RESEARCH

A usage-based alternative to "lexicalization" in sign language linguistics

Ryan Lepic

University of Chicago, 5801 South Ellis Avenue, Chicago, Illinois, US

rlepic@uchicago.edu

The usage-based framework considers linguistic structure to be emergent from how human languages are used, and shaped by domain-general cognitive processes. This paper appeals to the cognitive processes of chunking, entrenchment, and routinization to explore a usage-based alternative to the structuralist notion of lexicalization, as it has traditionally been used in sign language linguistics. This exploration shows that chunking, entrenchment, and routinization are useful for re-contextualizing three "lexicalization" phenomena sign language linguistics: multiword expressions, fingerspelled words, and morphologically complex signs. An advantage of the usage-based approach for linguistic theory and description is that it anticipates the existence of linguistic constructions that exhibit analyzable internal structure and holistic properties simultaneously. This alternate framing alleviates the burden for sign language linguists to determine whether or not linguistic constructions have become "lexicalized", and instead directs analysts to focus on the *degree to which* linguistic constructs are established in any language user's mental representation of their language.

> *I propose to do away with one of the objects most cherished by language researchers: the mental lexicon. I do not call into question the existence of words, nor the many things that language users know about them. Rather, I suggest the possibility of lexical knowledge without a lexicon.*
>
> (Elman 2009: 548)

> *What may account for the similarities between two systems with such different developmental trajectories? I suggest a functional explanation: formal similarities are shaped by similarities in function.*
>
> (Meir 2012: 151)

1 Introduction

A primary research goal for many linguists is to be able to explain both the commonalities and the differences among human languages. On one account, languages are shaped by multiple competing cognitive and functional pressures, and so structural diversity is the norm. However, because languages are all shaped by the same types of pressures, they end up being shaped in very similar ways, and some structural patterns recur across languages. From this *usage-based* perspective, language structure is considered to be emergent from how languages are used, and is mediated by general cognitive mechanisms

such as prototype categorization, rich memory, and analogical and inferential reasoning (see Langacker 1988; Barlow & Kemmer 2000; Tomasello 2003; Bybee 2010; Ibbotson 2013; Christiansen & Chater 2016a; b; Lieven 2016). The usage-based perspective on the human capacity for language is in contrast to approaches which instead attribute linguistic structure to an innate, highly abstract, and language-specific endowment.

As an example of a general cognitive mechanism shaping language structure, consider the domain of human memory. In the study of memory, a *chunk* is a structured unit of cognitive organization, "formed by bringing together a set of already formed chunks in memory and welding them together into a larger unit" (Newell 1990: 7). The process of *chunking* is at work when we plan to remember long sequences of information, such as a telephone number or a shopping list, by grouping the information to be remembered into a more manageable number of coherent blocks. Chunking is also at work in the consolidation of procedural memory, for example when we learn to tie shoelaces or to play a song on a musical instrument. Both of these activities are experienced as a series of individual steps at first, and with practice, eventually become melded together into more fluent routines. Bybee (2010: 7) has proposed that this same chunking ability underlies the formation of constructions and constituents that are essential for productive language use. The centrality of chunking in language processing and acquisition has also been emphasized by Christiansen and Chater (2016a: Chapter 5), who argue that learning a language is, in essence, learning to use and quickly identify recurring chunks of structure from that language, at varying levels of symbolic complexity.

From a usage-based perspective, to the extent that a process like chunking is a ubiquitous aspect of human memory and processing, it should also exert similar kinds of pressure on the structures of different languages. Accordingly, in this paper, I consider the general cognitive mechanism of chunking, and the related processes of *entrenchment* and *routinization*, and propose that these processes can be thought of as a usage-based alternative to the structuralist notion of *lexicalization* as it is used in sign language linguistics. To date, there have been relatively few studies of sign language structure from a usage-based perspective. However, sign languages are young languages that are close to their historical origins (e.g., Sandler et al. 2005; Meir et al. 2017). Because the usage-based framework considers grammar to be emergent from repeated instances of language use, across historical timescales, it will be useful in the development of usage-based theory to consider the unique contributions of sign language data (see Emmorey 2016). As a step toward this end, this paper explores how a usage-based approach can be brought to bear on the analysis of sign-formation processes in American Sign Language (ASL), and presents a usage-based approach to the morphological structure of ASL signs.

