE, which is listed in the ASLHD as being formed with an H rather than N handshape, the two differing only by the distance between the index/middle fingers and the thumb, are also not considered in this quantitative analysis. Again, this decision is in the direction of constructing a more conservative database, but examples like these could be examined more directly in future studies.

3.3.2 Phonological analysis

Analyzing the ASLHD signs according to the criteria outlined in Section 3.3.1, I find that, of the 748 signs in the ASLHD that are articulated with an alphabetic handshape, 286 are initialized signs, with their handshape corresponding to the initial letter of their English translation (see the Appendix to this chapter). This suggests that initialization accounts for a small but non-trivial proportion of the ASLHD, and, by extension, the ASL lexicon; approximately 38% of signs formed with a static alphabetic handshape are initialized, and approximately 15% of conventional lexical signs are initialized. Findings of this sort are naturally only as reliable as the corpus or dictionary they are based on, but can provide a general idea of how initialized signs fit into the overall structure of the ASL lexicon, as well as provide a point of departure and comparison for future corpus-based studies of ASL.

In Table 3.3, we can see that some handshapes are used more than others for creating initialized signs. Here, each of the 21 alphabetic handshapes used for fingerspelling is listed with the number of initialized and non-initialized signs formed using that handshape in the ASLHD. Rather than alphabetically, here the alphabetic handshapes are sorted according to the ratio of initialized to non-initialized signs, and secondarily by the overall number of signs for that particular handshape.

Table 3.3. Count of initialized and non-initialized signs, by handshape (n=748)



With this distribution data, we can determine, given that a sign is articulated with a particular handshape, whether we would predict that the sign is initialized, as opposed to having been formed by some other word-formation process. For example, if an ASL sign is articulated with a D handshape, it is very likely to be initialized, because all of the signs in the ASLHD that are made with a static D handshape are initialized. Conversely, if a sign is articulated with an X handshape, it is very unlikely to be initialized, because none of the signs in the ASLHD that are made with a static X handshape are initialized.[8] Note that this description is based on sign types considered together by handshape; it may well be that case that a database reflecting individual sign token frequencies would lead to a different set of predictions. However, based on this sign type data, it is possible to classify handshapes by how often they are used for initialization in ASL signs, as in Table 3.4.

Table 3.4 Use of alphabetic handshapes for initialization

Handshape	Category	
D, E, T, N, R, W, M	Primarily used for initialized signs	(90–100%)
K, I, L	Frequently used for initialized signs	(60–90%)
C, G, H, B, F, O, A	Sometimes used for initialized signs	(20–60%)
S, V, Y, X	Rarely used for initialized signs	(0–20%)

From Tables 3.3 and 3.4, we can see that certain handshapes, like N and T, are quite infrequent in ASL, and when they are used, they overwhelmingly represent the English letters N and T in initialized signs. Conversely, handshapes like V and S are quite frequently used in lexical signs, but only rarely used for initialization. In Chapter

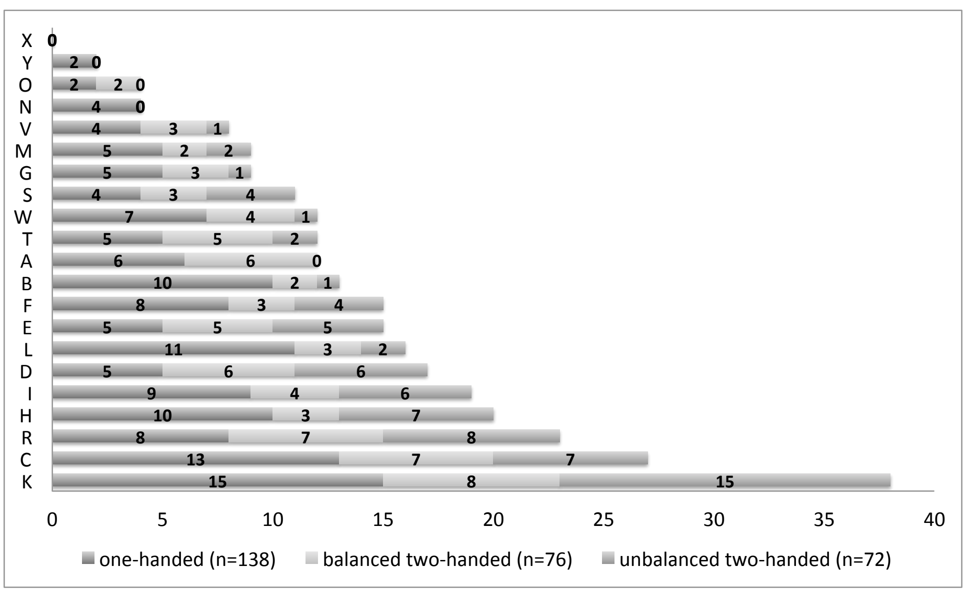
[8] Relevant here is the sign SEX; Padden (1998) views this as a rare example of an initialized sign that takes the final, rather than initial letter of its English translation, and it certainly seems likely that many singers would analyze this sign in this way. However, etymologically, the X handshape in SEX comes from Old French Sign Language: SEX was originally coined as a compound of the invented signs for the masculine and feminine gender articles *la* and *le* (Shaw and Delaporte 2010:196), which use the X handshape, but not as a fingerspelled letter X.

4 I will examine these patterns in a bit more detail, however, here it suffices to note that many of the handshapes that are only infrequently used for initialization are instead predominantly used for iconic representation in lexicalized classifier signs, for example the S handshape representing a closed fist as in the sign PROTEST.

A final finding about the distribution of initialized signs in the ASLHD concerns the use of the two hands. Recall that in general the ASLHD is composed of roughly 1/3 one-handed and 2/3 two-handed signs. A large body of research in sign language phonology has demonstrated that two-handed signs can additionally be split up into several types or subcategories based on the configuration of the hands and their movements relative to one another (e.g., Battison 1978; Napoli and Wu 2003; Channon 2004; Morgan and Mayberry 2012). Perhaps the coarsest division within two-handed signs can be made based on whether the dominant hand articulates on the non-dominant hand, or if both hands move as active articulators (so-called unbalanced signs and balanced signs, respectively, following van der Hulst 1996). This division yields a broad three-way contrast concerning the use of the two hands: lexical signs can be articulated with only the dominant hand, either contacting the head or body or moving through signing space (a one-handed sign), or they can be articulated with the dominant hand contacting the non-dominant hand as a place of articulation (an unbalanced two-handed sign), or they can be articulated with the dominant and dominant hands simultaneously and somewhat independently (a balanced two-handed sign). However, the ASL fingerspelling system is primarily one-handed. It is therefore not immediately obvious whether initialized signs will be preferentially one-handed, because they are influenced by the one-handed fingerspelling system, or if they will be preferentially two-handed, because they are lexical signs.

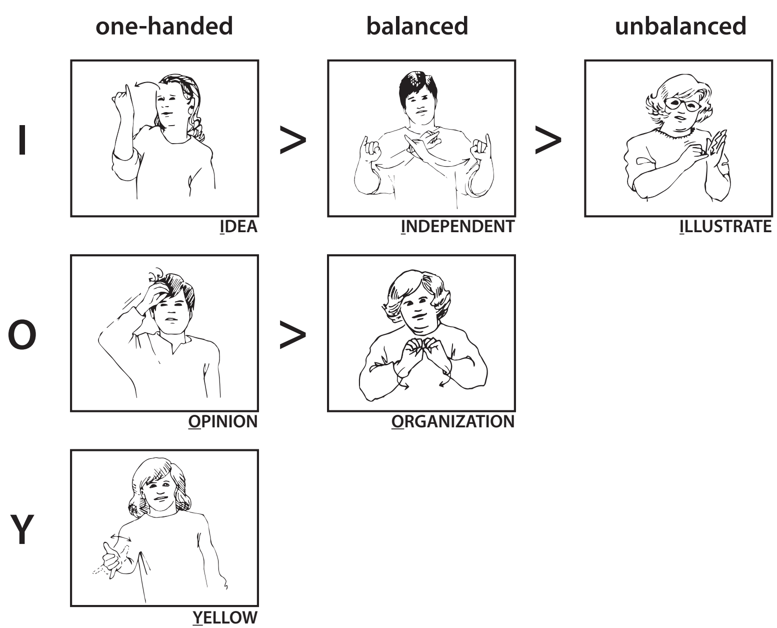
Looking at the distribution of one- and two-handed initialized signs in the database, we see that the initialized signs in the ASLHD are roughly split between one-handed (48)% and two-handed signs (52%), and that two-handed signs are also roughly split between balanced (51%) and unbalanced signs (49%). This suggests that initialized signs are one-handed signs at a slightly higher proportion than would be expected otherwise. When we compare the relevant counts, as in Table 3.5, we see that this distribution is largely similar, though not completely uniform, across handshapes; for example in the ASLHD, for the C handshape, 13 initialized signs are one-handed, seven initialized signs are balanced two-handed signs, and seven initialized signs are unbalanced two-handed initialized signs.

Table 3.5. One- and two-handed initialized signs, by handshape (n=286)



Though adequately testing this hypothesis would require a statistical analysis of a much larger database, the observed distribution of signs in Table 3.5 also points to an implicational hierarchy regarding initialized signs: if a given handshape is used in unbalanced two-handed initialized signs, it will also be used in balanced two-handed initialized signs, and it will furthermore also appear in one-handed initialized signs. Thus, as I have schematized it in Example 3.3, using the I, O, and Y handshapes as representative examples, it seems that one-handed initialized signs precede balanced two-handed initialized signs, which in turn precede unbalanced two-handed initialized signs.

Example 3.3. An implicational hierarchy for initialized handshapes[9]



This pattern is likely driven by an overall bias toward one-handed initialized signs, which could in turn be driven by the fact that the ASL fingerspelling system is one-handed. It is likely also driven by more general constraints on the interaction of the

[9] The ASL sign illustrations in this diagram come from the ASLHD (Tennant and Brown 2010:84,265,267,96,283,123).

hands as paired articulators (Battison 1978; Napoli and Wu 2003). However, this remains a conjecture based on an interpretation of the ASLHD data at this point, in need of further testing with other datasets and, ideally, through comparison with other sign languages which also have initialized signs.

Here I have presented several new findings to supplement the established and commonly accepted definition that initialized signs are articulated with a handshape that corresponds to an English letter. For example, initialized signs likely make up approximately 15% of the conventional ASL lexicon, at least as it is represented in the ASLHD. Relatedly, just because a given handshape is used both in the lexical sign system and the fingerspelling system does not mean that all signs made with that handshape are initialized signs, an idea I will return to in Chapter 4. Instead, some alphabetic handshapes are used less often for initialized signs, despite the fact that they are used quite frequently in native ASL signs, while others are used almost exclusively for creating initialized signs. This means that some handshapes, for example the E handshape, only occur in signs that represent borrowed vocabulary from English, which is perhaps similar to the idea that the final fricative in *rouge* in English is found primarily in words that are borrowed from French; as a result of language contact, the phonemic inventory of the borrowing language has changed slightly to reflect previously non-existing contrasts (Venezky 1970). Finally, we have seen that initialized signs in the ASLHD are evenly split between one- or two-handed signs, and therefore are slightly biased towards one-handedness, compared to the rest of the ASL lexicon.

3.3.3 Semantic analysis

In addition to their English-influenced phonology, initialized signs are also typically characterized in terms of their lexical semantics. It is well-known within ASL linguistics, for example, that initialized signs in ASL often cluster together to form families of semantically related signs (e.g., Frishberg and Gough 1973, Padden 1998). Accordingly, the contribution of this section is to elaborate what it means for initialized and native ASL signs to be "semantically related".

Here I categorize initialized signs and native ASL signs following a broadly taxonomical approach, and focusing primarily on the nature of the relationship between the concepts denoted by pairs of related signs (following e.g., Fellbaum 1998, 2005). The results of this semantic analysis will show that initialization is used to expand or shift the semantic domain of a native sign via metonymy, when possible, but also that initialized signs need not be defined in relation to one specific native sign. Instead, initialized signs are connected to one another in highly structured lexical networks. Practically, the analysis in this section involves identifying an initialized sign from the ASLHD, as well as a native ASL sign that differs from the initialized sign only by its handshape, and then determining the semantic relationship between the two signs. A simplifying assumption adopted here is that non-initialized signs are more basic, and provide the input for initialized signs. However, it is important to emphasize that this is an assumption; the practice of de-initializing signs to remove English-influenced signs from ASL can also create initialized/de-initialized doublets that cannot be distinguished from native/initialized sign doublets, without further historical or etymological information. An example is the sign RETIRE: this sign is an initialized variant of the native sign VACATION, which is a balanced two-handed sign, signed with two 5 handshapes. RETIRE replaces these 5 handshapes with (open-)R handshapes. However, a de-initialized version of RETIRE, the sign RETIRE, is instead signed with L handshapes, and replaces the crossed index and middle finger of the R handshape with an extended index finger alone.[10] In this case, the de-initialized sign RETIRE was most likely coined from the initialized sign RETIRE, rather than the other way around. Another example, this time dealing with a family of related signs, may be the sign ROYAL, signed with a bent-L handshape, which, for signers who use it, forms a family with the initialized signs {KING, QUEEN, PRINCE, LORD}. We could speculate that the existence of a family of initialized signs potentiated a gap for a more general non-initialized sign, and that the sign ROYAL was created to fill this gap, as the sign ROYAL is apparently not as common or widely-used as the signs KING and QUEEN are. At any rate, what is most important to note here is that each of the relationship types listed below are necessarily assessed between two signs, and more specifically, between two concepts, with less emphasis on the direction of the derivation of the signs.

I begin with the most basic cases, initialized signs in the ASLHD that can be described in terms of their relationship to a formationally similar native ASL sign:

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[10] See http://www.lifeprint.com/asl101/pages-signs/r/retire.htm

Canonical initialized signs

The first relationship type will already be familiar from the proceeding discussion in this chapter, and from our familiar example of YESTERDAY◆Y̲ESTERDAY. Canonically initialized signs are those signs in which an existing native ASL sign has had its handshape altered to correspond to the initial letter of the ASL sign's most frequent or canonical English translation. This process results in doublets of initialized and native signs which differ in meaning only in the sense that one sign additionally signals that there is an English word that is synonymous with the existing ASL sign. Another already-mentioned example is LONG◆L̲ONG, and other examples are ROOM◆R̲OOM and DEVELOP◆D̲EVELOP.

Hypernymic initialized signs

In Chapter 2, I discuss examples of hypernym compounds, where a group of signs are used together to denote the superordinate term, or hypernym, for that group. An example is RAKE+BROOM+#MOP+ETC, which can be used as an *ad hoc* hypernym for *tools*. Hypernym terms can also be borrowed from English directly through the fingerspelling system, or, of course, created from within ASL. However, the pair of signs APPLE and F̲RUIT suggests that some hypernymic relationships can also provide the basis for a derived initialized sign. An 'apple' is a kind of 'fruit', and F̲RUIT is initialized based on the native sign APPLE in ASL. APPLE◆F̲RUIT is perhaps the clearest case of a hypernymic initialized sign, and other examples are harder to find in the collected database of initialized signs from the ASLHD. This may be because other mechanisms exist for creating hypernyms in ASL, or because this kind of derivational relationship is relatively uncommon, a matter left for future research.

Hyponymic initialized signs

A hyponym is the counterpart to a hypernym; it is a word that is more specific than the relevant superordinate term. A hyponym can also be described using a "kind of" relationship; to use an English example, a *chair* is a piece or "kind of" *furniture*. Consistent with Padden's (1998, Padden and Gunsauls 2002) description of initialized signs creating connections between more familiar "everyday" ASL vocabulary and less familiar "technical" English vocabulary, many of the initialized signs I have collected are hyponyms of a native ASL sign. In these cases, the initialized sign has a more narrow or specific meaning than the native ASL sign. For example, a 'rose' is a kind of 'flower', and 'biology' is a branch of natural 'science'. These hyponymic relationships are lexicalized in ASL through initialization: ROSE is initialized from FLOWER, and BIOLOGY is initialized from SCIENCE.

In Chapter 2 I also discuss examples of chain compounds, where a specific English word is borrowed through the fingerspelling system, and combined with an ASL sign with a similar, but typically more general meaning. Functionally, these chain compounds seem to overlap with hyponymic initialized signs; both construction types link an ASL sign and a borrowed English word, on the basis of their shared semantics. However, while chain compounds were necessarily linearly ordered as two-constituent sequence, initialized signs draw upon parts of the ASL sign and of the English word more simultaneously.

Co-hyponymic initialized signs

Related to hyponyms and hypernyms, co-hyponyms are two words that together are covered by another, more general, superordinate category term. This means that one co-hyponym can be substituted for another in formulating a "kind of" relationship. To return to an earlier example, in English, a *chair* is a kind of *furniture*, and a *bed* is similarly a kind of *furniture*. In this case, *chair* and *bed* are co-hyponyms of *furniture*. Some initialized signs in the ASLHD are co-hyponyms with a native sign, an example is RAT, initialized from MOUSE, and both 'rats' and 'mice' are small 'rodents'. Another example is POISION, initialized from MEDICINE, both of which are kinds of 'ingestible chemicals'.

Holonymic initialized signs

As they are used in the previous subsections, hyponyms and hypernyms describe the two sides of a "kind of" relationship. In contrast, meronyms and holonyms describe the components of a "whole-part" relationship. For example, in English *leaf* is a meronym of *tree*, and *nose* is a meronym of *face*. Accordingly, in these examples, *tree* and *face* are also the holonyms of *leaf* and *nose*, respectively. In ASL, these lexical relationships can also be encoded through initialization, and several initialized signs in the ASLHD are coined on the basis of a whole-part relationship. For example, the 'senate' is made up of many 'members', and a 'dictionary' is made up of many 'pages', and accordingly, the initialized signs S̲ENATE and D̲ICTIONARY are holonyms derived from the native signs MEMBER and PAGE, respectively. Similarly, the 'vocabulary' of a language can be thought of as the total stock of 'words' in that language. It is therefore not surprising that V̲OCABULARY in ASL is an initialized holonym of the native sign WORD.

Meronymic initialized signs

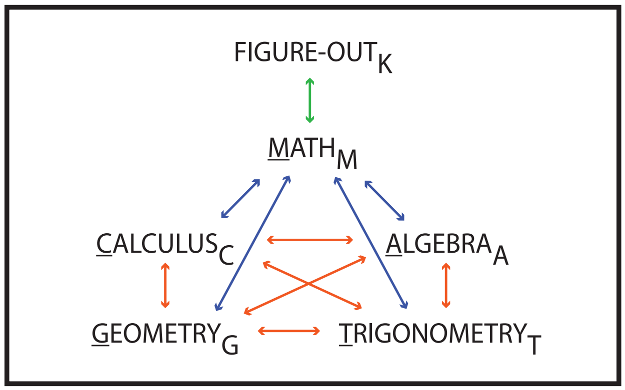
Meronyms are the counterpart to a holonym; they are parts associated with a larger whole. Like hypernyms, initialized signs based on a meronymic relationship seem less common in the ASLHD. This may be because it is more difficult to determine *a priori* whether something is typically or necessarily a part of a larger whole. However, the initialized sign D̲IAMOND and the native sign RING seem to be related to each other based on a meronymic relationship: a 'diamond' is often a salient part of a 'ring' as a piece of jewelry.

Families of initialized signs

Thus far we have seen that initialized signs can be related to native ASL signs in several ways. Typically, when taken together, pairs of related initialized and native signs reflect the paired elements of a "kind of" relationship or a "whole-part" relationship. I have been comparing single ASL signs with single initialized signs. However, initialized signs are also known to cluster together into families of related signs. We now turn to these families of signs.

In many cases, lexical families seem to result from several initialized signs independently and concordantly drawing upon the same native base sign. A well-known example, already discussed in Example 3.2a, involves the initialized sign MATH. This sign is a hyponymic derivative of the native sign FIGURE-OUT; 'math' is a specific kind of 'figuring out'. However, ASL MATH is itself a hypernym for several other related initialized signs: ALGEBRA, TRIGONOMETRY, GEOMETRY, and CALCULUS. Of course, any two of these more specific mathematic fields are also co-hyponyms of one another, as GEOMETRY and CALCULUS are both kinds of MATH, and an initialized sign like GEOMETRY is a hyponym of the initialized sign MATH and also a hyponym of the native sign FIGURE-OUT. Though this family contains many signs related to each other in slightly different ways, all of these signs belong to a semantic realm of 'figuring out', and phonologically they differ only by their handshapes. These relationships can thus be schematized as in Example 3.4. Here, all of the listed signs have the same movement pattern, shown in the inset illustration, and are all in the same semantic domain of 'figuring out', represented by the bounded box. Signs are listed with their respective handshapes as subscript diacritics, and lines of association trace metonymic relationships between signs.

Example 3.4. A lexical family of initialized signs: FIGURE-OUT[11]



figuring out

However, other signs are more clearly coined on the basis of an initialized sign and seem less likely to be related directly to a native sign. An example is the sign VEGETABLE, which is a co-hyponym of the initialized sign FRUIT; both 'fruits' and 'vegetables' are kinds of 'produce'. But while the initialized sign FRUIT is a hypernym of the native sign APPLE; there is no obvious semantic relationship between the sign APPLE and the sign VEGETABLE that does not also hold between the sign FRUIT and the sign VEGETABLE. Derivationally, APPLE and VEGETABLE are related to each other by virtue of the fact that they are both related to FRUIT.

A final class of examples involves groups of initialized signs that are semantically related to each other but not directly related to a native base sign. Here a good example is the group of initialized signs WORLD, INTERNATIONAL, and UNIVERSE. These signs are all semantically related, denoting different types of geographic/global masses. They are also phonologically related to the native ASL sign YEAR, which is

[11] The inset illustration in this diagram comes from the ASLHD (Tennant and Brown 2010:269).

articulated with two S handshapes revolving around and contacting each other. This sign is said to have originally been iconically motivated based on the idea that one year is measured by the movement of the Earth around the sun; one hand represents the sun, and the other hand represents the movement of the Earth around the sun (cf. Costello 2008:554)[12]. The representation of the Earth and sun also likely provided the basis for the 'global' sense that underlies the 'universe' family of initialized signs. However, it seems unlikely that in modern ASL there is a salient semantic relationship between the native sign YEAR and the initialized sign family {UNIVERSE, INTERNATIONAL, WORLD}. Instead, the initialized signs in this family are related to each other, and they are phonologically related to YEAR, but there is probably not a synchronic semantic relationship that also links them to YEAR, any more than there is a relationship which links them to the phonologically related but semantically unrelated initialized sign KIND.

Finally, there are several signs in ASL that are initialized in the sense that they have a handshape which matches the initial letter of a corresponding English word, but they do not take their location and movement from a native sign or even from another initialized sign. Instead, these signs are articulated in neutral space with a small shaking or twisting movement. Because fingerspelled words are articulated most often in neutral space near the dominant shoulder, it is likely that these initialized signs, or perhaps "pseudo-initialized" signs, are in fact a simplification of the fingerspelled English word to a single handshape with a default movement. For example, the sign

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[12] See also http://www.lifeprint.com/asl101/pages-signs/y/year.htm

CONSERVATIVE is signed with a C handshape shaking back and forth in neutral space. Similarly, the sign INSURANCE is minimally different from CONSERVATIVE, however signed with an I handshape. Another sign meaning either 'vanilla' or 'vitamin' is also signed in this way, with a V handshape shaking in neutral space. Within this relatively large phonological group it is possible to identify signs with shared elements of form and meaning, for example the sub-group of 'color' signs, and the 'political affiliation' signs CONSERVATIVE, DEMOCRAT, and REPUBLICAN, however there is no obvious meaning that unites all of these pseudo-initialized signs. Instead of being taken from an existing sign, this movement pattern appears to function as the default for borrowing a single fingerspelled letter as a sign. I will not analyze these pseudo-initialized signs further, and mention them here only for the sake of completeness.

In this section, then, I have shown that initialized signs are typically related to one another and to native ASL signs in multiple, overlapping, and systematic ways: to supplement the traditional definition of initialization that characterizes initialized signs as replacing the handshape of an existing sign with the handshape corresponding to the sign's English translation, we see that many other kinds of initialized signs can be found in ASL. In addition to canonically initialized signs, we find examples of initialized signs that extend the semantic domains of existing signs to establish metonymic "kind of" and "whole-part" connections between the semantics of borrowed English words and of native ASL signs.

With this description of both the phonology and the semantics of initialization, we now can turn to the morphology of initialized signs as a systematic link between form and meaning among ASL signs.

3.4 Initialized sign constructions

3.4.1 Lexical families are schematic morphological constructions

In Section 3.3 I discussed the phonological and semantic properties of initialized signs separately, a descriptive task informed by a database of signs collected from an ASL dictionary. In this section, I extend the construction-theoretic analysis from Chapter 2 to initialized signs, to account for the links between meaning and form that underlie lexical families of initialized signs.

A constructionist analysis of initialization seeks to describe initialized signs in terms of specific and schematic morphological constructions. Here I do this by treating lexical families of signs, and the signs within them, as constructions. We have already seen two classic examples of initialized families of signs: the 'group' family, containing {GROUP, F̲AMILY, A̲SSOCIATION, …} and the 'figuring out' family, containing {FIGURE-OUT, M̲ATH, A̲LGEBRA, …}. In both of these cases, the initialized signs are all included in the semantic domain of an existing, non-initialized ASL sign. Similarly, the relevant native ASL sign, by virtue of being systematically related to the corresponding initialized signs, is also a member of the lexical family. The analysis of these lexical families, then, mirrors the morphological constructions that were developed in Chapter 2. The elements of form and meaning that are common to the signs in a lexical family are specified as part of the morphological construction, and the elements of form and meaning that vary among the members of a lexical family are left schematic, through the use of variables.

Accordingly, because they are actually-existing words, and conventional pairings of meaning and form, each of the signs in a particular family is represented in the lexicon as a lexical construction. Example 3.5 is a lexical construction for the sign FAMILY, which is fully specified in form and in meaning.

Example 3.5. Lexical construction for the ASL sign FAMILY

H: F_{DH}, F_{NDH}
L: neutral space
M: DH and NDH simultaneously trace a small circle

'family; a group of people related by blood or marriage'

From these fully-specified lexical constructions, more schematic constructions can be extrapolated, and specific and schematic constructions are related such that specific constructions are instantiations of more schematic constructions.

In Example 3.6, then, we have two schematic morphological constructions, one for the 'group' family of signs, and another for the 'figuring out' family of signs. These constructions specify the elements of form, namely the location and movement, that are shared among the signs in each group, and the aspects of meaning that are similarly shared among the signs in each group.

Example 3.6. Schematic morphological constructions for the (a) 'group' and (b) 'figuring out' families of initialized signs

a. 'group' construction in ASL

H: x_{DH}, x_{NDH}
L: neutral space
M: DH and NDH simultaneously trace a small circle

'group; people considered together by virtue of Y'

b. 'figuring out' construction in ASL

H: x_{DH}, x_{NDH}
L: neutral space
M: DH and NDH simultaneously brush past one another

'figure out; abstract process of problem solving using Y'

These morphological constructions are quite filled in, and leave schematic only their handshapes and a portion of their meaning. Here there is no inherent connection between the handshape used to form the sign and the kind of group that is meant, which is represented by the differing variables *x* and 'Y'.