One of the hallmarks of a usage-based approach is the study of actual instances of language use, rather than introspective or elicited examples. After all, Bybee (2006: 711) characterizes grammar as the "cognitive organization of one's experience with language"; this framing requires us to consider how linguistic constructions are experienced across a variety of usage events, as attested, for example, in naturalistic corpora (see also Dąbrowska 2016: 488). Prior analyses of (synchronic and diachronic) variation in ASL in this tradition include Janzen (1995), Janzen and Shaffer (2002), Russell, Wilkinson, and Janzen (2011), Wilkinson (2013), Anible and Occhino-Kehoe (2014), Wilkinson (2016), Janzen (2018), and Lepic and Occhino (2018). Several of these studies involve small corpora of ASL signing, collected by individual researchers. However, as is discussed in Section 3, there is currently no publically available corpus of representative ASL. Instead, in this paper, all of the examples discussed are drawn from actual instances of ASL signing as attested in videos posted publically on the internet. As such, two important caveats are in order concerning the data discussed in this paper. First, while all of the examples

discussed here are indeed authentic examples of ASL signing, it is not yet clear the extent to which the type of ASL signing that is common on the internet is also representative of natural ASL discourse. Future additional research will be needed to determine possible genre effects in ASL signing, and the potential differences between recorded monologue and interactive discourse. Second, as this paper is not a corpus study, the examples that are discussed are primarily illustrative. This paper adopts a usage-based framework and explores how it can be applied to ASL data, rather than, for example, assessing whether a corpus-based analysis of ASL data can motivate, complicate, or elaborate aspects of the usage-based framework.

The remaining sections of the paper demonstrate that the general cognitive mechanism of chunking is a useful notion for re-contextualizing three phenomena that have previously been described as examples of lexicalization in sign language linguistics. These phenomena are *multiword expressions, fingerspelled words,* and *morphologically complex signs.* Section 2 contrasts the use of the term lexicalization in studies of sign language structure with the alternative assumptions of a usage-based approach, and Sections 3, 4, and 5 demonstrate how multiword expressions, fingerspelled words, and morphologically complex signs can each be re-analyzed from this alternate, usage-based perspective.

2 Reconsidering lexicalization

The term lexicalization implies a *lexicon* of some kind: lexicalization is the process by which words come to be "listed in the lexicon" as fixed pairings of form and meaning. Accordingly, the technical meaning of the term lexicalization will change depending on the notion of the lexicon that is assumed (Himmelmann 2004). In early descriptions of the structure of ASL, the lexicon and lexicalization were both imported directly from structuralist perspectives that were dominant in the United States in the middle of the 20th century. Sign language researchers in the 1960s and 1970s sought to demonstrate, contrary to popular belief at the time, that sign languages are indeed human languages. In order to successfully make this argument, researchers naturally adopted the theoretical and analytic tools that were established in spoken language linguistics.[1] However, some of these theoretical and analytic foundations remain as unquestioned assumptions within sign language linguistics, even when they have been problematized or improved upon in spoken language linguistics (e.g., Elman 2009; Traugott 2014).

In an influential study of diachronic change in ASL, Frishberg (1975: 707) uses the term "lexicalized" to describe historical two-word sequences ("compounds") that have merged together to form single words with idiosyncratic meanings in modern ASL. For Frishberg, lexicalization covers two related phenomena: first, a single sign form[2] has been created, and second, this sign form has been conventionally paired with an unpredictable meaning.