Conversely, consider the initialized signs ASSOCIATION, AUTHORITY, and ALGEBRA. These signs also form a lexical family, however, here, the element of form that these signs have in common is that they are articulated with a dominant A handshape. As we saw in Section 3.3.3, these are hyponymic initialized signs, where the borrowed English word is included within the semantic domain of the corresponding ASL sign. That is to say, an *association* is a kind of GROUP, *authority* is a kind of POWER, and *algebra* is a kind of FIGURING-OUT. A lexical representation for the sign AUTHORITY is provided in Example 3.7.

Example 3.7. Lexical construction for the ASL sign AUTHORITY

H: A_{DH}, openB_{NDH}
L: neutral space
M: DH traces an outline of a bicep on upper arm of NDH

'authority; the *a*-initial English word AUTHORITY is a kind of power'

The sign AUTHORITY, along with the A-initialized signs ALGEBRA and ASSOCIATION, gives rise to a schematic construction in ASL, as shown in Example 3.8. This construction is almost entirely schematic, and specifies only that some signs with an A handshape also share their meaning with an *a*-initial English word, which is the only element of meaning that the signs {ASSOCIATION, AUTHORITY, ALGEBRA} have in common.

Example 3.8. 'A-initialization' construction in ASL

H: A_{DH}, (x_{NDH})
L: y
M: z

'*a*-initial English word A'

As a schematic construction abstracted over a set of ASL signs, this construction also accounts for other A-initialized words, like ATTITUDE, in ASL. This provides an account of the systematic co-variation in meaning and form among initialized signs.

3.4.2 The morphological status of initialized handshapes

Recall from the discussion of the ASLHD in Section 3.3.1 that it was unclear whether the sign APOLOGIZE is to be considered an initialized sign in ASL. Though APOLOGIZE is signed with an A handshape, this could be a coincidence based on the fact that the A handshape is relatively unmarked in ASL, and that the sign APOLOGIZE actually has several possible English translations, including *regret* and *sorry*. The construction-theoretic analysis of an ambiguously-initialized sign like APOLOGIZE, given the schema in Example 3.8, is that some signers may construe it as being an instantiation of this schema, and others may not.

This analysis does not depend on a single "true" analysis of the sign APOLOGIZE; the construction-theoretic approach focuses on the structure of the lexical system, and treats actually-occurring words as primary theoretical objects. Under this view, the question is not about whether the A handshape in APOLOGIZE truly represents a fingerspelled letter, in an objective, etymological sense, but the implications that such an analysis would have for the structure of the lexicon. If individual signers do analyze APOLOGIZE as an initialized sign, consciously or not, then this analysis follows straightforwardly from independently-motivated lexical structures. If not, then the sign APOLOGIZE is simply not considered relevant for the schema in Example 3.8. In this case, APOLOGIZE would be treated just like other non-initialized signs that make use of the A handshape, for example STUPID or DIGEST.

Some external evidence for this view of initialization constructions comes from Padden's (1991) description of how signing children learn to fingerspell.

Discussing "system-external" strategies for fingerspelling, Padden notes that one strategy for fingerspelling involves making a guess about how to fingerspell an English word by using the handshape of an ASL sign as the initial letter of the corresponding fingerspelled word. This strategy works for initialized signs; however, young ASL-signing children have not yet developed the English skills necessary to determine which signs and/or handshapes correspond to an English/fingerspelled word, and which do not. Padden reports that one child aged 4;7 provided Y-O-B as a fingerspelled response to a picture of an airplane. Her fingerspelling attempt started with a Y handshape because her ASL sign AIRPLANE is signed with a Y handshape. Though she could not correctly fingerspell the word *airplane*, she was able to take advantage of the structure of the ASL sign to make a reasonable guess at the fingerspelled word's initial letter, which in turn reflects that she has already developed, but not yet perfected, a Y-initialization construction.

This is consistent with the view developed in this section, that schematic morphological constructions like those in Example 3.6 and in Example 3.8 describe recurrent configurations of form and meaning that can be abstracted away from initialized signs as actually-occurring words. However, these constructions also provide a recipe for creating or interpreting novel words. An example is the sign UNION, which is not (yet?) a widely-accepted and conventional ASL sign, but whose form is potentiated the overlapping family structure of the ASL lexicon. As an uncommon sign, UNION relies on the existence of the 'group' construction in Example 3.6a, and a similar schema to the one in Example 3.8, however one that describes 'U-initialized' rather than 'A-initialized' signs in ASL. When encountering the sign UNION for the first time, an ASL signer must rely on their abstract knowledge of the 'group' construction and the 'U-initialized' construction to deduce the meaning of the sign.

However, these schematic constructions are not compositional or primarily meaningful, independently of the specific signs that license them. This means that they are not predicted to together provide all of the information necessary to predict the meaning of the sign UNION. These constructions do allow for the inference that UNION will refer to some kind of "U-group", in the same way that FAMILY refers to an "F-group", and that ASSOCIATION refers to an "A-group", and in the same way that UNIVERSITY refers to a "U-college" and that UNIVERSE refers to a "U-world". Beyond this inference, however, a signer's success in determining the meaning of UNION will depend on context, or their ability to guess the appropriate English word.

At least anecdotally, this seems to be the case: using the sign UNION can sometimes lead to the interlocutor stopping the conversation and asking about the sign. Clarification usually involves fingerspelling the English word U-N-I-O-N or describing what a *union* is (i.e., 'an association of workers formed to protect their collective rights and interests').

Initialized signs can therefore be seen as tapping into overlapping configurations of schematic morphological constructions. A typical initialized sign is an instantiation of typicallytwo morphological constructions, one describing the similarity between the initialized sign and other signs with the same location and movement, and one describing the similarity between the initialized sign and other signs using the same handshape.

Under this view, initialization can be seen as a recombination of existing structures in the ASL word-formation system. All signs are made with a manual component, and so all signs necessarily have a specified handshape. At the same time, fingerspelled words in ASL make use of a conventional set of handshapes to represent English letters. Initialization in ASL, then, takes advantage of the fact that some handshapes are used in both the lexical sign system and the fingerspelling system, and reconfigures aspects of the ASL lexicon to facilitate borrowing words from English, but grounding them to the ASL lexicon.

3.5 Conclusion

In this chapter, I have examined the phonology, semantics, and morphology of initialized signs in ASL in depth. I have demonstrated that initialized signs are borrowed English vocabulary in ASL, but that they also raise interesting questions for morphological theory, as well. In particular, initialized signs are systematically related to one another, and to ASL signs. This systematicity hinges on the fact that initialized signs have properties of lexical signs and of fingerspelled words. Though they are morphologically complex, it is not the case that initialized signs can be seen as the compositional product of independently meaningful sub-lexical pieces of words. Instead, initialized signs are created by reconfiguring parts of existing ASL signs, and parts of existing English words, to create new signs that are grounded in existing lexical constructions in ASL. We have seen in this chapter, then, that the process of initialization is shaped by characteristics of interacting word-formation systems in ASL.

In Chapter 4, I extend the constructionist view of lexical families that we developed here, to include a wider variety of lexical families in ASL. I return to examples that we were not yet equipped to deal with at the beginning of this chapter: for example, in Section 3.2.2 I questioned whether the initialized family of 'traits' {CHARACTERISTIC, PERSONALITY, NOBLE, LOYAL} can be considered related to other signs articulated on the chest and relating to personal feelings or habits, like {TENDENCY, FEEL, ACCEPT, INHERENT}, despite the fact that none of these signs forms a perfect family with the members of the initialized sign family. If these signs are related, what is the nature of the relationship? This discussion takes us deeper into the definition and morphological analysis of lexical families in ASL.

Appendix to Chapter 3. 286 Initialized Signs (Tennant and Brown 2010)

GLOSS	H1	H2	MOVEMENT TYPE
AUDIOLOGY	A		one hand contacts the head
AUNT	A		one hand contacts the head
ARIZONA	A		one hand contacts the head
ATTITUDE	A		one hand contacts the body
ASSEMBLY	A		one hand contacts the body
ATLANTA	A		one hand contacts the body
BLUE	B		one hand in neutral space
BALTIMORE	B		one hand in neutral space
BOSTON	B		one hand in neutral space
BASTARD	B		one hand contacts the head
BACHELOR	B		one hand contacts the head
BEER	B		one hand contacts the head
BROWN	B		one hand contacts the head
BULLSHIT	B		one hand contacts the head
BOARD	B		one hand contacts the body
BITCH	B		one hand contacts the head
CHICAGO	C		one hand in neutral space
CONSERVATIVE	C		one hand in neutral space
COMPUTER	C		one hand contacts the head
COUSIN	C		one hand in neutral space
CHRISTMAS	C		one hand in neutral space
CONCEPT	C		one hand contacts the head
CAFETERIA	C		one hand contacts the head
CHRISTMAS2	C		one hand contacts the head
CHARACTER	C		one hand contacts the body
COP	C		one hand contacts the body
CONGRESS	C		one hand contacts the body
CHRIST	C		one hand contacts the body
COMPLAIN	C		one hand contacts the body
DEMOCRAT	D		one hand in neutral space
DETECTIVE	D		one hand contacts the body
DINNER	D		one hand contacts the head
DORM	D		one hand contacts the head
DIAMOND	D		one hand in neutral space
EAST	E		one hand in neutral space
EMERGENCY	E		one hand in neutral space

ELEVATOR	E		one hand in neutral space
EASTER	E		one hand in neutral space
EUROPE	E		one hand in neutral space
FRIDAY	F		one hand in neutral space
FRENCH-FRIES	F		one hand in neutral space
EVERY-FRIDAY	F		one hand in neutral space
FURNITURE	F		one hand in neutral space
FEDERAL	F		one hand contacts the head
FRANCE	F		one hand in neutral space
FRUIT	F		one hand contacts the head
FOX	F		one hand in neutral space
GREEN	G		one hand in neutral space
QUIZ	G		one hand in neutral space
GAY	G		one hand contacts the head
GUILT	G		one hand contacts the body
QUEEN	G		one hand contacts the body
HARD-OF-HEARING	H		one hand in neutral space
UNCLE	H		one hand contacts the head
HISTORY	H		one hand in neutral space
USE	H		one hand in neutral space
HELL	H		one hand in neutral space
HIGH	H		one hand in neutral space
HONOR	H		one hand contacts the head
HALLUCINATION	H		one hand contacts the head
HANDSOME	H		one hand in neutral space
HOSPITAL	H		one hand contacts the body
IMAGINE	I		one hand contacts the head
IDEA	I		one hand contacts the head
IF	I		one hand contacts the head
INSURANCE	I		one hand in neutral space
ITALY	I		one hand in neutral space
ISRAEL	I		one hand contacts the head
IMMATURE	I		one hand contacts the head
JEALOUS	I		one hand in neutral space
JAPAN	I		one hand in neutral space
KITCHEN	K		one hand in neutral space
POLITICS	K		one hand contacts the head
PURPLE	K		one hand in neutral space

PHILOSOPHY	K		one hand in neutral space
PHILADELPHIA	K		one hand in neutral space
POISON	K		one hand contacts the head
PINK	K		one hand contacts the head
PARENTS	K		one hand contacts the head
PEACH	K		one hand contacts the head
PENIS	K		one hand contacts the head
PERSONALITY	K		one hand contacts the body
KING	K		one hand contacts the body
PRINCE	K		one hand contacts the body
PRINCESS	K		one hand contacts the body
PATIENT (HOSPITAL)	K		one hand contacts the body
LEFT	L		one hand in neutral space
LANDLORD	L		one hand in neutral space
LIBRARY	L		one hand in neutral space
LORD	L		one hand contacts the body
LESBIAN	L		one hand contacts the head
LUNCH	L		one hand contacts the head
LATIN	L		one hand contacts the head
LINCOLN	L		one hand contacts the head
LEMON	L		one hand contacts the head
LAZY	L		one hand contacts the body
LEGISLATURE	L		one hand contacts the body
MONDAY	M		one hand in neutral space
EVERY-MONDAY	M		one hand in neutral space
MISSIONARY	M		one hand contacts the body
MEMBER	M		one hand contacts the body
MORMON	M		one hand contacts the head
NORTH	N		one hand in neutral space
NEUTRAL	N		one hand in neutral space
NIECE	N		one hand in neutral space
NEPHEW	N		one hand in neutral space
OPINION	O		one hand contacts the head
ORPHAN	O		one hand contacts the head
RESPECT	R		one hand contacts the head
RAT	R		one hand contacts the head
RIGHT	R		one hand in neutral space
REASON	R		one hand in neutral space

RESTROOM	R		one hand in neutral space
RELIGION	R		one hand contacts the body
RESTAURANT	R		one hand contacts the head
ROSE	R		one hand contacts the head
SOUTH	S		one hand in neutral space
SATURDAY	S		one hand in neutral space
EVERY-SATURDAY	S		one hand in neutral space
SENATE	S		one hand contacts the body
TUESDAY	T		one hand in neutral space
TOILET	T		one hand in neutral space
TWINS	T		one hand contacts the head
TAN	T		one hand contacts the head
EVERY-TUESDAY	T		one hand in neutral space
VANILLA	V		one hand in neutral space
VEGETABLES	V		one hand contacts the head
VOICE	V		one hand contacts the head
VODKA	V		one hand contacts the head
WEST	W		one hand in neutral space
WINE	W		one hand contacts the head
WATER	W		one hand contacts the head
WEDNESDAY	W		one hand in neutral space
WEIRD	W		one hand in neutral space
EVERY-WEDNESDAY	W		one hand in neutral space
WASHINGTON	W		one hand contacts the body
YELLOW	Y		one hand in neutral space
YESTERDAY	Y		one hand contacts the head
AREA	A	A	hands move in opposite directions
ASSOCIATION	A	A	hands move in opposite directions
ALGEBRA	A	A	hands move in opposite directions
ARCHITECTURE	A	A	hands move in opposite directions
ATTEMPT	A	A	hands move parallel to each other
ABLE	A	A	hands move parallel to each other
BEHAVIOR	B	B	hands move parallel to each other
BIOLOGY	B	B	hands alternate in movement
BUSY	B	B	hands have same shape, only dominant hand moves
CLASS	C	C	hands move in opposite directions
CALCULUS	C	C	hands move in opposite directions

CHANCE	C	C	hands move in opposite directions
CERTIFICATE	C	C	hands move in opposite directions
CHEMISTRY	C	C	hands alternate in movement
COMMUNICATE	C	C	hands alternate in movement
CLIENT	C	C	hands move parallel to each other
CERTIFY	C	Open B	passive hand acts as a base
CHAPTER	C	Open B	passive hand acts as a base
CONSTITUTION	C	Open B	passive hand acts as a base
COMPUTER	C	Open B	passive hand acts as a base
CULTURE	C	1	passive hand acts as a base
CHOCOLATE	C	S	passive hand acts as a base
CHURCH	C	S	passive hand acts as a base
DECODER	D	D	hands move in opposite directions
DEPARTMENT	D	D	hands move in opposite directions
DATE	D	D	hands move in opposite directions
DESSERT	D	D	hands move in opposite directions
DIVORCE	D	D	hands move in opposite directions
DESCRIBE	D	D	hands alternate in movement
DICTIONARY	D	Open B	passive hand acts as a base
DIAMOND	D	Open B	passive hand acts as a base
DEVELOP	D	Open B	passive hand acts as a base
DOCTOR	D	Open B	passive hand acts as a base
DUTY	D	passive	passive hand acts as a base
DAY	D	passive	passive hand acts as a base
EVALUATE	E	E	hands alternate in movement
EASTER2	E	E	hands move in opposite directions
EFFORT	E	E	hands move parallel to each other
EDUCATE	E	E	hands move parallel to each other
ENVIRONMENT	E	1	passive hand acts as a base
EMAIL	E	1	passive hand acts as a base
EMOTION	E	E	hands alternate in movement
ENCYCLOPEDIA	E	Open B	passive hand acts as a base
ENGAGED	E	Open B	passive hand acts as a base
ELEMENTARY	E	Open B	passive hand acts as a base
FEEDBACK	F	F	hands move in opposite directions
FREE	F	F	hands move in opposite directions
FAMILY	F	F	hands move in opposite directions
FIELD	F	B	passive hand acts as a base
FLUNK	F	B	passive hand acts as a base

FOREIGN	F	passive	passive hand acts as a base
FUNCTION	F	S	passive hand acts as a base
GRAMMAR	G	G	hands move in opposite directions
GROUP	G	G	hands move in opposite directions
GEOMETRY	G	G	hands move in opposite directions
GRADUATE	G	Open B	passive hand acts as a base
HIGHWAY	H	H	hands move in opposite directions
HERITAGE	H	H	hands alternate in movement
UNIVERSE	H	H	hands have same shape, only dominant hand moves
HURRY	H	H	hands alternate in movement
HONEST	H	Open B	passive hand acts as a base
HOLY	H	Open B	passive hand acts as a base
UNIVERSITY	H	Open B	passive hand acts as a base
USE	H	S	passive hand acts as a base
USUALLY	H	S	passive hand acts as a base
HOTEL	H	1	passive hand acts as a base
INDEPENDENT	I	I	hands move in opposite directions
ISOLATED	I	I	hands move in opposite directions
INDIVIDUAL	I	I	hands move parallel to each other
INTERVIEW	I	I	hands alternate in movement
INTERNATIONAL	I	I	hands have same shape, only dominant hand moves
INSTITUTE	I	I	hands have same shape, only dominant hand moves
JAM	I	Open B	passive hand acts as a base
ILLUSTRATE	I	Open B	passive hand acts as a base
ISLAND	I	S	passive hand acts as a base
INDUSTRY	I	S	passive hand acts as a base
PLACE	K	K	hands move in opposite directions
PROPORTION	K	K	hands move parallel to each other
PERSON	K	K	hands move parallel to each other
PERMISSION	K	K	hands move parallel to each other
PERFECT	K	K	hands move in opposite directions
PARTY	K	K	hands move parallel to each other
PEOPLE	K	K	hands alternate in movement
KEEP	K	K	hands have same shape, only dominant hand moves
KIND	K	K	hands have same shape, only dominant hand moves

PARANOID	K	K	hands move parallel to each other
PARLIAMENT	K	A	passive hand acts as a base
PROFESSIONAL	K	B	passive hand acts as a base
PRINCIPLE	K	Open B	passive hand acts as a base
KILL	K	Open B	passive hand acts as a base
PIECE	K	Open B	passive hand acts as a base
PSYCHIATRY	K	Open B	passive hand acts as a base
POISON	K	Open B	passive hand acts as a base
KITCHEN	K	Open B	passive hand acts as a base
PROGRAM	K	Open B	passive hand acts as a base
POETRY	K	passive	passive hand acts as a base
PROFESSION	K	1	passive hand acts as a base
PASSOVER	K	S	passive hand acts as a base
PRINCIPAL	K	S	passive hand acts as a base
LANGUAGE	L	L	hands move in opposite directions
LICENSE	L	L	hands move in opposite directions
LIVE	L	L	hands move parallel to each other
LATER	L	Open B	passive hand acts as a base
LAW	L	Open B	passive hand acts as a base
MATHEMATICS	M	M	hands move in opposite directions
MUSEUM	M	M	hands move in opposite directions
MEDICAL	M	Open B	passive hand acts as a base
MUSLIM	M	passive	passive hand acts as a base
OFFICE	O	O	hands move in opposite directions
ORGANIZATION	O	O	hands move in opposite directions
RELAY	R	R	hands move in opposite directions
ROPE	R	R	hands move in opposite directions
READY	R	R	hands move parallel to each other
REHAB	R	Open B	passive hand acts as a base
REQUIRE	R	Open B	passive hand acts as a base
ROOM	R	R	hands move in opposite directions
RESPONSE	R	R	hands move parallel to each other
RABBI	R	R	hands move parallel to each other
REST	R	R	hands move parallel to each other
RULE	R	Open B	passive hand acts as a base
RESEARCH	R	Open B	passive hand acts as a base
ROCKET	R	Open B	passive hand acts as a base
RESULT	R	Open B	passive hand acts as a base
REVIEW	R	Open B	passive hand acts as a base

REINFORCE	R	S	passive hand acts as a base
SYSTEM	S	S	hands move in opposite directions
SOCIETY	S	S	hands move in opposite directions
STRUCTURE	S	S	hands alternate in movement
STATE	S	Open B	passive hand acts as a base
SITUATION	S	1	passive hand acts as a base
SYMBOL	S	Open B	passive hand acts as a base
STAGE	S	passive	passive hand acts as a base
TOTAL-COMMUNICATION	T	C	hands alternate in movement
TIME	T	Open B	passive hand acts as a base
TRY	T	T	hands move in opposite directions
TRANSLATE	T	T	hands move in opposite directions
TEAM	T	T	hands move in opposite directions
TUTOR	T	T	hands move parallel to each other
TEMPLE	T	S	passive hand acts as a base
VAIN	V	V	hands move in opposite directions
VISIT	V	V	hands alternate in movement
VERY	V	V	hands move in opposite directions
VOCABULARY	V	1	passive hand acts as a base
WINTER	W	W	hands move in opposite directions
WAR	W	W	hands move parallel to each other
WORSHIP	W	W	hands have same shape, only dominant hand moves
WORLD	W	W	hands move in opposite directions
WEATHER	W	W	hands move in opposite directions

CHAPTER 4

A CONSTRUCTION-THEORETIC ANALYSIS OF ASL LEXICAL FAMILIES

4.1 Introduction

In Chapter 3 I demonstrated that though initialized signs are borrowed words in ASL, they are not anomalies to be sequestered in an isolated portion of the ASL lexicon. Initialized signs are systematically related to each other and to native ASL signs, and lexical families of initialized signs represent overlapping pockets of systematicity in ASL. This chapter is primarily concerned with the grammatical mechanism supporting these overlapping relationships, asking how lexical relationships among other families of words in ASL are to be accounted for in a construction-theoretic theory of morphology.

Lexical families are groups of whole surface words that are related according to some aspect of form and meaning shared among them. Morphological constructions are abstractions over specific lexical constructions, such that shared elements of form and meaning among specific constructions can license increasingly schematic constructions. Here I demonstrate that the version of construction grammar that we have been developing provides an intuitive analysis of a variety of lexical families in ASL, formalizing lexical families as morphological constructions.

In this chapter, I show that initialized signs are just like other ASL signs, particularly number incorporating signs and classifier verbs: these other types of signs also belong to highly structured networks of words. The construction-based analysis of initialized signs can be straightforwardly applied to these families of signs in ASL. Thinking about ASL morphology in terms of constructions also leads to the discovery that what are traditionally thought of as phonological features in ASL are actually schematic representations abstracted over actually occurring words. Some of these features are specified for certain aspects of meaning, and therefore seem more "morphological", and other features are semantically quite schematic, and therefore seem more "phonological", but this is a difference of degree rather than of kind; overwhelmingly, in ASL, phonological and morphological formatives are one and the same.

I begin this chapter, then, with a review of previous treatments of lexical families in ASL. In Section 4.2, I demonstrate that sign language linguistics has largely inherited, often implicitly, the assumptions of the generative approach to linguistic analysis that were mainstream in the 1980s and 1990s, as also discussed in Chapter 1. In Section 4.3, I will instead develop the alternative, construction-theoretic approach to sub-lexical structure in ASL lexical families. In Section 4.4, comparing across lexical family types, I demonstrate that the benefit of the construction-based approach is that it provides a way of formalizing an intuition that has always lingered in the background of sign language morphology, that morphological patterns are distinguished by configurations of phonological formatives, rather than by the formatives themselves.

4.2 Previous approaches to lexical families

4.2.1 Lexical families in ASL

Lexical families involving native ASL signs are like lexical families involving initialized signs, in the sense that it is often possible to group ASL signs together based on shared elements of form and meaning among them. However, unlike initialized signs, which are necessarily discriminated from one another based on their handshapes, lexical families in ASL can be organized around a wider range of phonological configurations. These patterns of co-variation between meaning and form can be found throughout the ASL lexicon, and for many configurations of phonological features (see Frishberg and Gough 1973/2000), though here I will continue to focus only on three broad phonological categories of handshape, location, and movement, for the sake of simplicity.

The ASL lexicon is structured such that there are countless "minimal pairs" which differ by one phonological feature, but are also semantically related. For example, the ASL signs PRESSURE[1] and FULL differ phonologically only by their movements, both signs using the non-dominant hand to represent a container and the dominant hand to limit its contents. Similarly, the signs WRITE-DOWN and COMMIT-TO-MEMORY differ only by their locations; WRITE-DOWN uses the non-dominant hand as a place of articulation, while COMMIT-TO-MEMORY is signed at the temple, with both signs transitioning from a flat-O to a 5 handshape and both denoting preservation of information. Finally, the signs THINK and KNOW differ only by their handshapes, but

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[1] Readers unfamiliar with ASL are reminded to consult the ASL glossary at the end of the dissertation for examples of ASL signs.

[2] Like the fingerspelling system, the number system in ASL is based on handshape contrasts. The ASL

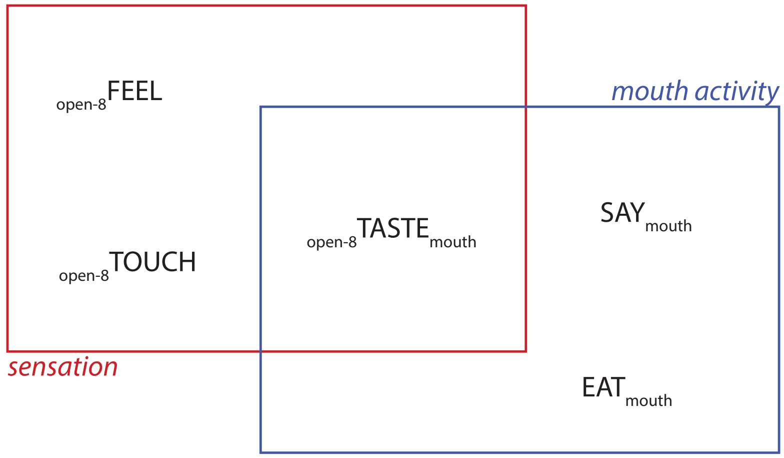
are both signed at the temple, the metaphorical site of mental activity. Pairs of signs like these represent quite small lexical families, but examples of slightly larger families can also be seen in Example 4.1:

Example 4.1. Semantically-related signs which differ by…

a. movement	b. location	c. handshape
FOLLOW	CONTACT	ONE-MONTH
CHASE	TOUCH	TWO-MONTHS
AVOID	FEEL	THREE-MONTHS
PASS	TASTE	FOUR-MONTHS
…	…	…

Lexical families in ASL also tend to overlap; a given sign can be related to different signs in different ways. The signs TASTE, FEEL, and EAT are instructive: TASTE differs from FEEL only by its location, but TASTE differs from EAT only by its handshape. TASTE and FEEL both denote verbs of sensation, differing regarding the part of the body that is involved, while TASTE and EAT both denote actions of the mouth, differing regarding the nature of the activity. Here then we can say that these signs belong to two overlapping lexical families, one denoting verbs of sensation, and the other denoting activities of the mouth. These families have been schematized in Example 4.2, where signs are grouped together by their shared semantic domain, and I have listed in subscripted text the relevant phonological features for signs in each family: signs in the 'sensation' family are signed with an open-8 handshape, and signs in the 'mouth activity' family are located near the mouth.

Example 4.2. Overlapping lexical families: TASTE



It might be tempting to dismiss these examples as spurious connections. The English words *hear* and *ear* are sometimes invoked to demonstrate the danger of positing false morphological relationships on the basis of a few examples (cf. Haspelmath and Sims 2010:2; Booij 2012:7). *Hear* and *ear* have an element of form and meaning in common, both containing the string *ear* and relating to audition. However, the subsequent inference that *h-* is a morphological marker meaning something like 'to sense using X body part' does not extend to other relevant pairs of words, as can be seen with the examples *high* and *eye*, which match the formal pattern but not the semantic one, and *smell* and *nose*, which match the semantic pattern but not the formal one.

The difference between the ASL and English examples is that the English example is indeed isolated and idiosyncratic, while the ASL examples, beyond being partially iconic, are also pervasive and systematic. One aspect of this systematicity can be seen when certain pairs of signs differ from one another in the same way that other pairs of signs differ from one another, a pattern I will return to in Chapter 5. A particularly well-known and widely-accepted example involves noun-verb pairs in ASL, in which pairs of signs draw on a paradigmatic contrast between a short repeated movement and a long single movement. Many nouns and related verbs in ASL are signed identically, except that the noun has the shorter, repeated movement, and the verb has the longer, single movement, as in CHAIR◆SIT, ANNOUNCEMENT◆ANNOUNCE, INFORMATION◆INFORM, and PHONE◆CALL-BY-PHONE (see Supalla and Newport 1978).

Another set of examples involves signs that are opposed in the direction of their movement as well as in their semantic polarity. In many pairs of signs which differ only by the direction of their movement, the signs with an upward movement are more positive, and signs with a downward movement are more negative, as in THRILLED◆DEPRESSED, PROMOTE◆DEMOTE, INCREASE◆DECREASE, and APPEAR◆DISAPPEAR (Frishberg and Gough 1973/2000). Like noun-verb pairs, these pairs of signs are formed identically, except for their movements, and the change in movement is also systematically correlated with the difference in meaning that can also be observed in other signs which differ only by their movement patterns.

4.2.2 S-morphs and P-morphs

The challenge that lexical families pose for morphological analysis is that they facilitate the identification of morphological structure, but it is also often difficult to describe the correspondence between form and meaning that can be identified within a single complex sign without also referring to other members of its family. In particular, approaches to morphology that are rooted in the structuralist notion of compositionality are not equipped to handle lexical families in a way that follows from the assumptions and predictions of the theory: I demonstrated in Chapter 1 that morpheme-based approaches privilege compositionality, and seek to separate those items which can be created from smaller, independently meaningful parts by a regular rule from those that cannot. In general this view leads to analyses stated in terms of morphemes as primarily meaningful pieces, and the rules that combine morphemes to create words are treated as measures of lexical structure (see Hockett 1987; Bochner 1993; Blevins 2015).

This view is also assumed by default in many analyses of sign language morphology. In an influential analysis of segmental phonology in ASL, Liddell and Johnson (1989) discuss a number of phonological processes, as well as predictable formal alternations resulting from certain morphological operations. One morphological operation they discuss involves "numeral incorporating" signs, namely the signs FIRST-PLACE, SECOND-PLACE, and THIRD-PLACE. Like the examples in Example 4.1c, these 'place in competition' signs differ only by the handshape that is used to form the sign, such that the handshapes used to form these three signs also correspond to the intended numbers: FIRST-PLACE is signed with a 1 handshape, SECOND-PLACE with a 2 handshape, and THIRD-PLACE with a 3 handshape, but all are signed by pulling the dominant hand sharply backward.

Liddell and Johnson argue in their analysis of these number-incorporated signs that in ASL "a number of morphological processes 'fill out' … incompletely specified roots with morphemes which consist of small bits of phonological information" (1989:255-6). Following from this view, FIRST- SECOND- and THIRD-PLACE are derived from smaller meaningful parts: an incomplete bound root, PLACE-IN-COMPETITION, is listed as a form-meaning pairing in the ASL lexicon, with its handshape value left unspecified, and this root then combines with numeral morphemes which fill in the missing handshape value and also procedurally derive the meaning of the sign.

Liddell and Johnson call the PLACE-IN-COMPETITION root that they identify an "incomplete segmental morph" or "S-morph", and call the corresponding numeral morphemes "paradigmatic" or "P-morphs". Note that Liddell and Johnson use the terms *morph* and *morpheme* interchangeably, as in their Figure 35, where individual morphemes are labeled as "morphs" inside the figure itself, but as "bound morphemes" in the figure caption (1989:256). Though there is a precedent in the spoken language morphology literature to contrast *morphs* as 'forms' with *morphemes* as 'form-meaning pairings' (see Anderson 1992; Aronoff 1994), this does not correspond to Liddell and Johnson's use of the term *morph*. They use it to mean *morpheme*.

Other examples of morphological operations that Liddell and Johnson analyze as involving P- and S-morphs are agreement verbs (see Padden 1988, 1990), and classifier verbs (see Supalla 1986; Emmorey 2003). For agreement verbs, Liddell and Johnson identify P-morphs which encode person inflectional information, and root S-morphs containing handshape and movement features. Under this analysis, a verb like GIVE contains only handshape and movement features, and combines with first and second person P-morphs to yield the sign I-GIVE-YOU, which, as a function of its two

P-morphs, moves between two different locations in the signing space (cf. Liddell and Johnson 1989:257). Similarly, Liddell and Johnson analyze classifier constructions as P-morphs specifying handshapes and semantic elements, for example PERSON or VEHICLE, which are affixed to root S-morphs that contain only a movement feature and a corresponding movement meaning, such as MOVE-FORWARD or TURN-SUDDENLY (cf. Liddell and Johnson 1989:259).

Because Liddell and Johnson are concerned with morphological operations only to the extent that they feed segmental phonological processes, they do not discuss the implications of their morphological analysis for theories of the lexicon. For example, though they identify S-morphs and P-morphs as formal devices that should explain how complex signs are constructed from independently meaningful parts, they do not consider the theoretical consequences of introducing these new devices, or offer any rules or constraints governing how these objects recombine. Presumably, and especially for more derivational processes, this information would also necessarily play a role in the analysis, otherwise the theory would over-generate combinations of morphemes beyond the set of actually occurring signs (cf. discussions of irregular rule application in e.g., Aronoff 1976, Bochner 1993). However, these theory-internal considerations from generative grammar are not a concern for construction-based approaches; the construction-theoretic approach to morphology avoids the rule/list fallacy implicit in morpheme-based approaches because it treats whole words, rather than morphemes, as being central to the study of morphological structure (Langacker 1987:42).

4.2.3 Ion-morphs

The conceptual and theoretical consequences of introducing a new formal device that, like Liddell and Johnson's P- and S-morphs, may be relevant only for the derivation of complex words in ASL, is taken up directly by Fernald and Napoli (2000). Fernald and Napoli focus in particular on constraints on combinations of morphemes in ASL word-formation; their analysis seeks to explain the fact that morphological operations in ASL are primarily non-concatenative, and moreover typically involve recurring configurations of phonological features, i.e, lexical family relationships.

Reviewing several previous analyses of ASL morphology (e.g., Klima and Bellugi 1979; Liddell and Johnson 1989; Sandler 1995; Brentari 1998), Fernald and Napoli are overall quite skeptical of statements about ASL morphology that refer to "affixation". Many morphological analyses adopt the terminology of affixation to describe sign-internal structure, even though, as Fernald and Napoli demonstrate (and has been documented in ASL research since 2000, cf. Aronoff, Meir, and Sandler 2005; Sandler and Lillo-Martin 2006), ASL and other signed languages make relatively infrequent use of the concatenative morphological processes that are so common in spoken languages. For example, in many cases, sign language researchers invoke terms such as "infixation" (e.g. Brentari 1996) or "simultaneous affixation" (e.g. Wilbur 2008) to capture the intuition that, overwhelmingly, morphological phenomena in ASL involve changing the phonological features of an existing sign, rather than sequentially adding a new set of phonological features as an affix to an existing root. Subsuming this behavior under the label of "affixation" allows analysts to acknowledge the simultaneous nature of ASL morphology without requiring a new formal device, but also implicitly maintains the underlying assumption that all morphologically complex words can be exhaustively broken down into independently meaningful parts.

Fernald and Napoli (2000:29) argue that, far from representing isolated examples, lexical families formed through non-concatenative, non-affixal morphological operations are pervasive the ASL lexicon. However, though lexical families are pervasive, it is rarely, if ever, the case that form-meaning associations within a family hold across the entire lexicon. This in turn raises the question of which rules can be said to guide the formation of lexical families of signs.

Drawing primarily on patterns noted by Frishberg and Gough (1973/2000), Fernald and Napoli identify two lexical family types: groups of semantically related signs in which only one formal feature differs among the relevant signs, as we saw in Example 4.1, and groups of semantically related signs in which all signs have a single shared formal feature in common. They call the first type a "nuclear family", while the second is an "extended family".

Fernald and Napoli demonstrate the difference between nuclear and extended families of signs using two classic examples. The first example involves a lexical family of initialized signs. As we have seen in Chapter 3, ASL signs for groups of people, like {FAMILY, TEAM, CLASS, ASSOCIATION}, share their movement and location, but differ in that each sign in the family uses a different handshape. These signs therefore constitute a nuclear family. In contrast are the signs {MOTHER, GIRL, AUNT, NIECE}. These signs for female family members are related in meaning and, while they differ with regards to which handshapes and movements they are signed with, they all are articulated at the same location, near the signer's chin.

Fernald and Napoli develop a useful schematic representation for nuclear and extended families, using matrices like those in Example 4.3 to indicate which features differ (marked with an X) or are shared (marked with a check) within a group of signs (cf. 2000:27). The signs {FAMILY, TEAM, CLASS, ASSOCIATION, ...} differ only by their handshape, while the signs {MOTHER, GIRL, AUNT, NIECE, ...} have only their location in common.

Example 4.3. Nuclear and extended families in ASL

Nuclear family	handshape	movement	location
FAMILY/TEAM/CLASS/ASSOCIATION	✗	✓	✓

Extended family	handshape	movement	location
MOTHER/GIRL/AUNT/NIECE	✗	✗	✓

Fernald and Napoli's description of lexical families shows that features of phonological parameters in ASL can be recur with a particular meaning within a group of signs. They interpret this to mean that the features themselves are meaningful: "the recognition of extended families reveals a startling fact about ASL: any of the four complex parameters *can itself carry semantic content* when it is combined with fixed sets of the other three parameters" (2000:29, my emphasis).

Given their dissatisfaction with previous explanations of ASL morphology, the formal analysis that Fernald and Napoli ultimately propose is somewhat puzzling.

They adopt a very classically morpheme-based view of morphology to formalize their intuition that, in an extended family like {GIRL, MOTHER, AUNT, NIECE}, a single phonological parameter (i.e., location) can be associated with a certain meaning (i.e., female). Fernald and Napoli make this point quite explicitly, stating that "any attempt to call such a unit 'morpheme' leads to problems with the basic principles of morphology that words should be exhaustively analyzable into morphemes and that morphemes should not overlap" (2000:42). This view, that morphologically complex words should decompose exhaustively into independently meaningful pieces, is central to classically morpheme-based theories of morphology, and it is clear from their discussion that Fernald and Napoli view this as a basic and uncontroversial assumption about morphological structure. Though they convincingly demonstrate that their data challenge the traditional morpheme-based view, they nevertheless adopt the assumption that complex words should be exhaustively analyzable into morphemes.

However, once Fernald and Napoli commit to this assumption, they are stuck: any attempt to account for form-meaning variation in ASL lexical families while also seeking to break words down into independently meaningful component parts will inevitably lead to a paradox. This is because the intuition behind the lexical family analysis hinges on the insight that signs exist in groups of related (whole) words, while the morpheme-based analysis, in contrast, assumes that complex words are epiphenomena created from meaningful parts (of words) that are concatenated according to general combinatorial rules.

Trying to provide a morpheme-based account for the lexical families they identify, Fernald and Napoli are torn between two analytic considerations. The first is that signs in lexical families, including initialized signs, necessarily have lexically idiosyncratic information in their lexical representations that cannot be derived, including whether or not the words in question even exist. Conversely, signs in lexical families are necessarily also parts of larger, more regular and general patterns in the lexicon; this is the basis for identifying that a lexical family exists in the first place. Adopting the morpheme-based perspective, Fernald and Napoli must either treat initialized signs as non-derived and stored wholes, thereby having no morphological structure, or as decomposable morphologically complex words, annotated with diacritic markers to get the morphological pieces to fit back together again (Bochner 1993, Blevins 2015).

Fernald and Napoli opt for the latter strategy: they break initialized signs and other lexical families into what they term "ion-morphs". Ion-morphs are a restricted type of classically defined morpheme, differing from true morphemes only in that ion-morphs are phonologically incomplete lexical items that combine exclusively with other ion-morphs to yield well-formed words (cf. Liddell and Johnson's 1989 analysis of P- and S-morphs which also combine sub-sign phonological features to yield a complete sign). Accordingly, under Fernald and Napoli's analysis, ion-morphs have three parts: 1), a set of specifications for a subset of the phonological features needed to create a well-formed sign; 2), an associated meaning; and 3), a second set of phonological features, complementary to the first, that restricts the environments in which the ion-morph can appear. Consider Fernald and Napoli's analysis of the 'group' family of signs (cf. 2000:34-35) in Example 4.4:

Example 4.4. Ion-morphs for the 'group' family of signs

	form		**meaning**	**restriction(s)**	
a.	[x, M_a, L_a]	=	'group'	when x ∈	{ H_F, H_T, H_C, H_A, … }
b.	[H_F, x]	=	'family'	when x ∈	{ [M_a, L_a] }
c.	[H_T, x]	=	'team'	when x ∈	{ [M_a, L_a] }
d.	[H_C, x]	=	'class'	when x ∈	{ [M_a, L_a] }
e.	[H_A, x]	=	'association'	when x ∈	{ [M_a, L_a] }
	…	=	…	when x ∈	…

Five ion-morphs are listed in Example 4.4, and each ion-morph consists of three parts: an element of form, an element of meaning, and a restriction on which other ion-morphs the ion-morph in question may combine with. For all of the ion-morphs listed in Example 4.4, the *x*-variable identifies the underspecified part of the ion-morph, and the subscript lowercase variables are arbitrarily selected to indicate phonological values for handshape, location, and movement. The subscripted variables are also co-referential across ion-morphs, but I will not discuss them further here.

The ion-morph analysis of FAMILY then, involves two of these five ion-morphs, one for the movement and location shared across the nuclear family of 'group' signs, and one from the set of initialized handshapes relevant for that family; FAMILY is derived by combining the ion-morph for 'group' (Example 4.4a) with the ion-morph meaning 'family' (Example 4.4b). The product that results from the unification of these two parts is a full sign with the form [H_F, M_a, L_a]. Fernald and Napoli do not provide the exact meaning of the full, derived sign, but their analysis predicts that it should be something along the lines of 'group/family', because it combines a piece meaning 'family' with a piece meaning 'group'. Consistent with what we saw in Chapter 1, then, in the ion-morph analysis, the motivation for breaking the initialized sign F̲AMILY into two component parts stems from a pressure to describe morphological relatedness among signs that systematically share aspects of form and meaning, while simultaneously seeking to eliminate redundancy from the lexicon altogether, thereby creating an economical analysis.

However, the ion-morph, as a formal theoretical device, does not accomplish either of these goals. This is because every ion-morph must have, as part of its lexical representation, a complete list of every other ion-morph that it can combine with. This is no more economical than simply listing all of the full lexical signs in the lexicon in the first place. We can see this very clearly by looking at the restrictions on the ion-morph meaning 'group' in Example 4.4a: this set is just a list of all the words in this lexical family, creating the illusion of a more general pattern. Recall that this approach was also anticipated by Bochner (1993): we saw in Chapter 1 that the diacritic-based analysis is one of the few options available to morphological analyses dealing with irregular words in a framework that privileges compositionality.

Similarly, under Fernald and Napoli's analysis, the ion-morph meaning 'family' in Example 4.4b can only combine with one thing, the ion-morph meaning 'group'. It is, in effect, a lexical entry for the initialized sign F̲AMILY: the ion-morph meaning 'family' posits a lexical entry that is only needed to get the pieces of F̲AMILY to fit back together again.

Another and more serious problem inherent to the ion-morph analysis, however, is that it provides no mechanism for describing how new words are to be formed. Fernald and Napoli's ion-morph analysis provides a characterization of the ASL lexicon as a static system. By virtue of listing all of the corresponding ion-morphs a particular ion-morph can combine with as a necessary component of its lexical representation, rather than stating the restrictions in the form of a rule or some more abstract pattern, they preclude any ion-morph from being used productively to create new signs in any predictable way.

The irony of the ion-morph analysis is that, at every step of the way, Fernald and Napoli are careful and convincing in their description of the substantial role that lexical families play in ASL morphology. They describe a number of families, consider implications of the lexical family analysis for language learning, and tie together a variety of morphological phenomena under a single overarching account. Their description of lexical families in ASL is quite thorough, and anticipates a word-based approach. Because they start with very narrowly defined theoretical assumptions, however, the analytic conclusions they reach are similarly restricted. As we will see in the next section, by setting aside the assumption that all morphological structure must be stated in terms of morphemes, the construction-theoretic approach allows for an analysis of lexical families that corroborates, rather than contradicts, the insights of the lexical family description.

4.3 Lexical families are morphological constructions

4.3.1 The primary role of words

We have seen already that the construction-theoretic approach treats the actually-occurring words of a language as fully specified pairings of meaning and form, giving whole words a central role in morphological theory, regardless of their internal complexity. With repeated and frequent use, instances of specific lexical constructions also give rise to more schematic constructions, which extrapolate configurations of meaning and form that are shared among related constructions into a more abstract representation (Bybee 2007; Booij 2010; Goldberg 2013). Accordingly, the construction-theoretic lexicon can be seen as a complex system of relationships among whole words and their parts (Hay and Baayen 2005; Blevins 2006). Under this approach, the analysis of lexical families in ASL is quite straightforward: lexical families, like other morphological patterns, are also analyzed as schematic morphological constructions. These schematic constructions are abstractions over actually-existing words, and describe elements of form and meaning that are shared among related words.

In this section, I further develop this analysis to account for second-order constructions in ASL (cf. Booij 2010; Booij and Masini 2015). These are schematic constructions that have been abstracted over constructions which are themselves partially schematic. Here I find it useful to take Fernald and Napoli's concept of nuclear and extended families as a starting point, discussing each in turn in Sections

4.3.2 and 4.3.3, though we will ultimately find that "extended" and "nuclear" families represent a descriptive rather than theoretical distinction.

4.3.2 Nuclear families

As an example of a nuclear family, consider the ASL signs FOLLOW, CHASE, AVOID, and PASS. These conventional signs all are formed with two A handshapes in neutral space, and all differ by the movement of the hands relative to one another. They also all have in common that they refer to the relative locations/movement of two movable objects, but they differ regarding the exact nature of the relationship. These lexical signs can be represented as specified lexical constructions:

Example 4.5. Lexical constructions for (a) FOLLOW, (b) CHASE, (c) AVOID, and (d) PASS

a. FOLLOW

H: A_{DH}, A_{NDH}
L: neutral space
M: DH and NDH move forward together
V

'follow; to come after something'

b. CHASE

H: A_{DH}, A_{NDH}
L: neutral space
M: DH circling behind NDH
V

'chase; to pursue something'

c. AVOID

H: A_{DH}, A_{NDH}
L: neutral space
M: DH moves back from NDH
v

'avoid; to keep away from something'

d. PASS

H: A_{DH}, A_{NDH}
L: neutral space
M: DH moves past/contacts NDH
v

'pass; to move past something'

The similarities among the signs in this lexical family can be represented with a partially-schematic morphological construction, as in Example 4.6. This construction specifies that two A handshapes move in neutral space to denote a spatial relationship between two objects, but the movement and the nature of the spatial relationship are left unspecified, and here are represented by the variables *x* and *y*:

Example 4.6. Schematic morphological construction for the 'AA/movable objects' family

H: A_{DH}, A_{NDH}
L: neutral space
M: x_{DH}, y_{NDH}
v

'movement and position of X relative to Y'

The schematic construction in Example 4.6 captures the idea that, though a particular movement pattern alone may not be enough to completely predict the meaning of a sign that involves moving two A handshapes in neutral space, the pairing of a particular movement with a particular meaning in a given sign can still be expected to be consistent with, or analyzable in terms of, the more general pattern, just as we saw with compounds in Chapter 2. A relevant example is the sign SUPERIOR, which is used to describe, for example, one person's position of authority relative to another person, and is signed by moving a dominant A hand above the non-dominant A hand, drawing on the conventional metaphor of POWER IS HEIGHT in ASL (Taub 2001). Like the signs in Example 4.5, SUPERIOR positions the hands relative to one another in space to indicate a spatial relationship. However, it is not the case that SUPERIOR derives its metaphorical meaning from the construction in Example 4.6, it is instead one of the many instances which give rise to this more schematic construction; the specific sign instantiates the more general pattern, rather than the other way around.

Another example is the sign CHALLENGE, which, like the English phrase *head to head*, describes two people entering into some kind of contest, physical or otherwise, and is signed with the dominant and non-dominant hands moving to contact one another "head on". Still other signs in this family include WITH, GO-STEADY and SUBORDINATE; for all of these signs, though the movement pattern alone is typically insufficient to fully predict or derive the meaning of the sign, the meaning and the movement can be understood in terms of each other, on the basis of an iconic or metaphoric motivation (Wilcox 2000; Taub 2001). They are therefore considered members of the same lexical family, and instantiations of the same schematic morphological construction.

Looking at compounding in Chapter 2, I identified abstractions over constructions that are themselves partially schematic, for example the noun-noun compound construction in English. Here as well, the partially-schematic morphological construction in Example 4.6 is an instantiation of a more schematic, second-order construction, which is represented in Example 4.7. Compared to Example 4.6, Example 4.7 has schematic variables in place of specific handshape values:

Example 4.7. Schematic morphological construction for the 'movable objects' family

H: x_{DH}, x_{NDH}
L: neutral space
M: x_{DH}, y_{NDH}

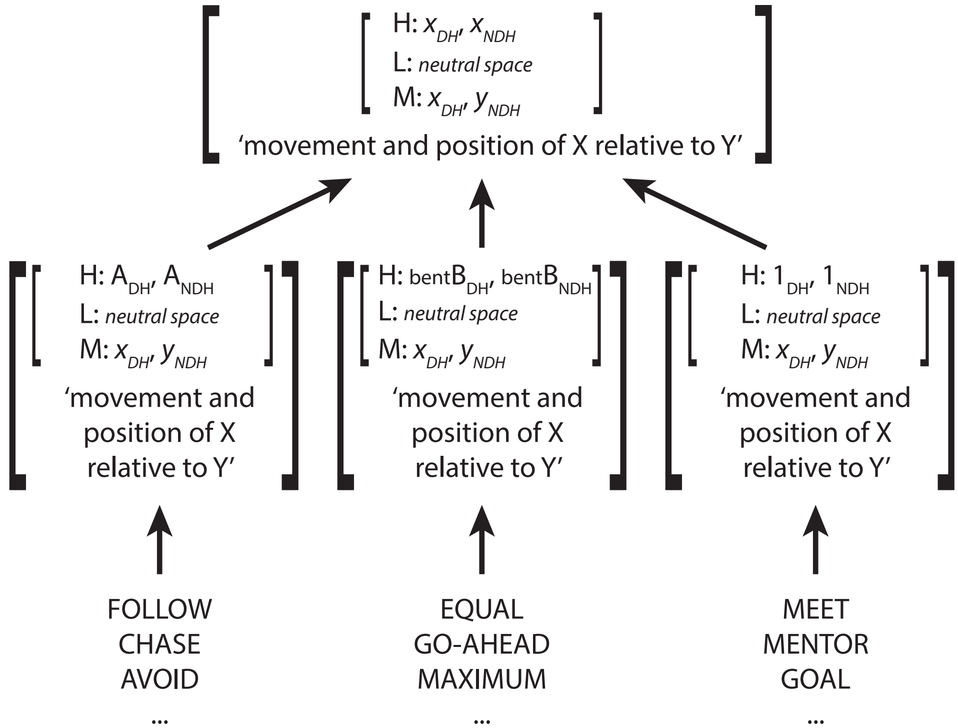
'movement and position of X relative to Y'

The evidence for this second-order construction comes from two other families of signs in which the hands assume the same handshape and move relative to one another to denote a spatial relationship between two people/objects (cf. Lepic, Börstell, Belsitzman, and Sandler 2015). For example, the signs MEET, MENTOR, and GOAL are all signed with two 1 handshapes, differing only by the movement of the hands relative to one another, and the signs EQUAL, GO-AHEAD, and MAXIMUM are all signed with two bent-B handshapes, and also differ only in the movement of the hands relative to one another.

Here again it is important to emphasize that in construction morphology, constructions are not derivational in the traditional sense. They describe regularities among existing words, as well as provide a blueprint for creating new words, however, it is not the case that a particular movement pattern, combined with a certain handshape, must deterministically yield the meaning of any actually occurring sign. This can be seen with the signs CHALLENGE, MEET, and EQUAL, which are all signed with the two hands coming together and contacting each other in neutral space, but differ regarding the kind of relationship this movement denotes. These signs differ by their handshapes such that CHALLENGE is signed with two A handshapes, MEET with two 1 handshapes, and EQUAL with two bent-B handshapes. While these signs can be analyzed into their component handshapes and movements, the handshape and movement patterns alone are insufficient to fully predict the meaning of a given sign, without further diacritics which are not necessary following an abstractive approach.

The analysis of the 'movable object' family of signs, then, is that it is an abstraction over three schematic morphological constructions, which are related to one another as in Example 4.8:

Example 4.8. Lexical organization of the 'movable object' family of constructions



Just as we saw in Chapter 2 that specific compounds are instantiations of particular compounding patterns, which are in turn instantiations of a fully schematic compounding construction, here in ASL I have shown that nuclear families of signs which are related to one another are specific instantiations of schematic morphological constructions. When multiple families of signs are related to one another in congruent ways, these schematic constructions in turn give rise to more schematic, second-order constructions which describe shared elements of meaning and form across lexical families. Now we turn to extended families of signs, and to the interaction of nuclear and extended families of signs, where the same analysis holds.

4.3.3 Extended families

In extended families of signs in ASL, a single phonological feature seems to indicate a particular meaning. As an example of such an extended family, consider the ASL signs MOCK, STUCK-UP, and IRONY in Example 4.9. These signs all share the same handshape, with the index and pinkie fingers extended (the 1-I or "horns" handshape), and are all signs with implied negative affect. Here I use the term *negative affect* because the kind of negativity described here is not straightforwardly derivational or inflectional, in the sense that the negative form exists in opposition to some positive form or reflects an contextual category like negative concord. Instead, the sense of negativity here is more lexical and emotional.

Example 4.9. Lexical constructions for (a) MOCK, (b) STUCK-UP, and (c) IRONY

a. MOCK

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: "horns"}_{\text{DH}}\text{, "horns"}_{\text{NDH}} \\ \text{L: neutral space} \\ \text{M: DH and NDH move forward together} \end{array}\right]_{\text{V}} \\ \\ \text{'mock; to insult someone'} \end{array}\right]$$

b. STUCK-UP

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: "horns"}_{\text{DH}} \\ \text{L: face} \\ \text{M: DH moves up against the nose twice} \end{array}\right]_{\text{A}} \\ \\ \text{'stuck up; acting aloof or superior'} \end{array}\right]$$

c. IRONY

H: "horns"$_{DH}$, "horns"$_{NDH}$
L: neutral space
M: DH from nose to NDH
$_{N}$

'irony; a state of affairs contrary to what is expected'

The similarities among the signs in this lexical family can then be represented with a morphological construction, as in Example 4.10. This schematic construction specifies that some signs with negative affect are also signed with the "horns" handshape, but that the exact location and movement, as well as the exact nature of the negativity, are left unspecified.

Example 4.10. Schematic morphological construction for the '"horns"/negative' family

H: "horns"$_{DH}$, ("horns"$_{NDH}$)
L: *x*
M: *y*

'negative'

The representation in Example 4.10 is also modeled after Bochner's (1993:144) analysis of the *gl–* family of phonesthemes in English: as discussed in Chapter 1, the word-based analysis of words like *glisten, glimmer,* and *gleam* is that they match an abstract pattern that codifies the relationship between the *gl–* onset and the meaning 'light'. The analogy to English phonaesthemes is crucial; Fernald and Napoli also discuss phonesthemes as an extension of their analysis of lexical families in ASL, and consider phonesthemes to be examples of extended families of words in spoken language. In ASL as in English, there exist many groups of words which can be characterized by their shared meanings and forms, even though they are not straightforwardly compositional. However, rather than representing a peripheral morphological phenomenon, as has long been assumed to be the case for English phonesthemes (e.g. Newmeyer 1992:758), the prevalence of these patterns in ASL suggests, as has since been recognized for English phonesthemes as well, that phonesthemes are instructive for the development of morphological theory, and so cannot be dismissed as unimportant or peripheral (e.g., Bergen 2004; Dingemanse 2012; Kwon and Round 2015).

The benefit of positing the schematic construction in Example 4.10 is that it also accounts for productive use of the "horns" handshape. One example of this that I have observed is a variant sign for LIE. LIE is conventionally signed in ASL with a bent-B handshape moving past and contacting the chin, and this sign also serves as the metonymic basis for the initialized name sign N̲IXON (see Section 4.4.2). A variant of this sign that I have observed in San Diego is produced with the "horns" handshape, however apparently with the same 'lie' meaning. My analysis of this idiolectal variant sign is that the form of the canonical sign has changed, based on a reanalysis of its negative 'to not tell the truth' meaning, to join the existing family of 'negative' signs in ASL which is described by the abstract schema in Example 4.10.

Similarly, Frishberg and Gough (1973/2000) report that, in the 1970s, at least, this use of the "horns" handshape was more fully productive, and that existing signs could be instead signed with the "horns" handshape to add a negative tinge of meaning to the existing sign. However, I cannot speak to whether this is still the case for the majority of signers in 2015, and have not observed this process myself, outside of a lexicalized example, a variant of the sign BORED. BORED is conventionally signed with a 1 handshape twisting into the nose, and the emphatic sign OVER-IT is instead signed with an incorporated "horns" handshape to convey that something is so boring as to be tedious.

At this point it is worth noting that the schematic morphological constructions that I have developed for nuclear families of signs in Example 4.6 and extended families of signs in Example 4.10 mirror those that I developed in Chapter 3 for initialized families of signs and initialized signs which share a particular initialized handshape, respectively. Both of these sets of constructions are formal representations of the intuition that there are groups of signs in ASL which have a recurring element of their form and meaning in common. Accordingly, in the next section, I directly compare initialized signs and numeral incorporated signs, to probe the point of intersection between overlapping families of signs.

4.4 Overlapping pockets of systematicity in the ASL lexicon

4.4.1 Numeral incorporation

We have already seen a few number-incorporated signs in the preceding discussion; the signs ONE-MONTH, TWO-MONTHS, THREE-MONTHS, and FOUR-MONTHS, as well as the signs FIRST-PLACE, SECOND-PLACE, and THIRD-PLACE, are examples of morphologically-related signs in which numeric[2] handshapes co-vary with the relevant numbers (Chinchor 1982; Liddell 2003). Relevant for our purposes here is the fact that, like initialized signs, these number-incorporated signs form lexical families.

Consider the ASL sign WEEK. This sign is articulated with a 1 handshape moving across the palm of the non-dominant hand. The sign TWO-WEEKS is formed similarly, however with a 2 handshape, and in the sign THREE-WEEKS, a 3 handshape is used. Correspondingly, the ASL sign DAY involves a dominant 1 hand descending to contact the back of the non-dominant hand, and the signs TWO-DAYS, THREE-DAYS, FOUR-DAYS, and so on also systematically change their handshapes according to the number. It is easy to divide the identifiable aspects of meaning in a numeral incorporation sign among the handshape and the location and movement; numeral incorporation therefore seems quite compositional and regular.

Though numeral incorporation may seem regular, it is actually characterized by numerous arbitrary gaps and idiosyncratic sub-patterns. Numeral incorporation typically involves nouns that can be quantified, such as lexical items relating to time (e.g., MONTH, MINUTE, YEARS-AGO, WEEKS-IN-THE-FUTURE) and money (DOLLAR, CENT). However, not all nouns that can be quantified can undergo numeral incorporation. Instead, the set of signs that participate in numeral incorporation paradigms is restricted, and must be learned. Even within families of number-

[2] Like the fingerspelling system, the number system in ASL is based on handshape contrasts. The ASL numbers 1 though 5 draw upon the iconicity of the fingers, with the number of extended fingers matching the signified number, and the signs for the numbers 6 though 9 are more arbitrary, but are nevertheless systematically related; each of the numbers 6, 7, 8, and 9 involves contact between the thumb and the pinkie, ring finger, middle finger, and index finger, respectively, in sequence. The signs for the numbers 10 and upwards, like the fingerspelled letters J and Z, additionally involve movement patterns, and will not be further discussed here.

incorporated signs, not all numbers are used consistently (Chinchor 1982; Liddell 2003; Jones 2013). Several families of number-incorporated signs involve all of the relevant handshapes 1 through 9, such as MONTH and YEARS-OLD. However, other families of number-incorporated signs, such as MORE and YEARS-AGO, tend to only include signs formed with the numbers 1 though 3 or 4. However, these gaps and constraints can also vary quite a bit from signer to signer; a good example is the possible sign FIVE-WEEKS, which is marginal for many signers, but is readily acceptable for others. Another example involves the DAY family of signs: Jones (2013) reports that some signers accept signs with handshapes 1 though 9, while others only accept signs with handshape 1 through 5, and she notes a great deal of variability across signers, overall. The point here is not that number-incorporated signs are so varied as to be unsystematic, but rather that number incorporation is an example of a pervasive phenomenon that can be best explained in a theory that focuses not only on parts of signs, but also on relationships between whole signs as part of a larger system.

The similarities between initialized signs and number-incorporated signs are clear: both types of signs use a closed set of handshapes that conventionally form a paradigm of letters or numbers, and are typically formed using locations and movements found in existing, semantically related ASL signs. A key difference between initialization and numeral incorporation is that the number handshape in a number-incorporated sign is much more semantically concrete than an alphabetic handshape in an initialized sign, which is more semantically abstract: a 2 handshape always "means" 'two' in a number-incorporated sign, whereas, as we saw in Chapter 3, a V handshape only "means" 'there is a synonymous English word that starts with a V' in an initialized sign.

This difference between these two sign types is handled straightforwardly in the construction-theoretic approach. We have already seen in Chapter 3 that initialized handshapes are formally represented as schematic constructions in which the handshape corresponds to the initial letter of an English word. However, the corresponding schema for e.g. the 3 handshape that describes the recurring elements of form and meaning in the signs THREE-DAYS, THREE-WEEKS, and THREE-MONTHS is much less ambiguous:

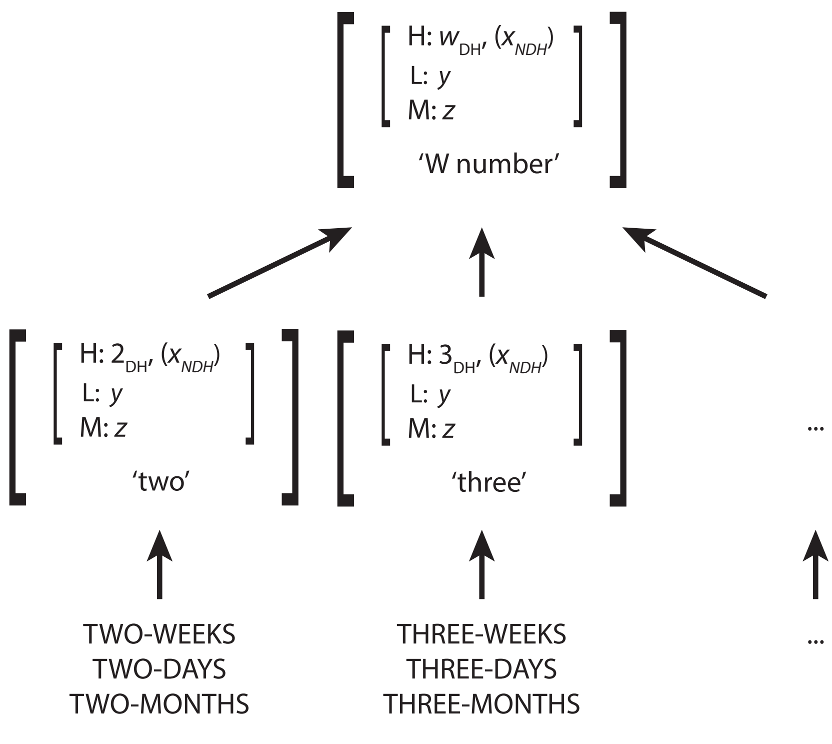
Example 4.11. Schematic morphological construction for 3-incorporated signs

$$\left[\begin{array}{c} \left[\begin{array}{l} \text{H: } 3_{\text{DH}}, (x_{NDH}) \\ \text{L: } y \\ \text{M: } z \end{array}\right] \\ \\ \text{'three'} \end{array}\right]$$

Another difference between initialized and number-incorporated signs has to do with the range of handshapes involved. Initialized signs make use of 21 handshapes, but in number-incorporated signs only 9 handshapes are used. This means that not only are number-incorporated signs more informative, but they also instantiate a smaller, tighter set of paradigmatically contrastive handshapes.

In discussing the idea of paradigmatic contrasts between handshapes, it becomes necessary to formalize the idea of paradigmatic opposition in construction grammar. Here I conceptualize paradigms as second-order schematic constructions over related schematic constructions, similar to the analysis of the 'movable object' family of signs in Section 4.3.2. In Example 4.12, then, individual number-incorporated signs are specific lexical constructions that give rise to schematic morphological constructions. By virtue of the fact that they describe systematic co-variation in meaning and form across lexical families, these constructions in turn give rise to a schematic construction that describes the relationship between form and meaning in number-incorporated signs as a family.

Example 4.12. Lexical organization of the 'number handshape' family of constructions



Here I have shown then, that number-incorporated signs can be analyzed using the same formalism that we have already developed for initialized signs and other lexical families in ASL. This analysis in turn suggests that families of initialized and number-incorporated signs might enjoy some shared status in the lexicon; it predicts that, by virtue of the fact that they both involve systematic contrasts in handshape, families of number-incorporated and initialized signs might interact with and influence one another. We turn to examine this phenomenon in the next sub-section.

4.4.2 Numeral incorporation and initialization

A group of initialized signs that emerged from an analysis of the database of initialized signs in Chapter 3, but that I have not yet mentioned, form a family based not on their semantics, but on characteristics of the written form of an English word. These signs, FRENCH-FRIES, HARD-OF-HEARING, LANDLORD, and RESTROOM, are all signed with a double-bouncing movement in front of the body. Here there is no obvious metonymic or semantic relationship which links these English words together; instead, these signs form a family based on the fact that the borrowed English words are spelled with a doubled initial letter.

These initialized signs might seem anomalous, because the basis for their lexical family is motivated by an orthographic rather than semantic pattern. However, these signs form a family with another group of signs which also use the double-bouncing movement in front of the body to "double" the character indicated by the handshape. The ASL signs for numbers with two repeated digits, 22, 33, 44, 55, 66, 77, 88, and 99, are also signed with a double-bouncing movement. These double-number-incorporated signs can therefore be analyzed as forming a family that also includes double-letter-incorporating signs in ASL, where the double-bouncing movement co-occurs with a 'doubled character' meaning.

Another, somewhat more complicated example involves a family of signs that actually comprises several sub-families. Before moving on to this example, it is necessary to discuss two additional construction types, in addition to initialization and numeral incorporation. The first group of signs are abbreviation signs. Abbreviation signs are like initialized signs, in that their handshapes also correspond to fingerspelled letters, and that they are also often related to native ASL signs (Padden 1998, Brentari and Padden 2001). In abbreviation signs, however, there is a change in handshape during the articulation of the sign, and both of the handshapes involved correspond to a letter from an English word. These are typically either the first and last letter of a word, as in LINGUISTICS (minimally different from the native sign SENTENCE and the initialized sign LANGUAGE) or the first and medial letter of a word with analyzable internal structure, as in WORKSHOP (minimally different from the native sign GROUP and the initialized sign ASSOCIATION). Additional examples are OPPORTUNITY (minimally different from the native sign ALLOW and the initialized sign PERMIT) and THURSDAY, in which the first two letters of the English word are borrowed, and PROJECT, in which the movement of the medial letter J is incorporated into the form of the sign.

The second group of signs are name signs. Name signs are like initialized signs in that they use an alphabetic handshape to represent an English letter, in this case the first letter of a proper name, though they have been described as typically drawing from a smaller set of possible locations and movements than initialized signs do (Supalla 1990; Padden 1998). A subset of the initialized signs collected in the initialized sign database in Chapter 3 were name signs, for example the signs EUROPE, CHRISTMAS, and CHICAGO.

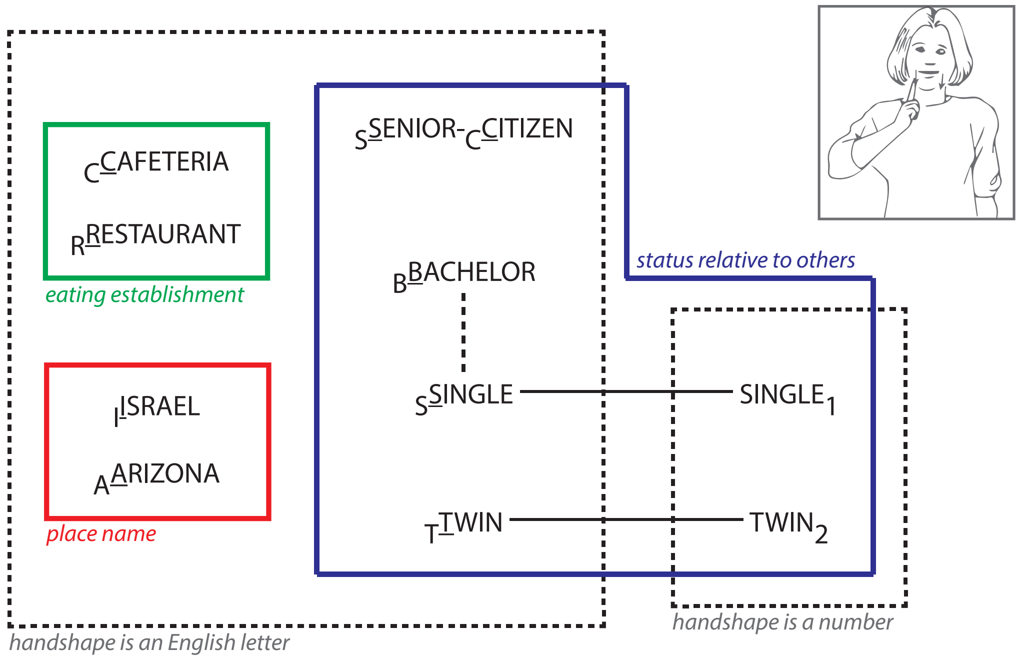
Number-incorporated signs, initialized signs, abbreviation signs, and name signs are considered here to be four separate construction types. However, because they all make systematic use of phonological handshapes to mark morphological contrasts, motivated by paradigms of letters and numbers in ASL, it is perhaps not surprising to find that they overlap such that they can also form a single lexical family. One such lexical family that I identify here includes ten signs: five initialized signs, two number-incorporated signs, two name signs, and an abbreviation sign. All of the signs in this family share a movement pattern, contacting the chin twice, once on either side of the mouth, and all are articulated with handshapes that function either as letters or numbers.

The first two initialized signs, RESTAURANT and CAFETERIA, are a pair of initialized co-hyponyms. They are not semantically related to a phonologically similar native ASL sign that I am aware of, however, these signs denote 'eating establishments', and are perhaps signed at the mouth on analogy to other ASL signs for eating and drinking.

The remaining initialized signs are signs for 'statuses defined in relation to other people': these are the signs SINGLE ('not in a romantic relationship'), TWIN ('one of a pair of siblings'), and BACHELOR/ETTE ('unmarried person'). Similarly, the abbreviation sign S̲ENIOR-C̲ITIZEN ('older than the rest of the population'), and the number-incorporated signs SINGLE, signed with a 1 handshape, and TWIN, signed with a 2 handshape, also denote 'statuses', though, as in English, there is no single hypernym in ASL to concisely describe this family. Finally, the remaining two signs, the name signs I̲SRAEL and A̲RIZONA, are also signed similarly, with a contact on either side of the mouth.

These ten signs, R̲ESTAURANT, C̲AFETERIA, S̲INGLE, B̲ACHELOR, T̲WIN, S̲ENIOR-C̲ITIZEN, SINGLE, TWIN, A̲RIZONA and I̲SRAEL, are all formationally identical, except for the handshapes that are used to articulate each sign. In this group of ten signs, three separate semantic families, comprising 'place name signs', signs for 'eating establishments', and signs for 'statuses defined in relation to other people', come together to form a structured network in the ASL lexicon. This network can be represented as in Example 4.13; here all of the signs are articulated with movement illustrated in the inset sign, the handshapes used for each sign are represented in subscript text, semantically-related signs are grouped together, and synonyms are connected with association lines.

Example 4.13. Overlapping lexical families: SINGLE[3]



The network in Example 4.13 is somewhat exceptional, because so many small families of signs make use of the same movement pattern. However this example is also instructive because it demonstrates that groups of signs can be related in the ASL lexicon, and motivated based on several factors, without being straightforwardly compositional; it is not the movement pattern by itself that contributes a specific meaning to any of these particular signs. Instead, this particular movement pattern comes to be associated with different meanings as a result of how it is employed in different groups of signs.

The implication of this analysis of the 'single' family of signs, then, is that just as actually occurring signs can give rise to partially schematic morphological

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[3] The illustration of the sign SINGLE comes from the ASLHD (Tennant and Brown 2010:135).

constructions which describe the relationship between meaning and form in morphologically related words, and just as schematic constructions can give rise to second-order constructions that describe co-variation between meaning and form across families of signs, so too can second-order constructions reify formational patterns that occur across groups of signs, however without any corresponding meaning. This analysis suggests that in ASL, actually occurring signs can give rise to schematic constructions which specify an element of form without a specific meaning. This has profound consequences for the relationship between morphology and phonology in ASL.

4.4.3 A phonology-morphology continuum[4]

In this section, I flesh out a key implication of the construction-theoretic approach to ASL morphology, that phonological features in ASL can be analyzed as maximally abstract schemas that emerge as generalizations over surface lexical constructions. Under this view, phonological schemas differ from morphological constructions only in that they are completely semantically schematic. However, just as schematic morphological constructions do not exist independently of the specific signs that instantiate them, nor do phonological schemas exist independently of actually occurring words in a language; like morphological patterns, phonological regularities are emergent properties over the lexicon as a structured network.

[4] In writing Section 4.4.3, I have benefited greatly from numerous discussions with Corrine Occhino-Kehoe, after we discovered that we have each been working on this topic independently of the other for quite some time. We intend to explore the issues presented here together in future work.

The view of ASL morphology that I have been developing over the course of the dissertation leads us to analyze lexical families as schematic morphological constructions. Thus, for example, initialized signs like RESPOND and ROLE give rise to a schematic morphological construction in which the R handshape is paired with a schematic meaning along the lines of 'there exists a synonymous R-initial English word'. Similarly, iconic signs like CIGAR and BRAIDS can be seen as instantiations of a schematic morphological construction in which the R handshape is paired with the meaning 'object with a braided appearance'. Here we see that one formal element, the R handshape, corresponds to two functions in two different groups of signs: the R handshape is formed by crossing the middle finger over the index finger, which serves as the iconic basis for its conventional 'braided' meaning, and it is also conventionally associated with the orthographic letter R. Furthermore, these functions are not necessarily mutually exclusive of one another; the sign ROPE can be viewed as an initialized sign, because its English translation starts with an R, and it can be viewed as an iconic sign in which the intertwined fingers on each hand represent a length of braided rope. A relevant question, then, concerns the status of the "R handshape" in the ASL lexicon. In particular, is the "R handshape" to be analyzed as a formal primitive, or an emergent structural pattern? Relatedly, is this functional ambiguity of the sort that the R handshape represents relevant for only a small number of signs of the ASL lexicon, or rather characteristic of the system as a whole?

Following from the preceding discussion of initialized signs and numeral-incorporated signs, here I begin with a discussion of handshapes that serve (at least) three different functions in the ASL lexicon, representing English letters in initialized signs, representing numbers in number-incorporated signs, and profiling visual referents in signs derived through the ASL classifier system. Three such handshapes can be seen in Table 4.1. Note that though handshapes can also have multiple functions within the classifier system (Klima and Bellugi 1979; Supalla 1986; Padden 1988; Emmorey 2003; Benedicto and Brentari 2004), here I consider them all together, in the sense that they serve a broadly iconic function which is fundamentally different from representing letters or numbers.

Table 4.1. Multiple functions for three selected ASL handshapes[5]

	Handshape	Letter	Number	Classifier
a.		VERY VISIT	TWO-WEEKS TWIN	SEE STAND
b.		FAMILY FEDERAL	NINE-DOLLARS NINE-O'CLOCK	COINS VOTE(DH)
c.		OFFICE OPINION	NONE ZERO-BALANCE	VOTE(NDH) OWL

I have been referring to the handshape in Table 4.1a as either the V handshape or the 2 handshape, depending on the construction it appears in, but both names refer to a single handshape that is formed by extending and separating the index and middle finger. This handshape represents the letter V in fingerspelling and in initialized signs like VERY, it represents the number two in the ASL number system and in number-incorporated signs like TWIN, and in iconic signs derived from the ASL classifier system, it often represents paired entities, such as human legs in the sign STAND. Similarly, I have been referring to the handshape in Table 4.1b as the F handshape

[5] The handshape font in this and the following table comes from http://www.cuhk.edu.hk/lin/Faculty_gladystang/handshape2002-dec.TTF.

when referring to fingerspelled words or initialized signs like FAMILY, as the 9 handshape when referring to numbers or number-incorporated signs like NINE-DOLLARS, and it also often represents small round objects in the ASL classifier system, as in the sign COINS. Finally, the handshape in Table 4.1c functions as the letter O in sings like OFFICE, as the number 0 in signs like NONE, and it often represents large round objects in signs like OWL, where the hands represent the large eyes of an owl.

The handshapes in Table 4.1 can therefore be seen as serving multiple functions in the ASL lexicon, and these functions emerge as constructions abstracted over actually occurring signs. Other ASL handshapes also have multiple numeric, alphabetic, and classificatory functions, however, like the R handshape, they appear to be used in only a few domains. Examples of these handshapes can be seen in Table 4.2:

Table 4.2. Fewer functions for another three ASL handshapes

Handshape	Letter	Number	Classifier
a. 	WATER WEST	SIX-MONTHS SIX-YEARS-OLD	
b. 	ILLUSTRATE IDEA		THIN LINE
c. 		THREE-DAYS THIRD-PLACE	GARAGE PARKING-LOT

The handshape in Table 4.2a functions as a fingerspelled W in signs like WATER, and as the number 6 in signs like SIX-YEARS-OLD, however it does not, as far as I am aware, function as an iconic classifier in ASL. Similarly, the handshape in Table 4.2b functions as a fingerspelled I in signs like IDEA, and as a classifier for thin objects, as in the sign LINE, but it is not a number in the ASL number system. Finally, the handshape in Table 4.2c functions as the number 3 in signs like THREE-DAYS, and as a vehicle classifier in signs like GARAGE, but it does not represent a fingerspelled letter in ASL.

Finally, there are also handshapes which appear to be used in only one domain, and do not appear in others. Some examples include the N handshape, which is only used in N-initialized signs like NORTH and NEGOTIATE, the 7 handshape, which is only used in 7-incorporated signs like SEVEN-YEARS-OLD and SEVEN-O'CLOCK, and the "horns" handshape, which represents, e.g., 'close-set rows of protruding objects' in iconic signs derived from the classifier system, like TENT and HIPPO, but does not represent a letter or a number in ASL.

ASL handshapes therefore instantiate morphological constructions in a range of form-meaning mapping configurations. Some handshapes, like N, have very limited functionality in the ASL lexicon, with an almost exclusively one-to-one mapping of meaning to form. Other handshapes, like F, are very versatile, and play a variety of roles in the ASL lexicon, with a many-to-one mapping of meaning to form. Assuming a more traditionally structuralist view of word-internal structure, we might view those handshapes which always co-occur with a particular meaning as serving a more "morphological" role, and implicated more directly in the meaning of a particular word, while the handshapes which appear in a variety of contexts serve a more "phonological" role, as elements of form that are not as intimately tied to particular meanings.

However, under the construction-theoretic view, morphology and phonology are not distinct, complementary kinds of word-internal structure. Instead, phonology and morphology can be mapped onto ends of a continuum. Some small families of signs may give rise to constructions which closely associate form and meaning, and other, larger, second-order families of constructions may describe signs that have aspects of their form in common even if they do not share an identifiable aspect of meaning. This view casts phonological elements in ASL, including locations and movement patterns, in addition to handshape, as emergent schemas that can be extrapolated over large groups of existing ASL signs.

The discussion up until this point has been focused on a synchronic characterization of sub-lexical patterns in the ASL lexicon. However, I propose that this view of the lexicon as made up of pockets of signs that are related in form and meaning, also explains the rise of the process of initialization in ASL in the first place. Consider the following thought experiment concerning the sign GROUP. The ASL sign GROUP is a two-handed sign, articulated with matching C handshapes, and traces out an imagined space occupied by a group of people. This sign most likely originated in ASL as an iconic sign which delimits the space occupied by a group, using a handshape that represents long, broad, and curved barriers. With frequent use, this sign became a lexicalized classifier sign with a conventional meaning, 'group'. However, this sign is also used in ASL for *class*, because a class can be straightforwardly conceived of as a 'group of students'. Fortuitously, the same handshape that denotes long, broad, curved barriers in the classifier system is also used in the fingerspelling system to represent the letter C; though CLASS need not have been coined as an initialized sign, it is readily interpretable as one. Reanalyzing CLASS as the initialized sign CLASS then opened this sign up to further derivation, with other handshapes corresponding to letters, A for ASSOCIATION, D for DEPARTMENT, F for FAMILY, and so on. I doubt very highly that this is the exact etymological explanation for each of these particular signs, or for the process of initialization itself; as mentioned in Chapter 3, initialized signs in French Sign Language predate ASL, and many initialized signs are common lexical items, so it is likely that even from the very beginning of ASL, there were already initialized signs present in the language. However, this account is meant instead to illustrate how initialized signs can be understood as being potentiated by the multiple ways that handshapes are used in ASL; initialized signs exist because, at some level, they are made available by handshapes that are used both in the lexical sign system and the fingerspelling system. Accordingly, the process of initialization is facilitated, as well as constrained, by the emergent properties of the fingerspelling system and the lexical sign system in ASL, recombining these elements to create new signs.

This view of sub-lexical structure as emergent in ASL also holds further implications for theories of first- and second-language acquisition, and in particular for theories of (sign) language emergence, which I will touch on only briefly here. Sign language linguistics is currently in a stimulating period in which it is possible to observe sign languages that have emerged naturally and spontaneously in previously-isolated communities with high incidence of deafness (e.g., Kegl, Senghas, and Coppola 1999; Meir, Sandler, Padden, and Aronoff 2010; Kastner, Meir, Sandler, Dachkovsky 2014). Sandler, Aronoff, Meir, and Padden (2011) have argued that one such new sign language, Al-Sayyid Bedouin Sign Language, has conventional lexical items but has not yet developed a level of phonological patterning comparable what is observed in more established languages. This descriptive fact can be construed quite directly through the construction-theoretic view of the ASL lexicon that I have developed here, which argues that what we are used to calling "phonological" patterns are schematic representations that have been abstracted over groups of whole words; this view necessarily requires a suitably-sized vocabulary of conventional signs to abstract over first, before any level of structure resembling "phonology" can emerge (see also Aronoff 2007). This leads to the prediction that ABSL and other new sign languages will begin with whole words first, then abstract away morphological constructions over those whole words, and eventually develop phonological schemas as abstractions over morphological constructions.

4.5 Conclusion

In this chapter, I have developed a construction-theoretic analysis of the ASL lexicon, focusing primarily on initialized and number-incorporated signs in ASL, though we have also examined a range of other lexical family types. I have shown that lexical families are systematic correspondences between form and meaning in ASL. Moreover, I have shown that lexical families in ASL have posed a challenge for previous morpheme-based analyses of ASL morphology precisely because lexical families are inherently word-based phenomena.

Looking at the ASL lexicon as a highly-structured network of whole words, and looking at lexical families as abstract morphological constructions that are abstracted over whole words, we have seen that morphological regularities in ASL can indeed be analyzed as constructions. An additional discovery that follows from this change in perspective is that thinking about the ASL lexicon from a construction-theoretic point of view also leads us to discover that phonology and morphology in ASL are two sides of the same coin; rather than representing inherently different levels of linguistic structure, phonology and morphology in ASL represent ends of a continuum between pairings of meaning and form that are more specific, and those that are more schematic. These abstract constructions are in turn viewed as emergent generalizations over the surface words of any given language.

In the next chapter, I examine lexical blends in English and in ASL through the construction-theoretic perspective developed here. I demonstrate that lexical blends in English not only result from a quite schematic blending construction in English, comparable to the compounding construction in Chapter 2, but that repeated lexical blending in English can also give rise to new morphological constructions. An outcome of this is that new affixes can emerge quite rapidly in English, as a result of blending. Conversely, yet consistent with the view of the ASL lexicon that I have developed in this chapter, we will see that lexical blending in ASL does not create new lexical patterns so much as take advantage of existing ones. Like initialized signs, blends in ASL reconfigure existing signs so as to keep the sign recognizable as it moves to join another lexical family.

CHAPTER 5

LEXICAL BLENDS AND LEXICAL PATTERNS IN ENGLISH AND IN ASL

5.1 Introduction

In the preceding chapters, I have examined the details of a construction-theoretic approach to morphology over a variety of complex word types in English and in ASL. In this final chapter, I show that this same construction-theoretic toolkit can be extended to account for a class of morphological phenomena that has typically fallen outside of the purview of theories of morphology that assume strict compositionality in structurally complex words (cf. Newmeyer 1992:758; Marantz 2013:912).

Lexical blends are words that are formed by combining phonological sub-constituents from two existing words, but cannot be decomposed into independently meaningful parts; two examples from English are *brunch* and *sexposition*, which are made from the words *breakfast* + *lunch* and *sex* + *exposition*, respectively. Similarly, lexical blends in ASL combine parts of two signs, like MORPHOLOGY[1] (from WORD + MEANING) and TACTILE-PERCEPTION (from EAVESDROP + HAND). As we will see, because they are formed from parts of existing whole words, lexical blends provide support for the abstractive view of morphology that we have been developing.

Blending can be construed as an analogical word-formation process in English and ASL, however, it differs between the two languages. In English, parts of existing

[1] As with many English lexical blends, these ASL lexical blends are not conventional signs; they are pictured in the ASL glossary at the end of the dissertation.

words can develop new or specialized meanings as a result of the blending process, while in ASL, blend signs draw on existing lexical patterns, rather than creating them; many lexical blends in ASL draw upon well-established, conventionalized families of signs in the ASL lexicon. As a result, blend signs in ASL most often change a feature of an existing sign on analogy to an existing lexical family, rather than incorporating aspects of a single identifiable source sign.

The lexical blends discussed in this chapter come from three main sources: previous studies of lexical blending, the Corpus of Contemporary American English (COCA; Davies 2008), and a database of lexical blends in ASL and English that I have been maintaining since 2010. Unless otherwise indicated, the words and signs that I describe here were opportunistically collected from personal conversations, from television programs, from videos posted to the internet, and from various forms of print media.

A good number of these words and signs will be new to many English speakers and ASL signers. Though individual lexical blends can emerge then disappear without becoming established, as novel words, they can be analyzed as licensed by abstract lexical blending constructions that are productive and active in the formation of novel words in English and in ASL. Such novel words prove indispensible for the analysis of morphological productivity.

The structure of this chapter is as follows: I begin in Section 5.2 with a brief overview of previous approaches to lexical blending. Previous studies of lexical blends have been primarily classificatory or phonologically-oriented; though lexical blends hold several important consequences for morphological theory, most have not yet been explicitly spelled out in previous accounts of lexical blending. In Section 5.3, accordingly, I develop a construction-theoretic analysis of lexical blends in English, focusing on the role that lexical families play in English blend-formation. In Section 5.4, we turn to ASL blends; given the prevalence of lexical families in ASL morphology, studying lexical blending provides an opportunity to develop further the analysis of lexical families from Chapter 4. Section 5.5 concludes by underscoring the value of comparing English and ASL for the development of morphological theory.

5.2 Previous linguistic studies of lexical blends

5.2.1 Classificatory approaches

Much of the previous linguistic research on lexical blending has sought to establish a classificatory system for lexical blends (e.g. Pound 1914; Algeo 1977; Cannon 1986; Kelly 1998; López-Rúa 2004; Ronneberger-Sibold 2006; and Renner, Maniez, and Arnaud 2012). For example, one taxonomy introduced by Algeo (1977), divides blends into two groups based on whether the relationship between the two identifiable source words in a blend is syntagmatic or paradigmatic: in *telescope blends*, the two source words are linearized in a modifier-head relationship, resembling classificatory compounds: *motel* is a combination of the words *motor* + *hotel*, and a *motel* is a kind of 'hotel designed for motorists'; similarly, *jazzercise* is a combination of the words *jazz* + *exercise*, and *jazzercise* is a kind of 'exercise set to jazz music'. In *portmanteau blends*, in contrast, the two source words are semantically rather than syntactically related: *smog* is a combination of the words *smoke* + *fog*, and, while it describes a substance which has 'smoke'-like and 'fog'-like qualities, 'smog' is neither a 'kind of smoke' nor a 'kind of fog'; similarly, *spork* is a combination of the words *spoon* + *fork*, and while it combines characteristics of a 'spoon' and a 'fork', a 'spork' is neither a 'spoon' nor a 'fork'.

Early work focused almost exclusively on lexical blends in English, but in recent years, lexical blends have been described in variety of languages, including French (Fradin, Montermini, and Plénat 2009), German (Ronneberger-Sibold 2006), Greek (Ralli and Xydopoulos 2012), Hebrew (Bat-El 1996), Mandarin (Ronneberger-Sibold 2012; Francesco Arcodia and Montermini 2012), and Russian (Francesco Arcodia and Montermini 2012). In delimiting lexical blending cross-linguistically, these and other studies have sought to distinguish words that are created by combining two words from words that are formed by other, related word-formation processes.

Determining where lexical blending ends and other word-formation processes begin can be a fraught issue, however; Bauer (1983:26) notes that lexical blending often "shades off" into the related word-formation processes of compounding, affixation, and truncation, presenting challenges for theories of word-formation that conceptualize of compounding and derivation as fundamentally different word-formation processes (cf. Beard 1998; Stekauer 2005).

Nevertheless, many studies of lexical blending assume, either implicitly or explicitly, a four-way distinction between words that are created through the combination of two full words (compounds); words that are created through the combination of two words, at least one of which is phonologically shortened (blends); recurring blend-formation elements that are considered non-morphemic ("splinters"); and recurring word-formation elements that are considered morphemic (affixes) (e.g., Bauer 2004; Fandrych 2008; Bauer, Lieber, Plag 2013). As an example of this four-way distinction, consider the following words in Example 5.1, which all are formed from the English word *friend*:

Example 5.1. A spectrum of word-formation processes

Compounding	Blending	Splinter-formation	Affixation
boyfriend	*friendsbians* (*friend* + *lesbians*)	*friendaholic* (*friend* + 'addict')	*friendly*
imaginary friend	*frenemy* (*friend* + *enemy*)	*friendscape* (*friend* + 'view')	*friendship*

Splinters, following a recent formulation by Bauer, Lieber, and Plag (2013:525), are "(mostly) non-morphemic portions of a word that have been split off and used in the formation of new words with a specific new meaning". Though many studies have noted the existence of splinters (see Cannon 1986; Bauer 1998; Lehrer 1998, 2007), exactly how independent individual splinters are from their source words, and how this independence is to be theoretically codified, remain open questions. Fradin, for example, views blends and splinters as different kinds of morphology, stating that words that participate in a lexical family, e.g. types of 'software' like *fontware*, *freeware*, *groupware*, *shareware*, and *vaporware* "cannot be blends because they constitute a series and blends are antithetic to series" (2013:20). Fradin adopts the position that words in a lexical family cannot be blends, because blends are inherently individual creations. Bauer, Lieber, and Plag (2013, chapter 23) argue that splinter-formations cannot be convincingly analyzed as either blends or as compounds, because blends typically involve more truncation than is typically observed in splinter-formations, while compounds, in contrast, typically involve no truncation at all. I turn to the topic of truncation in lexical blending shortly, in Section 5.2.2.

In practice, however, the question of whether a given word, or indeed, a given family of words, is a blend or a splinter-formation, is difficult to answer empirically (see also the discussion of schematic and analogical types of compounding in Chapter 2). As an example, consider the following words in Example 5.2; have these words been individually coined as blends of a name of a given language (or region) and *English*, or have they all been coined though the use of the splinter *–nglish*, which has a specific 'English language hybrid' meaning?:

Example 5.2. Lexical blends which designate English language hybrids

a.	*Denglish*	(*Deutsch/German*)	d.	*Konglish*	(*Korean*)
b.	*Frenglish*	(*French*)	e.	*Singlish*	(*Singapore*)
c.	*Hinglish*	(*Hindi*)	f.	*Spanglish*	(*Spanish*)

Recall from Chapter 2 that Booij (2010) informally describes elements which have split off from existing compounds and are active in the formation of new words as *affixoids*. However, Booij argues, as I do in Chapter 2, that the descriptive label *affixoid* does not actually represent a class distinct from compounding in construction morphology. Instead, compounds and affixoids are handled similarly in a construction-theoretic analysis, differing only to the degree to which the relevant morphological construction is schematic. In Section 5.3, I will show that this analysis applies to blends and splinters, as well. Just as affixoids are constructions that emerge from families of compounds, splinters are constructions that emerge from families of lexical blends.

5.2.2 Phonological approaches

Given that lexical blends are necessarily identified by how they combine parts of words to create a new word, another line of lexical blend research has sought to answer a different question about the process of lexical blending: what phonological elements are deleted in the formation of a blend from two source words? In contrast to early accounts which view lexical blending as largely unpredictable (e.g., Marchand 1969; Bauer 1983; Cannon 1986), recent work has demonstrated that blend structure is indeed predictable, once the right factors are taken into account (e.g., Kubozono 1990; Bat-El 1996; Gries 2004). While the earlier descriptions of blend structure focused on primarily on segmental content, for example characterizing a blend like *hacktivist* in terms of which segments that are deleted from each of its source words (i.e., *hack~~er~~* + *~~ac~~tivist*), the more recent work has instead focused on the retention of overall prosodic structure from the two source words; *hacktivist* is analyzed as preserving the prosodic structure of *hacker*, which has a stressed-unstressed syllable pattern, and of *activist*, which has a stressed-unstressed-unstressed syllable pattern. In *hacktivist*, both prosodic patterns are maintained by incorporating the shorter word into the longer one, merging the source words at the site of the overlap between them, the stressed syllable /ˈæk/. Additional examples fitting this pattern can be seen in Example 5.3:

Example 5.3. Typical lexical blends in English

a.	*web*	+	*seminar*	=	*webinar*
b.	*sex*	+	*exploitation*	=	*sexploitation*
c.	*fun*	+	*unemployed*	=	*funemployed*
d.	*glasses*	+	*asshole*	=	*glasshole*
e.	*adjoin*	+	*coinage*	=	*adjoinage*
f.	*drunk*	+	*munchies*	=	*drunchies*

Gries (2012) and Arndt-Lappe and Plag (2013) have demonstrated that lexical blends are typically structured according to two factors: similarity and recognizability. Drawing on the results of statistical analyses of a corpus of attested English blends (Gries 2012) and an English blend production experiment (Arndt-Lappe and Plag 2013), the authors find that the source words in a blend are often structurally similar to one another, and that the resulting blend is structured to facilitate recognition of the source words within the blend. For Gries and for Arndt-Lappe and Plag, similarity and recognizability are primarily prosodic notions, a function of the overall length and stress patterns of the source words, in addition to their segmental content. Accordingly, in many blends, the first source word is often shorter, but minimally retains its onset, while the second source word is longer, and retains its overall stress pattern. This prosodic characterization of lexical blending as incorporating aspects of one word into another in order to maximize source word recognizability in the resulting blend is not only relevant for the formation of blends in English, but also for families of splinter-formations in English, in Section 5.3, and for blends in ASL, as well, as we will see in Section 5.4.

5.3 Lexical blends in English

5.3.1 A constructional template for lexical blends

Following from previous descriptions of lexical blends in Section 5.2, I analyze lexical blends as instantiations of an abstract blending construction in English. In the view of morphology that I have been developing, schematic morphological constructions, as abstractions over conventional pairings of form and meaning, are formal representations of recurring configurations of elements. An advantage of the abstractive approach to morphological structure is its implicit recognition that configurations of certain recurring parts, rather than the parts themselves, can serve to distinguish morphological patterns.

"Reduplicative compounds" in English are one example of a construction in which it is the configuration of certain pieces, rather than the meanings of the pieces themselves, that constitutes a morphological pattern (Ghomeshi, Jackendoff, Rosen, and Russell 2004; cf. Bauer, Lieber, and Plag 2013; Booij and Masini 2015): Reduplicative compounds combine two identical constituents, as in the examples *salad-salad* or *actor-actor*. However, the meanings of these reduplicative compounds are more than the sum of the meanings of their parts; a *salad-salad* is not a pair of salads, or a salad made from other salads, either of which might be realistically expected from a compound that uses the word *salad* twice. The compound instead has a constructional meaning that can be analyzed as licensed by a productive reduplicative compounding construction: a *salad-salad* is a prototypical green salad, rather than say, a potato salad or a fruit salad, and similarly, an *actor-actor* is a prototypical actor, someone who is actually employed as an actor in films, rather than as just an extra in television programs or commercials. The specific configuration of two identical elements in a compound marks a constructional pattern with a specialized conventional meaning in English, in this case, a 'prototypical' example of the repeated constituent.

Lexical blending is another example of a construction in which it is the configuration of two elements that marks a morphological pattern. Following Bauer (2012), in Example 5.4 I have schematized lexical blending by representing any given blend's phonological and semantic content as a composite of two variables: a blend like *brunch*, from *breakfast* + *lunch* = *brunch,* can be analyzed as fitting the formal template *ab* + *cd* = *ad*, in which each word is represented as the combination of two formal variables.

Example 5.4. A schematic lexical blending construction

$$\begin{bmatrix} [\mathit{ad}] \\ \text{'AD; AB and CD'} \end{bmatrix}$$

This blending construction describes the morphological structure of the actually-occurring blends *brunch* and *smog*, which, as conventional blends, are also analyzed as specific lexical constructions, as in Example 5.5:

Example 5.5. Two lexical blend constructions: (a) *brunch* and (b) *smog*

a.

[*brunch*]$_{N}$
'brunch; a late morning meal eaten
instead of breakfast and lunch'

b.

[*smog*]$_{N}$
'smog; smoke combined with fog
or other pollutants'

The schematic construction in Example 5.4 can also be employed to describe the relationship between form and meaning in many other English blends. Consider the following blends in Example 5.6, which can be grouped together as denoting different kinds of *hybrids*, a term I use here to denote single entities made from a combination of two other entities:

Example 5.6. Hybrid words for hybrid concepts

a. **biological hybrids**	b. **hybrid concepts**	c. **pairs of people**
grapple (*grape*+*apple*)	*cronut* (*croissant*+*donut*)	*Bennifer* (*Ben*+*Jennifer*)
liger (*lion*+*tiger*)	*brunch* (*breakfast*+*lunch*)	*Billary* (*Bill*+*Hillary*)
pluot (*plum*+*apricot*)	*smog* (*smoke*+*fog*)	*Kimye* (*Kim*+*Kanye*)
zorse (*zebra*+*horse*)	*spork* (*spoon*+*fork*)	*Robsten* (*Robert*+*Kristen*)
wholfin (*whale*+*dolphin*)	*ginormous* (*giant*+*enormous*)	*Brangelina* (*Brad*+*Angelina*)

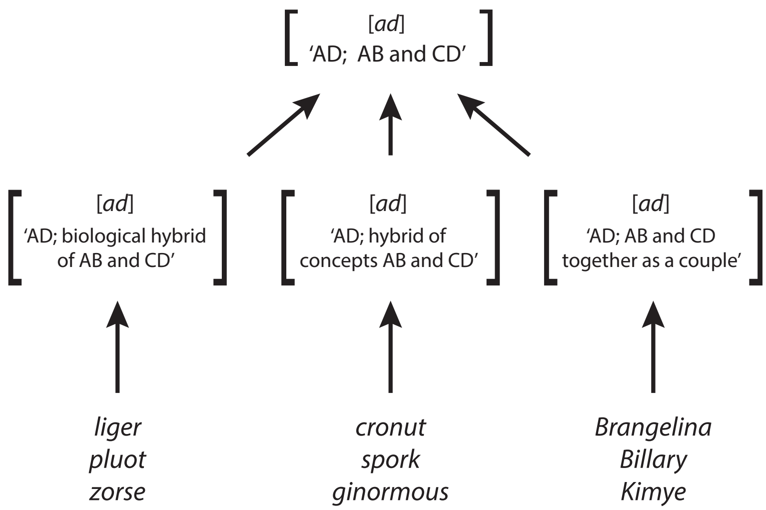
The words in Example 5.6a are examples of biological hybrids, where two different plants or animals provide genetic material that leads to the creation of a new plant or animal. A bit more abstractly, the words in Example 5.6b represent hybrid concepts: a *cronut* is a pastry made from *croissant* dough, but shaped and fried like a *donut*. The blend *cronut* thus combines the words *croissant* and *donut* in much the same way that the referent object 'cronut' is a combination of the objects 'croissant' and 'donut'.

Finally, the names in Example 5.6c can be seen as units that are created through the combination of two people; in these "couples" names, the names for two people in a romantic relationship are blended to denote the name of the couple as a unit, as in *Billary*, a nickname for Bill and Hillary Clinton together as a power couple.

In each of the words in Example 5.6, the structural relationship between the two source words in the blend is iconically motivated: a concept which can be construed as a combination of two other concepts is named with a word that can be similarly analyzed as a combination of two other words. In contrast to the image-based or *imagistic* iconicity that is sometimes discussed in relation to word-formation, the iconicity that motivates naming blended concepts with blended words can be considered *diagrammatic* (Pierce 1974; Haiman 1985; Ungerer 1999): the relationship between the component parts of a given concept motivates the relationship between the component parts of the word(s) used to name it.

I have identified three 'hybrid' sub-patterns in Example 5.6, and these patterns are instantiations of the more abstract, second-order blending construction from Example 5.4. The relationships between these constructions can be represented in Example 5.7:

Example 5.7. Iconic constructional templates for naming 'hybrids' with blends in English



In contrast to iconically-motivated portmanteau blends, telescope blends like *motel* are examples where the source words of the blend are in a compound-like modifier-head relationship. The blend form is primarily motivated by phonological overlap across word boundaries, as discussed in Section 5.2.2. To account for these different patterns, we can posit an abstract blending construction which specifies nothing about the meaning of individual blends, but which licenses the reconfiguration of existing words to create a new lexical construction. This semantically schematic construction specifies a formational relationship among related words, and moreover is instantiated by the various semantic sub-patterns observed among lexical blends that we have observed thus far, and by individual blends that may not match any specific semantic pattern.

Example 5.8. A semantically schematic lexical blending construction

[[*ab*] ‘AB’]	↔	[[*ad*]]	↔	[[*cd*] ‘CD’]
baby	↔	*babyators*	↔	*aviators*
glam(orous)	↔	*glamping*	↔	*camping*
share	↔	*sharrows*	↔	*arrows*
web	↔	*webinar*	↔	*seminar*
feminist	↔	*feminazi*	↔	*nazi*
back	↔	*bacne*	↔	*acne*

Under this view, a blend like *sharrows* 'share arrows; the arrows that designate lanes of traffic that are to be shared by cars and bikes' results from a process of haplology (Stemberger 1981) motivated by the partially overlapping syllables in the potential compound *share arrows*. Though its form is licensed by an abstract construction, the meaning of *sharrows* is not determined by the configuration of the elements in the construction, but, like other compounds, must either be decoded based on a likely interpretation of its parts or otherwise extracted from context (cf. Chapter 2).

One of the more intriguing and visible consequences of lexical blending for English morphology is that repeated blending sometimes leads to the creation of new derivational patterns. I turn next to the constructional relationship between these emergent splinters and lexical blends.

5.3.2 Variation in splinter-formations

Splinters, which I briefly discussed in Section 5.2.1, are word-formation patterns that emerge when the relationship between an institutionalized lexical blend and its source word comes to serve as the analogical basis for the further formation of other blends. In Example 5.9, I have listed examples of words containing established and novel splinters, together with their original source words.

Example 5.9. Families of lexical blends in English

a.	***delicious***	b.	***alcoholic***	c.	***hamburger***
	bubblicious		*workaholic*		*cheeseburger*
	snugglicious		*shopaholic*		*thickburger*
	bootylicious		*chocoholic*		*soyburger*
	pinkalicious		*foodaholic*		*veggieburger*
d.	***Benghazi***	e.	***explaining***	f.	***inception***
	ballghazi		*mansplaining*		*vacationception*
	bridgeghazi		*whitesplaining*		*listception*
	chipotleghazi		*straightsplaining*		*storyception*
	Lupeghazi		*cissplaining*		*foodception*

The splinters in Example 5.9a-c are quite conventional; these words are taken from COCA and the splinters here will likely be familiar to many English speakers. In contrast, the more novel splinters in Example 5.9d-f are quite recent and idiosyncratic; they are conventional only in particular contexts and they are not yet attested in COCA, though they are findable through a Google search, as in Example 5.10:

Example 5.10. New "splinters" in context

a. *–ghazi* 'scandal'

"with the ongoing **Ballghazi** investigation and Brad Johnson's admitting to bribery, I'm hoping the NFL will investigate other scandals and/or conspiracy theories"

(http://deadspin.com/the-ballghazi-takes-are-here-and-they-are-fucking-insa-1680877948)

b. *–splaining* 'patronizing explanation'

"A junior colleague in another department, who is both black and of Caribbean origins, likes to **mansplain** to me about how I *must* wear a suit or I will not be taken seriously. I am thus in the bizarre position of **whitesplaining** to him that I, indeed, as a rich white lady, can get away with being tweedy and disheveled because students will accept that from me as an expected full professor costume."

(http://whatever.scalzi.com/2013/10/30/why-i-wear-what-i-do/)

c. *–ception* 'recursive X'

"Adapted from David Mitchell's novel of the same name, *Cloud Atlas* is a **story-ception**; a post apocalyptic campfire story about a guy watching a movie in which someone reads a novel whose main character follows a series of letters."

(http://suu.media.clients.ellingtoncms.com/news/documents/2012/09/10/10_Sept_12.pdf)

Bauer, Lieber, and Plag (2013:526-528) identify several splinters in English, noting that "the degree of similarity to the model word may not be uniform across formations, as can be seen with *retailtainment* versus *shop-o-tainment*, or *eggitarian* versus *fruitarian*" (2013:529). In other words, though it is often possible to identify a recurring segmental string as a splinter, as in Example 5.11, attested splinter-formations display considerable formal variation, as well.

Example 5.11. Splinters identified by Bauer, Lieber, and Plag (2013)

–ati 'elite group'	*–tarian* 'one who eats X'	*–scape* 'view or scene'
–bot 'robot'	*–licious* 'appealingly X'	*–stan* 'country'
–burger 'patty served on a bun'	*–matic* 'automatic device'	*–tainment* 'entertainment'
–delic 'wild, mind-altering'	*–o* 'language error'	*–tronic* 'electronic'
–holic 'X addict'	*–orama* 'sizable display'	*–ware* 'software'
–illion 'large number'	*–rific* 'extremely X'	*–zilla* 'overbearing X'

Here I examine a subset of these splinters in order to determine the role that a splinter's source word plays in constraining the variation that is seen across families of splinter-formations. As an example of variation among splinter-formations, consider the following blends in Example 5.12, taken from COCA.

Example 5.12. Results from a COCA search for "*licious"

[ə]licious		**licious**		**icious**
cheetalicious	*springalicious*	*jewlicious*	*tacolicious*	*bagelicious*
momalicious	*yummalicious*	*silverlicious*	*divalicious*	*bubblicious*
barfalicious	*boobalicious*	*bootylicious*	*homolicious*	*rebelicious*
bookalicious	*curvalicious*	*rubylicious*	*discolicious*	*fabulicious*
starchilicious	*pinkalicious*	*cougarlicious*	*shinylicious*	*snugglicious*
thugalicious	*lowcarbolicious*	*treelicious*	*sillylicious*	*jekyllicious*
babelicious	*pigalicious*	*hydralicious*	*bodylicious*	
tintalicious	*hunkalicious*	*sweetielicious*	*jerseylicious*	
weavealicious	*blackalicious*	*turkeylicious*	*skinnylicious*	

Abstracting away from orthographic variation in these examples, we can divide the forms in Example 5.12 into three categories according to the shape of the splinter in relation to the base. There is a three-way division between forms whose splinter begins with an unstressed vowel (–[ə]*licious*), forms whose splinter lacks the initial vowel (–*licious*), and forms whose splinter additionally lacks the initial /l/, (–*icious*). Not all splinters, for example (–)*burger*, –*scape*, or –*zilla*, appear in three variant forms. However, this pattern is found across several splinters; a similar three-way contrast can be seen with the comparatively less well-attested splinter –*orama*, as in Example 5.13:

Example 5.13. Results from a COCA search for "*rama"

[ə]rama	**rama**	**ama**
crashorama	*dramarama*	*gatorama*
freakorama	*envirorama*	*glamorama*
votearama	*cyclorama*	*burgerama*
teaseorama	*bananarama*	*wonderama*
junkorama	*cinerama*	*futurama*
mothorama		*investorama*
bowlarama		

Though many analyses of blend structure focus on segmental structure, prosodic structure often best explains what is retained in the formation of a given lexical blend (cf. Arndt-Lappe and Plag 2013). This turns out to be the case for splinter-formations, as well: syllabic stress and haplology can together account for most of the variation in Example 5.12 and Example 5.13: *bubble*, *bagel*, and *rebel* all end in a syllabic [l], and with these bases, *–licious* undergoes haplology to appear only as *–icious*. Similarly, *glamor*, *burger*, and *investor* all end with the unstressed syllable [ər], and with these bases, *–orama* undergoes haplology, appearing as *–ama*.

These haplology-driven examples are in turn a subset of a larger pattern conditioned by syllabic stress[2]. Consider the data in Example 5.14: here are several splinter-formations from COCA, sorted by splinter, and separated according to whether the base the splinter has attached to ends in a stressed or an unstressed syllable.

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[2] In this discussion of syllabic stress, I have relied on my own intuitions as an English speaker, as well as various metrical stress resources available online, e.g., http://www.merriam-webster.com/ and http://www.ashley-bovan.co.uk/words/feet.html.

Example 5.14. Prosodic analysis of splinters (taken from COCA, orthography has been standardized)

splinter		base ends in: ˈσ (stressed)		σ (unstressed)	
a.	*pedia	joke-lopedia plant-lopedia web-opedia	explore-opedia insect-lopedia suggest-opedia	ballot-pedia congress-pedia dino-pedia	hero-pedia info-pedia
b.	*rific	ball-erific cheese-erific slowjam-erific		cursor-ific moisture-ific promo-rific	splatter-ific twitter-ific
c.	*rati	jazz-erati		digi-rati glitter-ati	techno-rati designer-ati
d.	*delic	folk-edelic funk-edelic	shag-edelic slum-edelic	echo-delic sample-delic	
e.	*matic	bass-omatic chop-omatic	vote-omatic veg-omatic	hydra-matic insta-matic	strato-matic

Though several of these splinter-formations also involve truncation of the base, overwhelmingly, for splinters that alternate between a "longer" form like *–erific* and a "shorter" form like *–ific*, the longer variant appears after a stressed syllable, and the shorter variant appears after an unstressed syllable.

Recall that not all splinters alternate between longer and shorter forms. Unlike the splinters in Example 5.14, regardless of whether they attach to bases that end in a stressed or unstressed syllable, the splinters in Example 5.15 appear in only one form:

Example 5.15. Prosodic analysis of additional splinters (taken from COCA, orthography has been standardized)

splinter	base ends in: ˈσ (stressed)		σ (unstressed)	
a. *oholic	fruit-oholic growth-oholic rage-oholic	sex-oholic event-oholic work-oholic	family-oholic gamble-oholic choco-holic	
b. *scape	dream-scape farm-scape green-scape	moon-scape plant-scape sea-scape	table-scape media-scape winter-scape	desert-scape mountain-scape aroma-scape
c. *zilla	groom-zilla bride-zilla chub-zilla	dog-zilla mom-zilla shop-zilla	error-zilla baby-zilla	
d. *ware	brain-ware course-ware free-ware	shape-ware share-ware spy-ware	capture-ware ransom-ware shovel-ware	study-ware alien-ware compu-ware
e. *burger	beef-burger cheese-burger fat-burger	soy-burger swine-burger thick-burger	garden-burger naked-burger tofu-burger	carno-burger veggie-burger

In identifying the source of this variation across splinters, we must consider not only the prosodic characteristics of the base a given splinter has attached to, but also characteristics of the source word the splinter has been derived from: the splinters in Example 5.14 have in common that they are derived from source words with a particular stress pattern. We can identify the relevant prosodic pattern by comparing the splinters with their source words, as in Example 5.16. Here, I have broken the orthographic forms of the source words into syllables, marked with periods, and marked their primarily (ˈσ) and secondarily (ˌσ) stressed syllables:

Example 5.16. Comparing splinters with their source words

	splinter	source word
a.	ˈli.cious	de.ˈ**li.cious**
b.	ˈra.ma	ˌpa.no.ˈ**ra.ma**
c.	ˈpe.di.a	en.ˌcy.clo.ˈ**pe.di.a**
d.	ˈri.fic	te.ˈ**rri.fic**
e.	ˈra.ti	ˌli.te.ˈ**ra.ti**
f.	ˈde.lic	ˌpsy.che.ˈ**de.lic**
g.	ˈma.tic	ˌau.to.ˈ**ma.tic**

The splinters in Example 5.16 all start with a stressed syllable that corresponds to the primarily stressed syllable of the source word they are derived from, and retain all phonological material to the right of that syllable. These splinters also follow an unstressed syllable in their source words. In contrast, while the splinters in Example 5.17 also retain all segmental information to the right of a stressed syllable, they follow another stressed syllable in their corresponding source words:

Example 5.17. Comparing additional splinters with their source words

	splinter	source word
a.	*oholic	ˌal.**co.ˈho.lic**
b.	*scape	ˈland.ˈ**scape**
c.	*zilla	ˌgod.ˈ**zi.lla**
d.	*ware	ˈsoft.ˈ**ware**
e.	*burger	ˈham.ˌ**bur.ger**

In Example 5.17a, the splinter *–oholic* is something of an anomaly; it has additionally retained an initial unstressed syllable from its source word *alcoholic*. Despite this idiosyncrasy, we can see a clear pattern among splinter-formations, with respect to prosody: variation in splinter-formations is conditioned primarily by the prosody of the splinter's source word, and secondarily by the prosody of the base. The resulting variation among splinter-formations can be schematized as in Example 5.18: splinters that follow unstressed syllables in their source words retain an additional unstressed syllable when attaching to a base that ends in a stressed syllable.

Example 5.18. Splinter alternations are conditioned by prosodic considerations

base prosody	source word/splinter prosody	example outcome	
...ˈσ	σ.ˈσ	ex.ˈplore-o.ˈped.i.a	(“long” variant)
... σ	σ.ˈσ	ˈhe.ro-ˈped.i.a	(“short” variant)
...ˈσ	ˈσ. σ	ex.ˈam-ˈzill.a	(no variation)
... σ	ˈσ. σ	ˈba.by-ˈzill.a	

This pattern suggests that splinters can retain prosodic information from their source words even as they become more affix-like. Accordingly, I will adopt the notation of transcribing splinters, not with affix boundaries, but with parenthetical representations of the remainder of the source word, for example *(de)licious* instead of *–licious*. The benefit of this notation will also become clear as I develop a templatic analysis of families of blends and splinter-formations.

5.3.3 A construction-theoretic analysis of blend families

In Section 5.3.2, I demonstrated that some splinters can retain prosodic information from their source words, even as they begin to take on a new, more affix-like role. In this section, I develop a construction-based analysis of blends and splinters that takes this phonological variation into account.

Like other examples we have seen, among the attested splinter-formations in COCA, the splinter *(lite)rati* variously undergoes haplology, or it undergoes schwa-insertion, or it truncates the base it attaches to. This can be seen in Example 5.19:

Example 5.19. Results from a COCA search for "*ati"

haplology	**[ə] insertion**	**truncation**
glitter-ati	jazz-erati	techno-rati
designer-ati		digi-rati

Following from the discussion in Section 5.3.2, my analysis of this variation is that these three processes are conditioned by the prosody of the splinter's source word and of the base. Here I will discuss this conditioning in terms of prosodic templates, such that the primarily stressed syllable of the base is aligned with the secondarily stressed syllable of the source word, which is retained as part of the splinter. This alignment can be schematized as in Example 5.20, where the primarily-stressed syllable of *glitter* is aligned with the secondarily-stressed syllable the *(lite)rati* splinter template. These alignments are represented with association lines; a dark line links the stressed *ra* of *literati* and the stressed *gli* of *glitter* to the resulting form *glitterati*:

Example 5.20. Alignment of stressed syllables in the formation of *glitterati*

[ˌli.te.ˈra.ti]

ˌgli.tte.ˈra.ti

ˈgli.tter

In *glitterati*, there is also a great deal of segmental overlap, as *glitter* and *literati* have a shared stress pattern and a shared string –*liter*– in common. However, this same prosodic alignment is found, without segmental overlap, in the splinter-formation *jazzerati*. In *jazzerati*, the sole stressed syllable of *jazz* is aligned with the secondarily stressed syllable in the *(lite)rati* template. As a result, and as we saw in Section 5.3.2, an unstressed syllable is retained also in the resulting blend. This can be represented as in Example 5.21.

Example 5.21. Alignment of stressed syllables in the formation of *jazzerati*

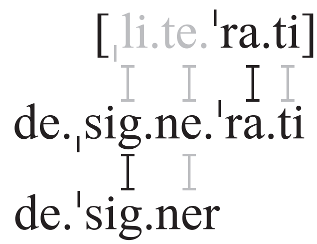
[ˌli.te.ˈra.ti]

ˌjazz.e.ˈra.ti

ˈjazz

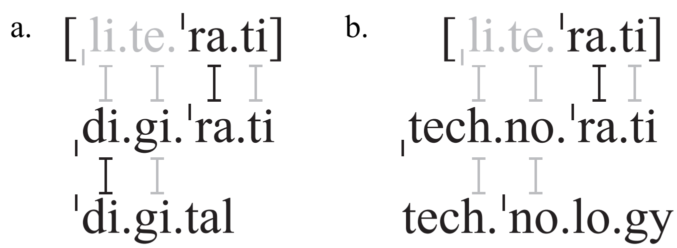
Templatic stress alignment also accounts for the formation of *designerati*. In Example 5.22, alignment of the primarily stressed syllable in *designer* with the *(lite)rati* template creates a word that is longer than either source word, but still aligns with the prosodic and segmental content of the *(lite)rati* template.

Example 5.22. Alignment of stressed syllables in the formation of *designerati*



Designerati not only allows for the preservation of the stress structure of *(lite)rati*, but, like *glitterati*, preserves some of its segmental content, as well. The second and third syllables of *designer* are retained because they overlap with the structure of *(lite)rati*, and due to this prosodic and segmental overlap, the first syllable of *designer* comes along for free. However, in the two remaining COCA examples, *digirati* (Example 5.23a) and *technorati* (Example 5.23b), prosodic considerations instead lead to truncation of the base:

Example 5.23. Syllabic truncation in the formation of (a) *digirati* and (b) *technorati*

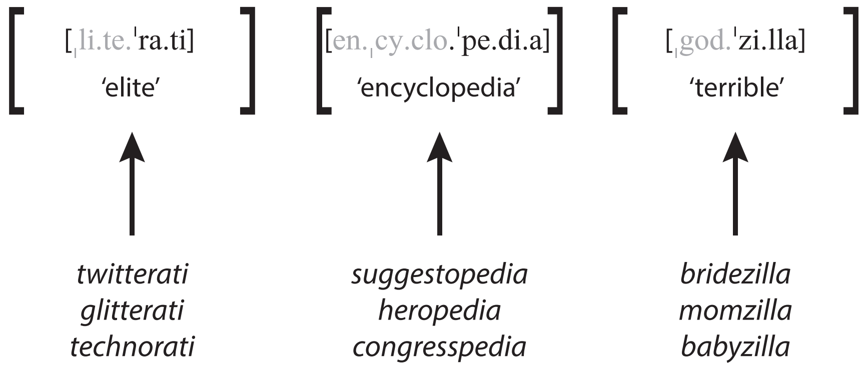


In Example 5.23a, the final syllable of *digital* is lost because there is no room for it to be incorporated into *(lite)rati*'s prosodic template, after alignment of the relevant stressed syllables. The example of *technorati* in Example 5.23b is an interesting one; if *technorati* is indeed coined from *technology*, it is a counterexample to my stress-alignment account, which predicts that alignment of the primarily stressed syllable of *technology* with the secondarily stressed syllable of *(lite)rati* would yield ?*technolorati*. I suspect that *technorati* has actually been formed from the clipping *techno*, whose stressed-unstressed pattern better matches that of *(lite)rati* and *technorati*. However, given that we began this investigation of splinter-formations with Bauer, Lieber, and Plag's (2013) observation that splinter-formations display considerable variation, it is not surprising that we might find some variation here, especially considering the lack of segmental overlap between *technology* and *(lite)rati*.

Though we find variation among splinter-formations, I have also shown that this variation is not unconstrained, but rather is conditioned by several interrelated factors, such as stress, number of syllables, and segmental content, that can persist in the morphological template of the splinter.

This templatic view of splinter-formation can be represented directly in a construction-theoretic account. The analysis of splinter-formations, as lexical families of blended English words, is that they are instantiations of a schematic construction which retains different degrees of prosodic *and* segmental material from the splinter's source word. This templatic phonological representation affects how much phonological material can be incorporated from a base word into the prosodic template. Accordingly, some examples of morphological constructions abstracted over families of lexical blends can be seen in Example 5.24:

Example 5.24. "Splinter" constructions in English that are abstracted over lexical blends



Just like other lexical families that we have seen throughout the dissertation, here we see with English blends that groups of words which share some element of form and meaning in common instantiate a more schematic morphological template which can then be used to form additional new words. The only adjustment that we have had to make here concerns the formational content in a given construction, as the phonological elements in a given blend family may be prosodic and partially schematic, rather than either fully schematic or fully specified.

In this section I have dealt primarily with splinters as a sub-type of lexical blending in English; splinters are examples of affixes that emerge as a result of repeated lexical blending in English. However, rather than representing a distinct type of word-formation process, under a construction-theoretic analysis, splinters differ from blends only in the degree of specificity in the construction. This analysis has been developed under a view of English morphology in which families of whole words give rise to morphological structure, at varying levels of abstract representation. As we will see in the next section, the centrality of lexical families in English blends also provides an opportunity to examine the role of blending in the creation of new words in ASL.

5.4 Lexical blends in ASL

5.4.1 Lexical blends as combinations of signs

In Section 5.3, I identified a lexical blending construction in English that is instantiated by individual lexical blends as combinations of whole words, and which further licenses the productive formation of new lexical blends. Similarly, splinters are analyzed as word-formation templates that emerge as a result of repeated lexical blending in English. In this section, I demonstrate that lexical blending in ASL seems to pattern in the opposite direction; instead of creating new lexical patterns, ASL blends overwhelmingly take advantage of existing patterns. Though I identify a few examples of ASL signs that, like English blends, have been coined from the combination of two individual words, in this section I mainly discuss signs which resemble lexical blends, but typically they are cases of an individual sign changing its form to join an existing family of signs.

English lexical blends are constrained by prosodic considerations, and are typically structured to retain as much content from both of the source words as possible, while also merging the two words together. In Section 5.2, I described this process as incorporating one word into the prosodic structure of the other. Lexical blends in ASL appear to be similarly structured; the ASL blends that I have identified have for the most part been created by incorporating or substituting a phonological parameter from one sign (or group of signs) into the existing phonological structure of another sign.

A large class of examples of lexical blends in ASL, examined in depth already in Chapter 3, are initialized signs. Initialized signs are typically formed by combining phonological information from an existing ASL sign with a fingerspelled handshape that represents the initial letter of an English word; initialized signs systematically incorporate fingerspelled letters into the structure of an existing sign.

An example of an initialized blend not yet discussed is an ASL sign for *Google*, GOOGLE. GOOGLE is signed with a G handshape moving in small circles in front of the face; the G handshape in this sign is motivated by the spelling of the English word *Google*, and the overall shape of the sign is the same as the ASL sign SEARCH, in which a C handshape moves in small circles in front of the face. The initialized blend sign GOOGLE is a metonymic extension of the ASL sign SEARCH, and is formed by combining the location and movement of the sign SEARCH with the G handshape from fingerspelling. The formation of this sign can be schematized as in Example 5.25, where the fingerspelled letter, representing the initial *G* of *Google*, is incorporated into the phonological structure of the existing sign SEARCH:

Example 5.25. GOOGLE is a lexical blend in ASL

$$\begin{bmatrix} \text{H:} & C_{DH} \\ \text{L:} & \text{in front of face} \\ \text{M:} & \text{circling} \end{bmatrix} \begin{array}{c} \mapsto \\ \mapsto \\ \mapsto \end{array} \begin{bmatrix} \text{H:} & G_{DH} \\ \text{L:} & \text{in front of face} \\ \text{M:} & \text{circling} \end{bmatrix} \begin{array}{c} \mapsto \\ \\ \\ \end{array} \begin{bmatrix} \text{H:} & G_{DH} \\ \text{L:} & \\ \text{M:} & \end{bmatrix}$$

While initialized signs are blends of ASL signs and (fingerspelled representations of) English words, an ASL sign for *morphology* is an example of a lexical blend which combines two ASL signs, in the same way that lexical blends in English combine two English words. This particular sign MORPHOLOGY can be analyzed as a lexical blend of the signs WORD and MEANING, on the basis of the characterization that *morphology* is 'the study of the meanings of words': WORD is signed with a dominant G handshape contacting an extended 1 handshape on the non-dominant hand, and MEANING is signed with a dominant V handshape contacting the non-dominant B hand twice, with a slight change in orientation between the first and second contact. The lexical blend MORPHOLOGY is signed by replacing the V handshape of MEANING with the G handshape of WORD; the resulting sign is a two-handed form in which a dominant G handshape contacts the non-dominant B hand twice. The formation of this sign can be schematized as in Example 5.26, where the dominant handshape of WORD is incorporated into the phonological structure of the sign MEANING.

Example 5.26. MORPHOLOGY is a lexical blend in ASL

$$\begin{bmatrix} \text{H:} & V_{DH}, B_{NDH} \\ \text{L:} & \text{neutral space} \\ \text{M:} & \text{DH contacts NDH twice} \end{bmatrix} \quad \begin{bmatrix} \text{H:} & G_{DH}, B_{NDH} \\ \text{L:} & \text{neutral space} \\ \text{M:} & \text{DH contacts NDH twice} \end{bmatrix} \quad \begin{bmatrix} \text{H:} & G_{DH}, 1_{NDH} \\ \text{L:} & \text{neutral space} \\ \text{M:} & \text{DH contacts NDH} \end{bmatrix}$$

Both GOOGLE and MORPHOLOGY are signs that are formed by incorporating the handshape of one sign into the phonological structure of another sign, and so, though they are morphologically complex, they are no more phonologically complex than the base signs from which they are coined. In Chapter 1 I discussed the example of THINK-

DEAF, a lexical blend which incorporates the location of the sign THINK-HEARING into the prosodic structure of the sign DEAF; here the location specification for the sign THINK-HEARING, which is articulated at the center of the forehead, combines with the handshape and movement of the sign DEAF, which is signed with a 1 handshape contacting the side of the face twice. The resulting sign THINK-DEAF is articulated with a 1 handshape contacting the face twice, once on either side of the forehead.

Liddell (1984:390; 2006:16) has suggested that certain lexicalized compounds in ASL resemble lexical blends like English *motel* in that, like telescope blends, many lexicalized compounds are reduced and fused together, relative to the corresponding linear sequence of two signs.[3] For example, Liddell analyzes the lexicalized compound BELIEVE (from THINK+MARRY) as combining one segment from THINK and two segments from MARRY to form a sign that is segmentally shorter than would be expected from the straightforward combination of THINK and MARRY, just as *motel* is segmentally shorter than the compound *motor hotel*. Liddell and Johnson (1986) similarly argue that that the sign IT'S-UP-TO-YOU can be analyzed as having fused together parts of the signs THINK and SELF: THINK is signed with a 1 handshape contacting the forehead, and SELF is signed with an open-A handshape directed toward the addressee. The "blend" sign IT'S-UP-TO-YOU is articulated with an L handshape that

[3] My use of the term *lexicalized compound* here is a bit anachronistic; Liddell (1984) notes that it is problematic to call signs like BELIEVE "compounds", yet he continues to do so for ease of exposition, and does not use the term *lexicalized compound*. As I suggested in Chapter 2 and have argued in Lepic (2015), many of the well-known examples of "compounds" in ASL are not synchronically compounds at all. Very few such signs, e.g., IT'S-UP-TO-YOU or WHY-NOT, can be analyzed as having been coined via compounding, and even then, as Liddell notes, such signs can be considered compounds in a historical context only (1984:380).

combines the 1 and open-A handshapes, which are formed with the index finger and the thumb extended, respectively.

Important for our discussion of lexical blending is Liddell's suggestion that some fused constructions in ASL may be analyzed as lexical blends. This matter crucially hinges on whether the fusing and reduction that can be observed in many lexicalized compounds in ASL happens synchronically, as part of the formation of the target sign, or if it happens only later, as part of a general process of univerbation which can affect any institutionalized construction (cf. Chapter 2). As we saw in Section 5.3, lexical blending in English involves truncation and fusion of two source words as a part of the morphological construction itself. The synchronic reduction that has taken place in the creation of the blends *hacktivist* or *glitterati* is therefore fundamentally different from the diachronic process of univerbation that has led, for example, to the creation of the segmentally reduced form *don't* from *do not*, or *cupboard* from *cup board* (see Chapter 2; Bybee 2001).

Though many phonological studies of lexicalized compounds in ASL analyze the ways in which individual lexicalized compounds have reduced and fused together over time (e.g., Frishberg 1975; Liddell and Johnson 1986; Sandler 1993; Brentari 1993), I know of no studies that demonstrate that, in novel compounds, parts of the two constituent signs can be fused together immediately, as part of a lexical blending construction. Instead, as Liddell and Johnson (1986:481-486) themselves argue, the fusion that takes place in some lexicalized compounds is most appropriately viewed as the result of diachronic univerbation. Accordingly, I reject the suggestion that "lexicalized compounds" are lexical blends; the fusion that affects lexicalized compounds like IT'S-UP-TO-YOU is diachronic, and fundamentally different from the fusion which guides the formation of true lexical blends like MORPHOLOGY.

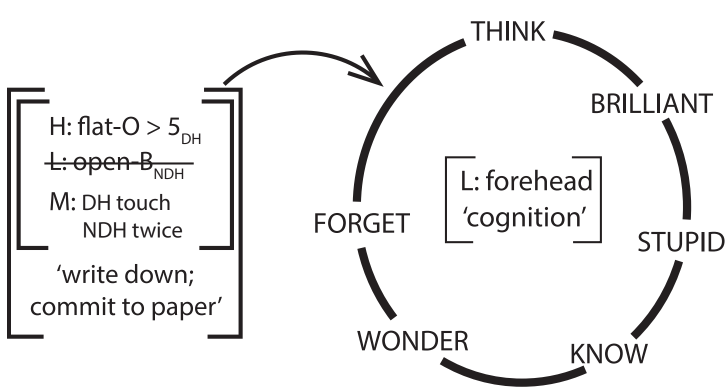
Though we will not consider univerbized "lexicalized compound" constructions as lexical blends, I have identified other examples of ASL signs which change the form of an existing sign by replacing one of its phonological parameters with a different phonological feature, in exactly the same way that MORPHOLOGY replaces the handshape of MEANING with that of WORD. However, in these blend signs, it is not always possible to identify for certain a specific single sign from which the other phonological element has been extracted. I turn now to an analysis of these family-driven lexical bends.

5.4.2 Lexical blends as combinations of lexical families

In Chapter 1, I suggested that though the sign THINK-HEARING can be analyzed as a blend of the signs THINK and HEARING, it is not clear that the forehead location in THINK-HEARING is incorporated from the specific sign THINK, or if THINK-HEARING is instead formed from a morphological pattern that is productive in the ASL lexicon: not only does the forehead location recur among signs related to 'cognition', but the contrast between the head and the mouth is also systematic in ASL, thus potentiating the formation of the sign THINK-HEARING as an extension of the sign HEARING.

A related example is the sign COMMIT-TO-MEMORY, which can be analyzed as re-using parts the signs WRITE-DOWN and KNOW. WRITE-DOWN is signed with a flat-O handshape contacting the palm of a non-dominant open-B hand, and then opening to a 5 handshape and contacting the non-dominant hand a second time, and the sign KNOW is signed with a bent-B handshape contacting the side of the forehead. COMMIT-TO-MEMORY is signed with the handshape and movement of WRITE-DOWN, however contacting the side of the forehead, like KNOW. As with THINK-HEARING, it is not entirely clear whether the forehead location in the sign COMMIT-TO-MEMORY has been taken from a single sign, KNOW, or is instead motivated by other signs in the ASL lexicon, having been extracted from a lexical family of signs in which the forehead is systematically correlated with a range of meanings corresponding to 'cognition'. This alternative analysis of COMMIT-TO-MEMORY can be schematized as in Example 5.27, in which COMMIT-TO-MEMORY has "relocated" to join a lexical family of signs in which the forehead location is correlated with 'cognition':

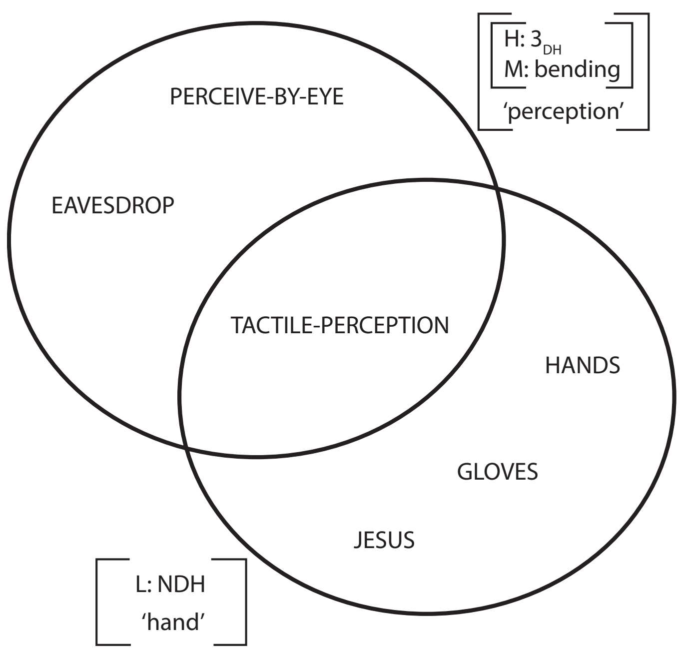
Example 5.27. Analysis of COMMIT-TO-MEMORY as an analogical extension



A fact about ASL that favors the analysis in Example 5.27 is that this pattern of "relocating" an existing sign, changing how it is signed in order to derive a new sign, is quite productive in ASL. In signs like HIT and SURGERY, for example, a wide range of locations on the body can be used: keeping the handshape and movement the same, but changing the location, the signs HIT-ON-HEAD and BRAIN-SURGERY are signed on the head, HIT-ON-STOMACH and APPENDECTOMY are signed on the abdomen, HIT-ON-CHEST and OPEN-HEART-SURGERY are signed on the chest.

In other cases, the range of possible locations is more limited; a relevant example is TACTILE-PERCEPTION in ASL, a recently-coined sign that can be used to describe how Deaf-blind signers perceive tactile ASL (Edwards 2014). This sign is related to the conventional signs EAVESDROP and PERCEIVE-BY-EYE, which are signed with two 3 handshapes near the ears or eyes, respectively, differing only by their locations. The novel sign TACTILE-PERCEPTION combines the handshape and movement pattern from one lexical family with the location that has been extracted from another family of signs in which the hands represent human hands, as in Example 5.28:

Example 5.28. TACTILE-PERCEPTION combines two lexical families



These examples demonstrate that the body serves as a very useful resource for iconic representation, in which body parts represent body parts, as well as for metaphorical representation, in which body parts are conventionally associated with sensations, feelings, or characteristics (cf. Frishberg and Gough 1973/2000; Meir, Padden, Aronoff, Sandler 2007). Moving an existing ASL sign to another location on the body can have the effect of coining a new sign whose meaning has also systematically changed.

Though "relocation" is a particularly powerful way to coin new signs, in ASL families of signs organized around handshape or movement patterns can also provide the analogical basis for the formation of a new sign that incorporates that handshape. An example that Klima and Bellugi (1979) discuss concerns the use of the I handshape, which is formed with the pinkie finger extended. In signs like THIN and LINE, this handshape is correlated with a 'small/thin' meaning. Accordingly, changing the handshape of certain existing signs to instead be formed with an I handshape infuses the sign with an additional 'small' meaning: the signs SIGN and UNDERSTAND are formed with 1 handshapes, but substituting the 1 handshape for the I handshape yields the playful signs SIGN-A-LITTLE and UNDERSTAND-A-LITTLE. In the next section, I examine word-formation patterns involving changes in movement, as well.

5.4.3 Discriminable differences in ASL morphology

Similar to the word-based, construction-theoretic perspective on morphological structure that I have adopted in this dissertation, Ackerman and colleagues (Ackerman and Malouf 2013; Blevins, Ackerman, and Malouf 2015) have advocated for a view of (inflectional) morphology as an "adaptive discriminative system". *Discriminative* here highlights the results of many avenues of cross-linguistic research which suggest that words participate in various "discriminably different" structural patterns; whole words are conceptualized of as participating in multiple paradigmatic patterns, and various configurations of word-internal structure serve to facilitate the identification and realization of these multiple patterns. Under this view, morphological structure arises from contrastive configurations of formatives within families of related words.

Relevant in this context, then, is Bellugi and Newkirk's (1981) early observation that in ASL, it is sometimes sufficient to only minimally change the form of an existing sign in order to derive a new word. Calling such signs *idiomatic derivations*, Bellugi and Newkirk remark that, in general, as individual signs are used in increasingly diverse contexts, "there appears to be a strong tendency for shifts in meaning to be accompanied by minimal shifts in some dimension of the movement of the sign" (1981:21). Examples that Bellugi and Newkirk discuss include the sign ACQUIESCE, which is an idiomatic derivative of QUIET, and UNEXPECTEDLY, which is an idiomatic derivative of WRONG. These and other pairs of base signs and idiomatic derivatives that Bellugi and Newkirk identify share their phonological specifications for handshape and location, differing only by the quality of the movement in articulating the sign, whether the rate, amount of tension, or number of repetitions, for example.

However, unlike many of the patterns that I have been examining thus far, the change in movement in these idiomatic derivative signs cannot be easily matched to a larger and more systematic pattern in the ASL lexicon: QUIET is signed with two B handshapes moving simultaneously down and away from the mouth, and ACQUIESCE is formed similarly, however with the hands instead moving forward and down, and at a faster rate. Likewise, WRONG is signed with a Y handshape moving to contact the chin, and UNEXPECTEDLY is formed similarly, however with a rotation of the Y handshape at the chin instead of a contacting movement toward the chin. Though the individual signs in such pairs are systematically related to the other member of the pair, few, if any, other pairs of signs differ from one another in exactly the same ways that ACQUIESCE differs from QUIET, or that UNEXPECTEDLY differs from WRONG.

Other examples of possible idiomatic derivative signs that I have observed include HUGE, HANDS-DOWN-EXPERT, and DRUNK. HUGE is idiomatically related to LARGE; LARGE is signed with two bent-L handshapes moving apart in neutral space, and in the sign HUGE, the hands each additionally incorporate a small, tense, forward movement, one after the other. HANDS-DOWN-EXPERT is related to the initialized sign CLEVER; CLEVER is signed with a C handshape contacting the forehead, and in the sign HANDS-DOWN-EXPERT, the non-dominant hand is added, and both hands move sharply backward, with the dominant hand moving to contact the forehead, and the non-dominant hand remaining low in the signing space. Finally, DRUNK is idiomatically related to BAR; BAR is signed with an open-A handshape moving toward the mouth, thumb-first, and DRUNK is instead signed with the open-A handshape moving sideways, past the face. Though each of these pairs of signs are related in form and meaning, the formational differences between them cannot be said to derive their differences in meaning; because these movements are only systematically contrasted within these pairs of signs, such an argument would be circular.

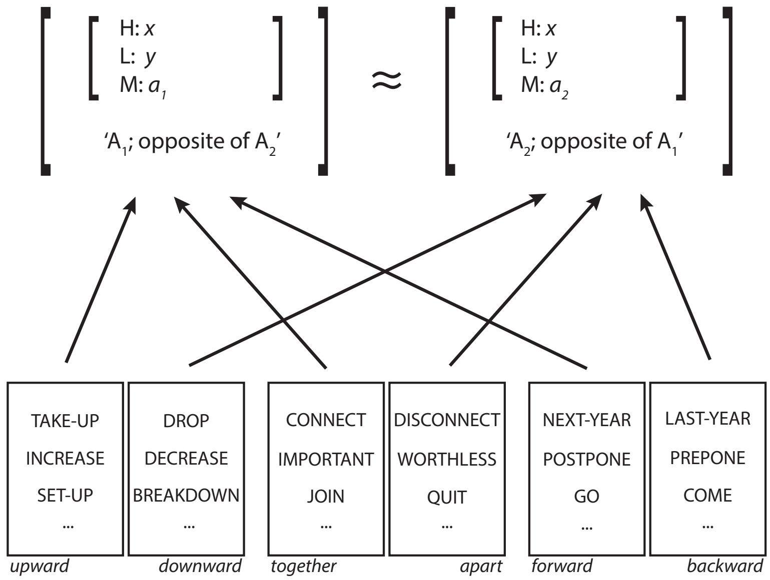
Perhaps unsurprisingly, then, few studies have further investigated the consequences that such idiomatic derivative signs hold for theories of morphological structure in ASL; by virtue of being idiomatic, derivative signs display idiosyncratic properties that cannot be predicted or derived by rule, and so may seem uninformative for theories that view morphological structure as essentially morphemic.

However, following Blevins, Ackerman, and Malouf (2015), who argue that the role of morphological structure is to discriminate related words, these idiomatic derivatives can be construed as part of an expected morphological pattern. Idiomatic derivatives in ASL change the structure of an existing surface word such that the word remains recognizable, but is also conspicuously different. The end result of such a change is the formation of a lexical family which contains only two members. These two-member families are in turn a concrete manifestation of morphology as primarily a discriminative system; in ASL, one way to derive a new sign is to change the form of an existing sign just enough that it can be discriminated from itself.

The construction-theoretic analysis of these idiomatic derivative signs is that the "discriminable difference" is an abstract constructional pattern in the ASL lexicon. This larger pattern is instantiated by smaller sub-patterns, some of which we have seen already; for example, one pattern involves pairs of signs that are opposed in the direction of their movement, as well as the polarity of their meanings: TAKE-UP◆DROP, INCREASE◆DECREASE, and SET-UP◆BREAKDOWN are examples of pairs of signs in which overall upward and downward movements are systematically opposed, and furthermore systematically correlated with opposed meanings. In other groups of signs, we find pairs which differ not by the absolute direction of the movement, but rather the movement of the hands relative to one another: CONNECT◆DISCONNECT, IMPORTANT◆WORTHLESS, and JOIN◆QUIT are examples of pairs of signs where the two hands either begin apart and move to contact each other, or begin in contact with one another and then separate, and are similarly opposed in meaning. In still other examples, pairs of signs which differ by the direction of their movement do so relative to the body: NEXT-YEAR◆LAST-YEAR, POSTPONE◆PREPONE, and GO◆COME are examples of pairs of signs which differ by the direction of the movement of the sign such that one sign moves forward and away from the signer, and the other either moves backward and toward the signer's body or backward and toward the space behind the signer's body.

The relationship between meaning and form in among these patterns can be represented as in Example 5.29. Following Booij (2010) and Booij and Masini (2015), relationships between paradigmatically-related constructions are represented here with the ≈ notation; in ASL, several smaller families of signs instantiate an abstract pattern in which opposed movements are systematically correlated with opposed meanings.

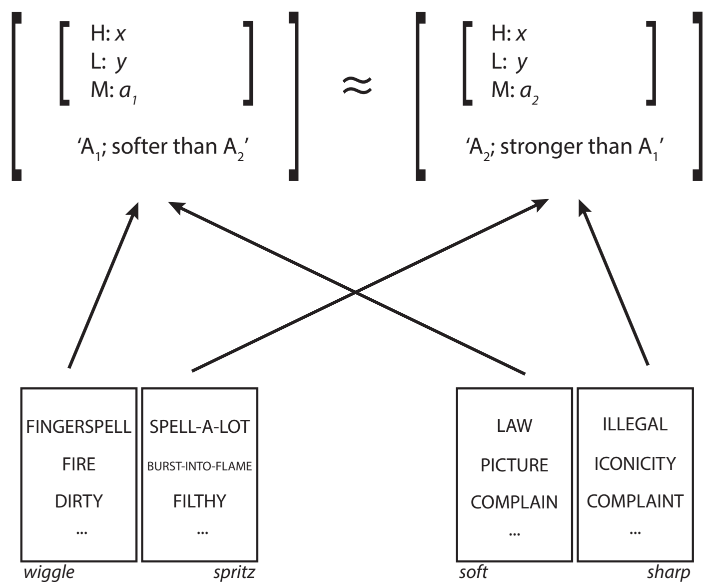
Example 5.29. Systematically opposed movements are discriminable patterns in ASL



In ASL, groups of pairs of signs can also differ from another not by the direction of the sign's movement, but rather by the overall quality of the movement. For example, one pattern that has been previously identified by Frishberg and Gough (1973/2000) is the contrast between a "wiggle" movement, where the fingers continuously wiggle up and down in turn, and a "spritz" movement, where the entire hand quickly opens from a completely closed to a completely open configuration, in a single or repeated movement. Pairs of signs which differ only in that one is signed with a "wiggle" movement and the other is signed with a "spritz" movement include FINGERSPELL◆FINGERSPELL-A-LOT, FIRE◆BURST-INTO-FLAME, and DIRTY◆FILTHY. DIRTY, for example, is signed with a 5 handshape positioned palm-down under the chin, with the fingers wiggling, but the emphatic form FILTHY is instead signed with a closed fist bursting open under the chin in a single movement.

Frishberg and Gough characterize the "wiggle"~"spritz" alternation as being related to another pattern, in which "soft" and "sharp" movements are systematically contrasted among related signs with "softer" and "stronger" meanings. Examples of pairs of signs which differ only in that one sign has a "soft" movement, and the other has a "sharp" movement include LAW◆ILLEGAL, PICTURE◆ICONICITY, and COMPLAIN◆COMPLAINT. Sharp movements differ from soft movements in that they are signed more quickly and with greater tension: the initialized sign LAW is signed with an L handshape contacting the non-dominant palm twice, but in the related sign ILLEGAL, the dominant L hand quickly strikes the non-dominant palm once and then quickly bounces back to its initial position in neutral space. Similarly, the sign COMPLAIN involves tapping the center of the chest with the fingertips of a bent-5 or "claw" hand, while COMPLAINT is signed with a single tense movement of the "claw" hand striking the chest, and then quickly bouncing back to its original position. Together, "wiggle"~"spritz" signs and "soft"~"sharp" signs can be analyzed as schematic morphological constructions that have been abstracted over pairs of related signs, and in turn instantiate a more abstract, second-order construction in which certain signs with a broadly soft, repeated movement and certain signs with a more tense, single movement are paradigmatically related, as in Example 5.30.

Example 5.30. Other systematically-opposed movement pattern constructions in ASL



Still other systematic contrasts between certain movement patterns and certain changes in meaning have also been observed among noun/verb pairs in ASL (Supalla and Newport 1978), among signs that differ only in their temporal aspect (Klima and Bellugi 1979), and among a number of other inflectional and derivational patterns in ASL (e.g., Frishberg and Gough 1973/2000; Padden and Permutter 1987; Liddell 2003).

Though movement is a particularly salient formational parameter for marking a variety of grammatical distinctions, it is not the sole parameter that is employed in this way in the ASL lexicon. We saw in Section 5.4.1 that initialized signs, for example, are a class of signs which discriminate related signs based on changes in handshape, and we saw in Section 5.4.2 that many analogical lexical blends in ASL also take advantage of different locations on the body to create a new sign which differs systematically from an already-existing sign.

Here I examine one final pattern in ASL which lends itself well to an analysis in terms of discriminable patterns among small families in ASL. Padden and colleagues (Padden, Meir, Hwang, Lepic, Seegers, Sampson 2013; Padden, Hwang, Lepic, Seegers 2015) have identified an iconic pattern in ASL in which conventional names for hand-held, man-made tools can often alternate between one of two related forms: in *handling* signs, the form of the sign profiles a human hand as it is configured when using the referent object, and in *instrument* signs, the form of the hand additionally profiles the shape of the tool as it is canonically used. Some examples of signs which fit this pattern are variants of the signs TOOTHBRUSH, SAW, and NAIL-POLISH. The handling form for TOOTHBRUSH involves moving an A handshape back and forth in front of the mouth, and the instrument form is minimally different, however with a 1 handshape representing the shape of the toothbrush. Similarly, the handling form for SAW involves moving an S handshape back and forth over the non-dominant hand, and the instrument form is instead formed with a B handshape, which represents the shape of a saw. Finally, the handling form of NAIL-POLISH is signed by repeatedly moving an F handshape along the fingernails of the non-dominant hand, and the instrument form is signed similarly, however with an H handshape, representing a small brush.

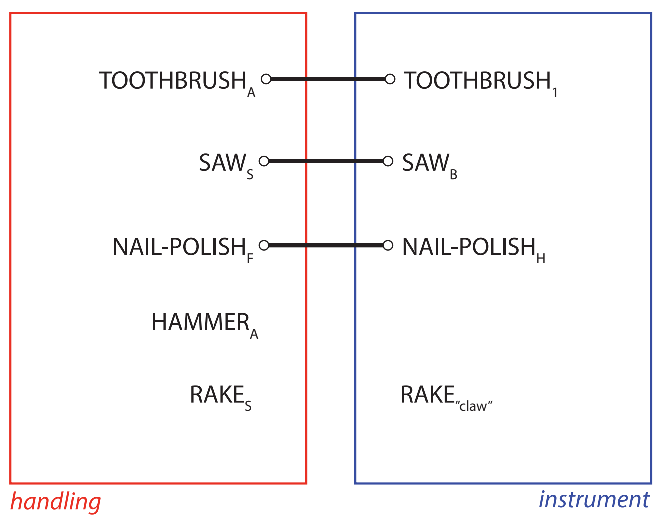
In these three pairs of signs, the handling and instrument forms for a given concept are nearly identical, differing primarily by their handshapes. Padden and colleagues demonstrate that in these and other signs for tools and tool use, the contrast between handling and instrument forms in ASL is preferentially, though not deterministically, driven by semantics: handling forms function more often as verbs, and instrument forms function more often as nouns (Padden, Hwang, Lepic, Seegers 2015:90), suggesting that, rather than random variation, the alternation between handling and instrument forms marks a grammatical distinction for ASL signers.

Though individual signs can be classified as either handling or instrument forms, these assessments can only be made based on an implicit assessment of several overlapping configurations of meaning and form simultaneously. There is no single "handling" or "instrument" handshape in ASL, nor are there specific underlying movement patterns which uniquely identify all of the signs which fit this pattern. Furthermore, though the handling and instrument forms of TOOTHBRUSH, SAW, and NAIL-POLISH can be considered minimally different, the handling form for RAKE is completely unrelated to the instrument form RAKE, and other signs, such as HAMMER and MOP, do not undergo the alternation at all, and, in this case, are only signed as a handling forms.

The construction-theoretic analysis of this set of facts is that signs which iconically represent human hands as they use a tool can be considered together as a lexical family of handling signs; signs in this family may use various handling handshapes, such as A, S or F, and so while there is no single "handling" handshape, the 'handling' pattern arises a specific iconic configuration of meaning and form in this group of signs. This family is represented on the left of the diagram in Example 5.31.

Similarly, signs which represent the shape of a tool as it is used can be considered a lexical family of 'instrument' signs; signs in this family may use a wide range of iconic handshapes to profile different aspects of the referent objects, but, like signs in the 'handling' family, they all have in common that they exhibit similar iconic relationships between meaning and form. This family is represented on the right of the diagram in Example 5.31.

Example 5.31. Handling and instrument signs as discriminable morphological patterns in ASL



A third lexical family contains those pairs of signs that are related such that they refer to similar concepts and differing primarily by their handshapes. This family is a second-order abstraction, a pattern that made up of pairs of signs that systematically differ such that one of the members of the pair is a handling sign, and the other is an instrument sign. This family is not directly represented in Example 5.31, however, the links between the individual signs in this family, i.e., {TOOTHBRUSH$_{A}$◆TOOTHBRUSH$_{1}$, SAW$_S$◆SAW$_B$, NAIL-POLISH$_F$◆NAIL-POLISH$_H$, ...} are represented with association lines between related signs.

These families of signs can be analyzed in terms of Blevins, Ackerman, and Malouf's (2015) characterization of morphology as a discriminative system, in which sub-lexical structure functions to identify systematic patterns in the lexicon. As an individual sign, the instrument form of TOOTHBRUSH might be analyzed as a blend of the handling form for TOOTHBRUSH, plus an incorporated iconic classifier for 'long thin objects'. However, such an analysis would miss a larger generalization that handling and instrument forms are systematically related to one another in a variety of ways. Indeed, this overlapping lexical family structure, as we have seen in Chapter 4, is characteristic of the ASL lexicon as a whole.

5.5 Conclusion

In this chapter I have surveyed a range of seemingly disparate phenomena which can all be subsumed under the label of "lexical blending": I began with an analysis of lexical blends in English, in which individual forms are licensed by an abstract morphological blending construction. I have also examined several sub-patterns associated with this blending construction. One class of examples involves a number of words which can together be considered lexical families that result from lexical blending: within these families, splinters like *(alc)oholic* and *(ex)plaining* are recurring pieces of whole words that have become productive in the formation of new words.

Previous analyses of classificatory accounts of lexical blending in English have struggled to classify splinters as either lexical blends or as affixes. In examining splinters from a perspective informed by morphological patterns in ASL, I have argued that the construction-theoretic analysis in this chapter, which is built to accommodate the insights of a lexical family description of ASL morphology, can be straightforwardly extended to account for individual lexical blends and for families of lexical blends alike: splinters are abstractions over actually occurring words, just like any other morphological pattern.

Just as we have benefitted in the analysis of splinters in English by considering ASL morphology, so too have we benefitted from considering English lexical blends in an examination of ASL morphology. Thinking about individual ASL signs from the perspective of English blends leads to additional insights about the nature of lexical organization in ASL; because the ASL lexicon contains numerous lexical families, rather than combining parts of individual signs, the operation of lexical blending most often involves changing and existing sign on analogy to an existing family. This has led to a more targeted examination of lexical family structure in ASL, and I have shown that many lexical families can be construed as patterns of discriminable difference in the ASL lexicon; it is sometimes sufficient only to change the form of an existing sign in order to derive a new sign.

CONCLUSION

Many discussions of the relationship between form and meaning in linguistics, this dissertation included, begin with Saussure's (1916/1959) characterization of the linguistic sign as an inherently arbitrary pairing of meaning with form. However, I have found that the notion of the Saussurean sign, as it is normally invoked in mainstream linguistic theory, can be seen as too restrictive in (at least) two respects: First, construction grammarians, looking at constructional idioms and formulaic language, have questioned whether the Saussurean sign describes a form-meaning association that holds only for morphologically simple words and affixes, or if instead, recurring configurations of form and meaning can be found all throughout the grammar (see Hoffman and Trousdale 2013). Second, sign language linguists, confronted with pervasive iconicity in sign language, have questioned whether the relationship between meaning and form can be considered inherently arbitrary even at the level of the "simple" sign (see Perniss, Thompson, and Vigliocco 2010).

These twin critiques motivate a fresh exploration of the relationship between form and meaning, and the consequences that it holds for our conceptualization of linguistic structure. As has been recently reviewed by Dabrowska (2015), for example, construction grammar began as an attempt to account for syntactic patterns with idiosyncratic properties that are not predictable from general rules, but nevertheless are used productively to create novel utterances (e.g., Fillmore, Kay, and O'Connor 1988; Kay and Fillmore 1999). An insight that arose from this line of research is that whatever mechanisms are required to account for so-called "peripheral" grammatical patterns can also be extended to straightforwardly account for higher-level "core" patterns (Croft 2001; Goldberg 2013). Construction grammar seeks therefore to capture all of the various and interrelated patterns that are the hallmarks of language structure in terms of constructions, form-meaning parings that can range from specific and simple to complex and schematic.

More than just a formalism for describing recurring patterns, the construction-theoretic approach to grammatical analysis leads to the development of subsequent questions and hypotheses about the structure of the larger system that these recurring patterns participate in. For the construction grammarian, linguistic constructs are conceptualized of as interlocking and overlapping networks of parts and wholes, and a pattern identified to describe a particular set of parts may itself be a part of a larger patterned whole. Linguistic phenomena are therefore seen as systemically motivated, or potentiated and constrained by, the dynamics of the system they belong to. Under this view, the motivating forces of iconicity, linguistic analogy, and, indeed, even compositionality, can be subsumed under the more general label of analogy; rather than a language-specific process, analogical reasoning is considered to be domain-general, and fundamental to human cognition (e.g., Esper 1973; Genter 1983; Emmorey 2014). The change in perspective to a construction-theoretic view of morphology therefore aligns the study of morphological structure with other domains in cognitive science, providing a fruitful and testable set of assumptions to guide morphological analysis.

The act of reassessing our foundational assumptions also has consequences for how we implement linguistics theories. Historically, descriptions of ASL morphology have regarded analyses of English as a template for morphological analysis. The extension of analytic tools from the study of spoken languages to the study of sign languages has played an important role in establishing that sign languages are natural human languages: the demonstration that ASL exhibits structures that are amenable to analysis using tools that were developed for analyzing English proves that ASL is a language like any other, albeit in a different modality; moreover, the ability to use the same tools to analyze speech and sign argues for the general appropriateness of these tools for the study of human languages (Stokoe 1960; Sandler and Lillo-Martin 2006).

This is a compelling argument, and it has been successful by any measure. But I have demonstrated here that it remains possible to argue, from a different set of guiding assumptions and with a different set of analytic tools, that sign languages and spoken languages, as human languages, display similar kinds of morphological structure. As an alternative to the morpheme-based approach which has predominated morphological analysis in the post-Bloomfieldian generative tradition, a word-based tradition of morphological analysis has developed (Robbins 1959; Blevins 2006) which is generally less familiar: the word-based approach is abstractive and discriminative, viewing morphological structure as an emergent property of families of related surface words. Accordingly, word-internal morphological structure serves to distinguish between the different grammatical patterns that whole words participate in.

Approaching ASL morphology from a word-based perspective leads to the discovery that, to the language user, any given linguistic sign is anything but arbitrary (cf. Bolinger 1949); all words are related to other words, and to their meanings, in a variety of ways. In ASL, these highly-structured networks of relatedness are often motivated in a variety of ways: an ASL sign like COMMIT-TO-MEMORY is structured such that an aspect of its form, contacting the forehead with a flat 5 handshape, iconically profiles an aspect of its meaning, 'to "stick" something to be remembered to the mind'. But this sign's internal structure is also analogically motivated by a number of other ASL patterns which are also themselves iconically motivated: first, many other ASL signs relating to the 'mind' or 'cognition' are located at the forehead, and the iconic link between signs for 'cognition' and the forehead location is itself well-entrenched and conventional in ASL. Second, the signs EXPOSURE and WRITE-DOWN are signed with the same handshape and movement pattern as COMMIT-TO-MEMORY, however at different locations; the forms of these conventional signs similarly profile a particular aspect of their meanings, 'the act of "sticking" something to be retained to a surface', whether that surface is a person, conventionally represented with a non-dominant 1 handshape in EXPOSURE, or a piece of paper, conventionally represented with a non-dominant B handshape in WRITE-DOWN. Third, the act of "relocating" a sign to the forehead to create a new sign which is related to cognition, or away from the forehead to create a new sign whose relation to cognition is partially obscured, is also conventional in ASL: the members of pairs of signs like SCRATCH◆MENTAL-SCAR, WEAK◆WEAK-MINDED, MISUNDERSTAND◆MISSPEAK, STUPID◆INCREDIBLY-STUPID, and

KNOW◆INTUITION are all signed with the same handshape and movement, but differ systematically in that one sign is articulated on the forehead, and the other sign is articulated elsewhere on the body, whether the mouth, in the case of MISSPEAK, the abdomen, in the case of INTUITION, or the non-dominant hand in neutral space, in the case of SCRATCH, WEAK, and INCREDIBLY-STUPID. The prevalence of such patterns reveals that iconicity is systematic in ASL, and that groups of sign forms that are related to their meanings in analogous ways provide the basis for a number of lexical/morphological patterns.

Though the visual-manual modality of sign language seems to be more naturally predisposed to imagistic iconic representation, neither holism nor iconicity are unique to sign language (e.g., Haiman 1985; Perniss, Thompson, and Vigliocco 2010; Goldberg 2013). Looking to English morphology with lexical families in ASL in mind, I have demonstrated that English lexical blends are like ASL signs in that they too can be construed as participating in conventional, sometimes iconically-motivated patterns instantiated by overlapping families of whole surface words. Many English words for 'hybrids', whether concretely genetic or more abstractly conceptual, are named with words which are themselves hybrids of the words that denote the elements of the hybrid; in common examples like *smog* and *ginormous*, and less common examples like *shoat* and *pluot*, the relationship between form and meaning is iconic; the blended form of the word is motivated by the blended concept it denotes. In other cases, where the relationship between a blend's form and its meaning is less obviously iconic, like *motel*, *bromance*, or *webinar*, the formal pattern of lexical blending can instead be construed as analogically motivated by other conventional lexical blends, including those blends that iconically name hybrid concepts. Rather than motivated by their semantics, these blends are motivated by a constructional pattern that describes the relationship between conventional blends and their identifiable source words, thereby providing a template for the formation of additional new blends, and also potentiating the emergence of novel blending sub-patterns, so-called "splinters".

As a different way of looking at morphological structure, the word-based approach to morphological analysis leads to quite different conclusions, compared to the morpheme-based approach which often directs discussions of morphology in modern linguistics by default. In this dissertation, I have shown that words with compositional structure represent only one quite limited kind of morphological structure. Precluding words that are not compositionally structured from morphological analysis leads to the neglect of instructive morphological variation in words which display systematically motivated internal structure, despite being non-compositional.

Though this dissertation has been primarily theoretically oriented, the theoretical issues raised here hold important consequences for the interpretation of psycholinguistic experiments, which have played a large role in the study of sign language structure, following the seminal work of Klima and Bellugi (1979). A natural next step, then, is to seek to test the psycholinguistic reality of the lexical family phenomena and of the constructional representations described here; in order to understand how patterns work together to constitute our grammatical knowledge, we must also seek to determine which patterns are grammatically and psychologically real for speakers, as opposed to linguistic theorists. This interplay between theoretical and experimental approaches will undoubtedly prove instructive not only for our understanding of the nature of morphological structure in human language, but for our understanding of the mechanisms that guide morphological processing, and its relation to more general cognitive processes, as well.

ASL GLOSSARY

A key consideration in any linguistic study is the presentation of the examples which serve as primary data. In spoken language linguistics, individual words can be represented orthographically, using a conventional writing system, they can be transcribed phonemically, using the International Phonetic Alphabet, or they can be represented visually, as a phonetic waveform or spectrogram. The presentation of sign language data provides a bit of a challenge; there are no systems for sign writing or transcription which are widely and standardly used in sign language linguistics. Instead, it is standard to name signs with English glosses, to describe sign forms using written English prose, and to supplement these (often imprecise) descriptions with static visual images, either in the form of photographs or line drawings, of ASL signs.

This glossary lists all of the ASL signs mentioned in the text of the dissertation with a sample reference, as well as an inventory of handshapes referred to in the dissertation.[1] Many of these signs can be found in any standard ASL dictionary, whether in print (e.g., Tennant and Brown 2000; Costello 2008) or online (e.g., www.lifeprint.com/, www.handspeak.com/word/, or www.signingsavvy.com/). For frequently-discussed or uncommon signs, I have also included a reference image. When possible, these images are adapted from Jolanta Lapiak's excellent website, www.handspeak.com, but I have also modeled many signs myself ("hearing accent" and all), to at least provide readers with an idea of the intended forms.

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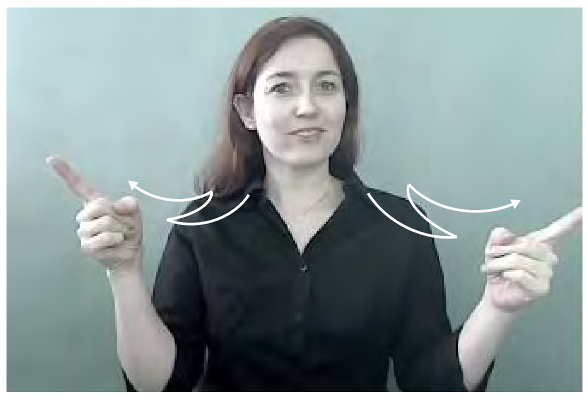
[1] Thank you Tessa Verhoef and Amira Silverswartz for their assistance in creating this glossary.

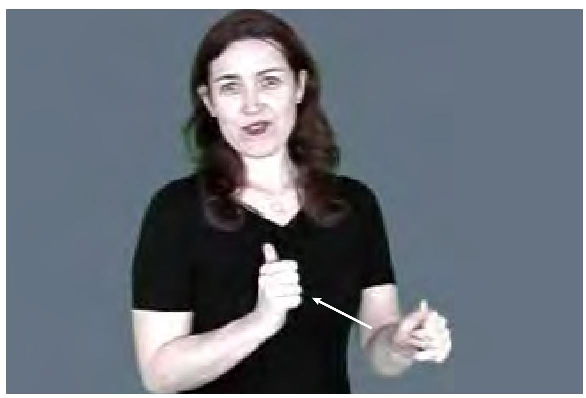
Gloss(es)	Page(s)	Suggested sample reference
ACCEPT	112, 144	http://www.handspeak.com/word/search/index.php?id=10
ACQUIESCE	235, 236	pictured in Klima and Bellugi (1979:201)
ADDRESS	119	http://www.handspeak.com/word/search/index.php?id=30
AIRPLANE	141	http://www.handspeak.com/word/search/index.php?id=56
ALGEBRA	111, 132, 133, 136, 138, 139	http://www.handspeak.com/word/search/index.php?id=4283
ALLOW	186	http://www.handspeak.com/word/search/index.php?id=65
ANNOUNCE	158	http://www.handspeak.com/word/search/index.php?id=85
ANNOUNCEMENT	158	(see ANNOUNCE)



APPEAR	158	http://www.handspeak.com/word/search/index.php?id=95
APPENDECTOMY	233	http://www.handspeak.com/word/search/index.php?id=4357
APPLE	128, 133	http://www.handspeak.com/word/search/index.php?id=97
ARE	116	https://www.signingsavvy.com/sign/ARE/6084/1
ARIZONA	188, 189	http://www.handspeak.com/word/search/index.php?id=6472

ASSOCIATION	111, 137, 139, 142, 163, 164, 186, 196	http://www.handspeak.com/word/search/index.php?id=122

ATTITUDE	139	http://www.handspeak.com/word/search/index.php?id=128
AUNT	163, 164	http://www.handspeak.com/word/search/index.php?id=132
AUTHORITY	138	http://www.handspeak.com/word/search/index.php?id=3820
AVOID	156, 171-172, 176	http://www.handspeak.com/word/search/index.php?id=141



BACHELOR, BACHELORETTE	187-189	http://www.handspeak.com/word/search/index.php?id=3587
#BACK	80	http://www.handspeak.com/word/search/index.php?id=5714
BAR	112, 235	http://www.handspeak.com/word/search/index.php?id=6062

BARELY-ADEQUATE, GOOD+ENOUGH	84	http://www.handspeak.com/word/search/index.php?id=927
BED	83	http://www.handspeak.com/word/search/index.php?id=175
BELIEVE	229	http://www.handspeak.com/word/search/index.php?id=183
BIOLOGY	129	http://www.handspeak.com/word/search/index.php?id=2967
BLUE	112	http://www.handspeak.com/word/search/index.php?id=232
BORED	180	http://www.handspeak.com/word/search/index.php?id=213
BRAIDS	191	http://www.handspeak.com/word/search/index.php?id=241
BRAIN-SURGERY	233	

BREAKDOWN	238, 239	http://www.handspeak.com/word/search/index.php?id=249
BROOM	86, 128	http://www.handspeak.com/word/search/index.php?id=6175
BURST-INTO-FLAME	239, 241	discussed in Frishberg and Gough (1973/2000:107)
CAFETERIA	187-189	http://www.handspeak.com/word/search/index.php?id=3841
CAKE	86	http://www.handspeak.com/word/search/index.php?id=2536
CALCULUS	111, 132, 133	http://www.handspeak.com/word/search/index.php?id=3535
CALL-BY-PHONE	158	http://www.handspeak.com/word/search/index.php?id=2850

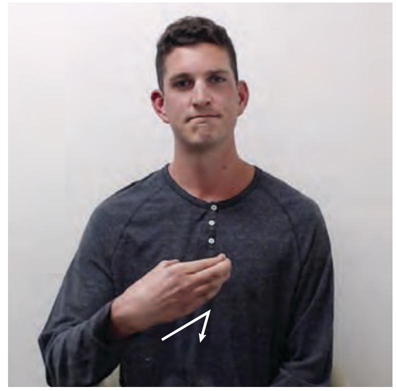
CAR	81	http://www.handspeak.com/word/search/index.php?id=319
CHAIR	86, 158	http://www.handspeak.com/word/search/index.php?id=350
CHALLENGE	173, 175	http://www.handspeak.com/word/search/index.php?id=353
CHARACTERISTIC	111, 143	http://www.handspeak.com/word/search/index.php?id=360
CHASE	156, 171, 176	http://www.handspeak.com/word/search/index.php?id=363

CHICAGO	187	http://www.handspeak.com/word/search/index.php?id=3994
CHRISTMAS	187	http://www.handspeak.com/word/search/index.php?id=390
CIGAR	191	http://www.handspeak.com/word/search/index.php?id=394
CL:'4x4 grid'	91	https://www.signingsavvy.com/sign/SCHEDULE/4422/1
CL:'long/thin'	85	pictured in Klima and Bellugi (1979:238)
CL:'rectangular'	85	pictured in Klima and Bellugi (1979:238)
CL:'upright disk'	85	https://www.signingsavvy.com/sign/CLOCK/1127/1
CL:'wave'	91	https://www.signingsavvy.com/sign/WAVES/5658/1

CLASS	111, 163, 164, 195	http://www.handspeak.com/word/search/index.php?id=398

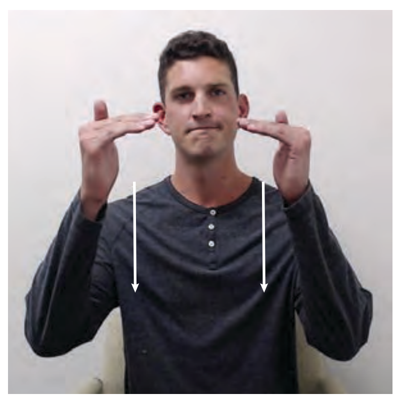
CLEVER	236	pictured in Klima and Bellugi (1979:332)
COINS	192, 193	http://www.handspeak.com/word/search/index.php?id=2562
COLOR	112	http://www.handspeak.com/word/search/index.php?id=420
COME	238, 239	https://www.signingsavvy.com/sign/COME/85/1
COMMIT-TO-MEMORY	155, 231, 232, 250	

COMPLAIN	238, 239	http://www.handspeak.com/word/search/index.php?id=443

COMPLAINT	240, 241	
CONNECT	238, 239	http://www.handspeak.com/word/search/index.php?id=466
CONSERVATIVE	135	http://www.handspeak.com/word/search/index.php?id=5583
CONSUME	112	http://www.handspeak.com/word/search/index.php?id=2962
CONTACT	156	http://www.handspeak.com/word/search/index.php?id=3544
COPY	83	http://www.handspeak.com/word/search/index.php?id=2599
COUGH	118, 119	http://www.handspeak.com/word/search/index.php?id=489
CRAZY (*THINK-HEARING)	33	http://www.handspeak.com/word/search/index.php?id=507
CULTURE, CULTURE	87, 105	http://www.handspeak.com/word/search/index.php?id=519
CURL (*THINK-HEARING)	33	

CUTE	91	http://www.handspeak.com/word/search/index.php?id=529
DAY	112, 180	http://www.handspeak.com/word/search/index.php?id=537
DEAF	33-35, 87, 229	http://www.handspeak.com/word/search/index.php?id=539

DECREASE	158, 239, 240	http://www.handspeak.com/word/search/index.php?id=549
DEMOCRAT	135	https://www.signingsavvy.com/sign/DEMOCRAT/1200/1
DEMOTE	158	(see PROMOTE)



DEPARTMENT	196	http://www.handspeak.com/word/search/index.php?id=6301
DEPRESSED	158	http://www.handspeak.com/word/search/index.php?id=2506
DEVELOP	128	http://www.handspeak.com/word/search/index.php?id=570
DEVELOP	128	https://www.signingsavvy.com/sign/DEVELOP/1208/2

DIALOGUE	106, 110	http://www.handspeak.com/word/search/index.php?id=6679
DIAMOND	131	http://www.handspeak.com/word/search/index.php?id=2986
DICTIONARY	130	http://www.handspeak.com/word/search/index.php?id=3279
DIGEST	140	http://www.handspeak.com/word/search/index.php?id=6310
DIRTY	239, 241	http://www.handspeak.com/word/search/index.php?id=582
DISAPPEAR	158	http://www.handspeak.com/word/search/index.php?id=585
DISCONNECT	238, 239	http://www.handspeak.com/word/search/index.php?id=586
DRINK	112	http://www.handspeak.com/word/search/index.php?id=627
DROP	116, 238, 239	http://www.handspeak.com/word/search/index.php?id=5520
DRUNK	236	http://www.handspeak.com/word/search/index.php?id=629
DUTY	91	http://www.handspeak.com/word/search/index.php?id=5801
EAT	83, 155, 156	http://www.handspeak.com/word/search/index.php?id=645
EAVESDROP	199, 233	
ENOUGH, FULL	84, 154	http://www.handspeak.com/word/search/index.php?id=878
EQUAL	174-177	http://www.handspeak.com/word/search/index.php?id=1341
ETC, ET-CETERA	86, 87, 128	pictured in Klima and Bellugi (1979:232)

EUROPE	187	http://www.handspeak.com/word/search/index.php?id=691
EVERYDAY	102	http://www.handspeak.com/word/search/index.php?id=696
EXPLAIN	36, 37	http://www.handspeak.com/word/search/index.php?id=716
EXPOSURE	250, 251	

FALL	80, 97, 98	http://www.handspeak.com/word/search/index.php?id=5528
FAMILY	105, 111, 137, 142, 163, 164, 167, 168, 191, 192-3	http://www.handspeak.com/word/search/index.php?id=740

FATHER	97	http://www.handspeak.com/word/search/index.php?id=758
FEDERAL	192	http://www.handspeak.com/word/search/index.php?id=3568
FEEL	112, 143, 155, 156	http://www.handspeak.com/word/search/index.php?id=768

FIGURE-OUT	111, 131, 132, 136, 138	http://www.handspeak.com/word/search/index.php?id=784
FILTHY	239, 241	http://www.handspeak.com/word/search/index.php?id=788
FINGERSPELL	239, 241	http://www.handspeak.com/word/search/index.php?id=2658
FINGERSPELL-A-LOT	239, 241	

FIRE	239, 241	http://www.handspeak.com/word/search/index.php?id=799
FIRST-PLACE	159, 160, 180	http://www.handspeak.com/word/search/index.php?id=2542
FIVE-WEEKS	182	

FLASH	83	https://www.signingsavvy.com/sign/FLASH/6903/1
FLOWER	129	http://www.handspeak.com/word/search/index.php?id=827

FOLLOW	155, 169, 170, 175	http://www.handspeak.com/word/search/index.php?id=835
		
FOOD	111	http://www.handspeak.com/word/search/index.php?id=837
FORMAL	86	http://www.handspeak.com/word/search/index.php?id=5923
FOUR-DAYS	180	http://www.handspeak.com/word/search/index.php?id=1422
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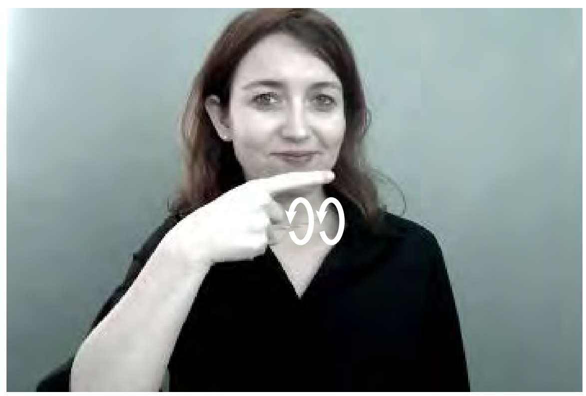
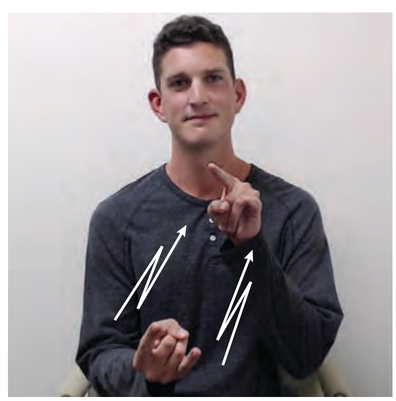
HEARING, SAYING	14-17, 29-33, 231	http://www.handspeak.com/word/search/index.php?id=1001 
HIPPO	194	

HIT	232	http://www.handspeak.com/word/search/index.php?id=1037
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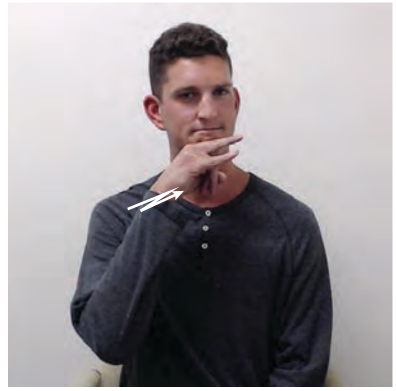
LIE ("horns")	179	
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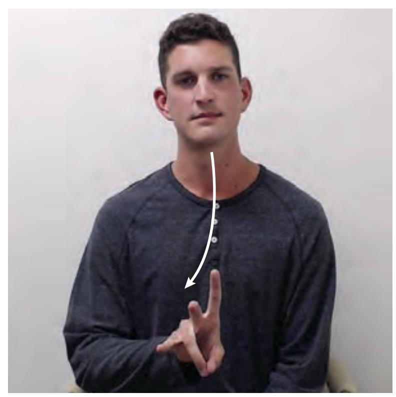

SHED	82	http://www.handspeak.com/word/search/index.php?id=5530
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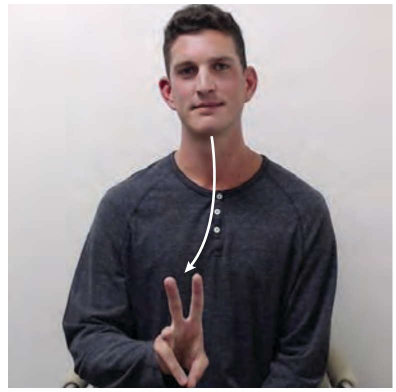
SIX-YEARS-OLD	192	
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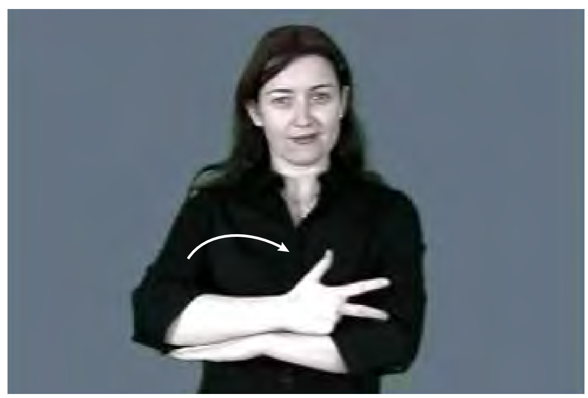

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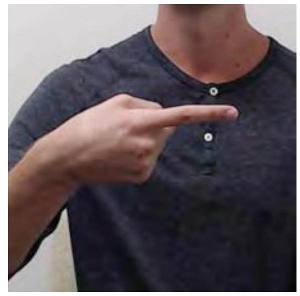
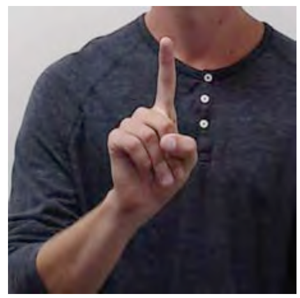
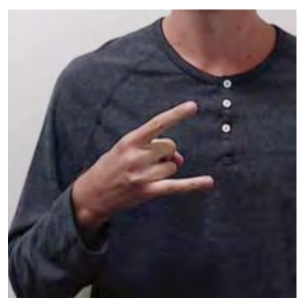
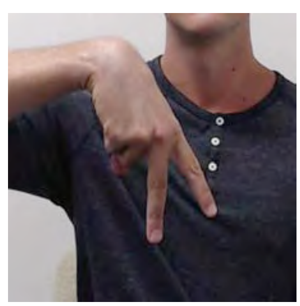
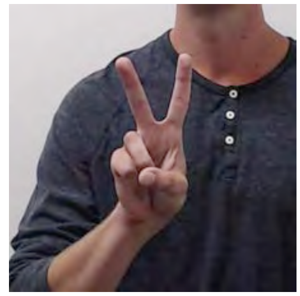
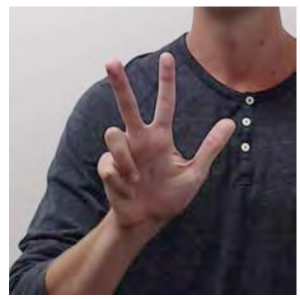
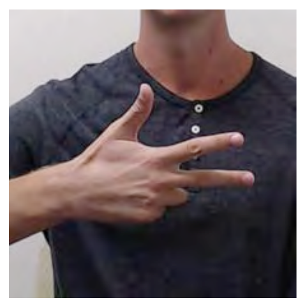
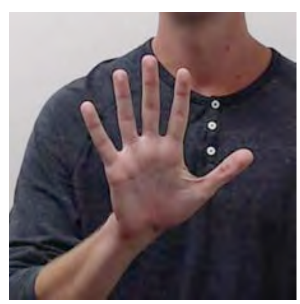
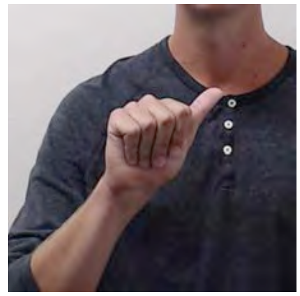
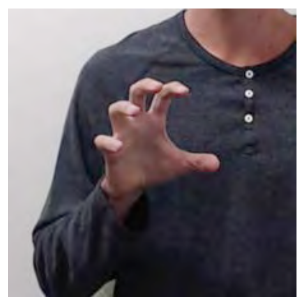
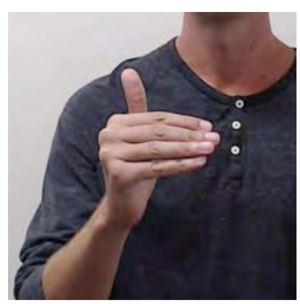
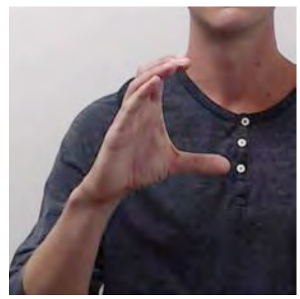
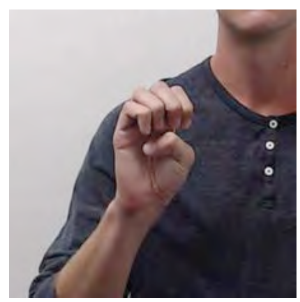
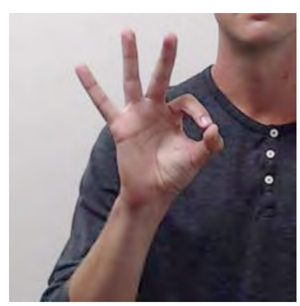
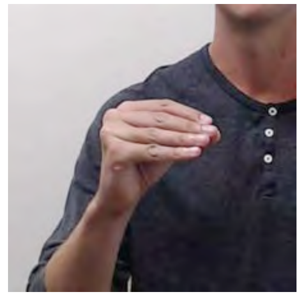
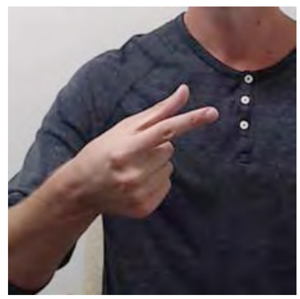
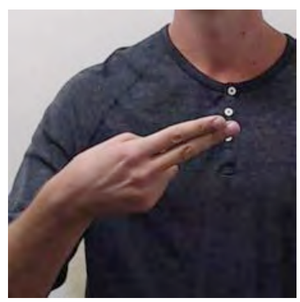
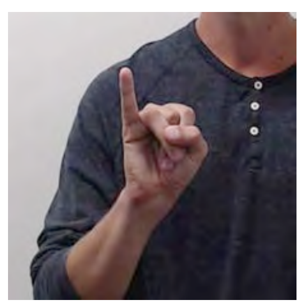
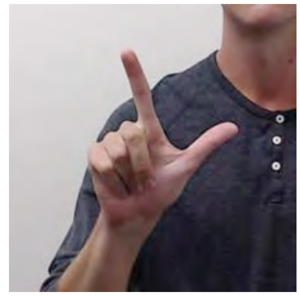
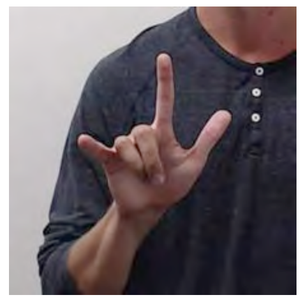
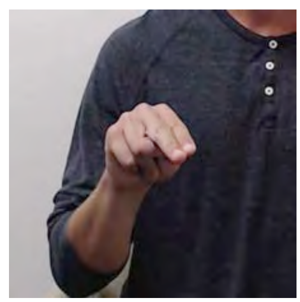
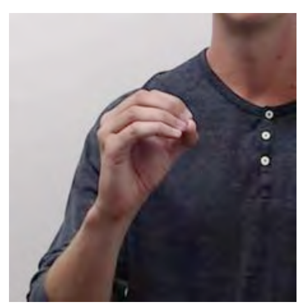
Gloss	Handshape
1 (horizontal)	
1 (vertical)	
1-I, "horns"	
2 (inverted)	

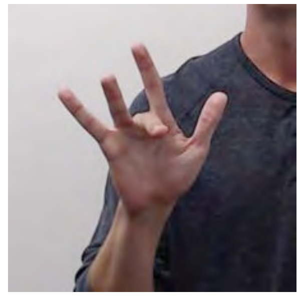
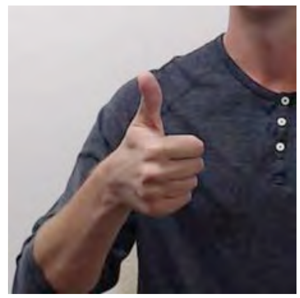
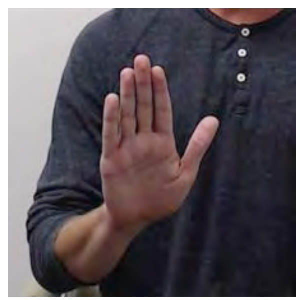
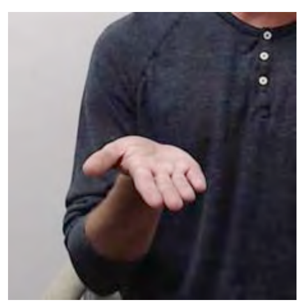
2, V	
3	
3 (horizontal)	
5	

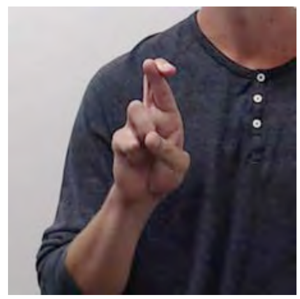
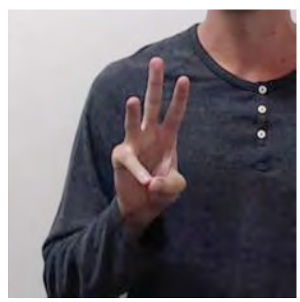
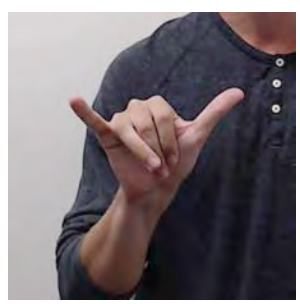
A	
bent-3	
bent-5, "claw"	
bent-B	

bent-L	
C	
E	
F, 9	

flat-O	
G	
H, U	
I	

L	
L-I, "ILY"	
N	
O, 0	

open-8	
open-A	
open-B	
open-B (horizontal)	

open-R	
R	
W, 6	
Y	

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