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[1] As part of this research agenda, structural properties that seemed to be unique to sign languages were set aside in favor of commonalities between spoken languages and sign languages. For example, sign languages make simultaneous use of multiple bodily and manual articulators. This presents signers with the opportunity to produce complex, multilayered constructions that deviate from the discrete, linear character that is often ascribed to spoken language (see Kendon 2014; Vigliocco et al. 2014; Perniss 2018). This potential difference between sign and speech complicates the argument that signed languages exhibit the same kind of structure that has been attributed to spoken languages. As a result, there may be a number of morphosyntactic constructions that appear frequently in signed discourse, but have not yet been adequately described. Fortunately, these constraints concerning the legitimacy of sign languages and sign language research have been alleviated to some degree, enabling linguists to analyze sign languages on their own terms, and to also consider the ways in which sign languages can inform and expand the study of spoken languages.

[2] Just as it is difficult to precisely define a suitable, standard notion of "word" in spoken language research (Haspelmath 2011), it can be difficult to suitably define the "sign" in sign language research (Slobin et al. 2001). Several of the issues raised in this article concerning the analyzability of linguistic expressions as structured gestalts bear directly on this question. By "single sign forms", I refer to isolable (hand) movement sequences with identifiable meanings, regardless of whether those meanings are fixed or determined by context (after Stokoe 2001).

A decade later, re-analyzing the same class of signs from a generative perspective, Liddell and Johnson (1986: 501) also suggest that any lexicalized word form is stored in the lexicon with a unitary meaning "that has not been derived from the meanings of its components". In both accounts, lexicalization refers to the process by which a sign form becomes paired with a meaning that is defined by convention, rather than derived by a grammatical rule. The lexicon, then, is conceptualized as an inventory of all such non-derivable form-meaning pairings.

From this structuralist perspective, productive grammatical phenomena are modeled with one mode of representation, that of a symbolic grammatical rule, while linguistic forms whose meanings cannot be derived by rule are instead lexically listed as learned stipulations (this is sometimes referred to as a "post-Bloomfieldian" perspective, see Blevins 2006; 2016 for historical contextualization and critique of this approach). The structuralist notion of lexicalization and the lexicon is also still current in the field of sign language linguistics. Cormier and colleagues (Cormier et al. 2012: 336), for example, define "lexical" signs as highly standardized pairings of form and meaning that are stored in the lexicon. The traditional definition of the lexicon as an inventory of stipulations is maintained, even as the authors attempt to also situate productive morphosyntactic operations in the so-called "productive lexicon", following previous stratified-lexicon proposals from Johnston & Schembri (1999) and Brentari & Padden (2001).[3] Confusingly, in this approach, "lexical" signs that exhibit productive morphology and retain aspects of analyzable internal structure must then be analyzed as having somehow become "de-lexicalized" in the course of language use (Cormier et al. 2012: 338). This use of the terms lexicalization and de-lexicalization rests on the structuralist premise that linguistic expressions are either built up entirely from smaller parts, or they are retrieved from lexical storage as unanalyzed wholes. This division unfortunately imposes a theoretical dichotomy that is at odds with the descriptive generalizations that Cormier and colleagues identify regarding the gradual or partially-fixed structure of many signs in many contexts (Cormier et al. 2012: 330–2).

As an alternative, the usage-based approach rejects the division of linguistic knowledge into lexicon and grammar, recognizing the false dichotomy that this division creates (Langacker 1987; Fillmore et al. 1988; Croft 2001; Bybee 2006; Goldberg 2006; Elman 2009; Lepic & Occhino 2018). Instead, usage-based accounts characterize linguistic knowledge in terms of recurring chunks of structure that are represented in the minds of speakers at varying strengths, according to the discourse contexts in which they are encountered. Under this view, the structured network representing the totality of our linguistic knowledge (both the "words" and the "rules") has been referred to as the "constructicon" (Goldberg 2003; Fillmore et al. 2012; Goldberg 2013) or the "chunkatory" (Christiansen & Chater 2016a: 115). Recurring chunks of structure may become "listed" as a part of linguistic knowledge, but these chunks are not limited to single words with idiosyncratic, unpredictable meanings. Productive grammatical templates are "listed" in linguistic knowledge as well, in the form of grammatical schemas that prescribe how new utterances can be structured. In this way, "listedness" is not considered to be an either-or distinction, in opposition to grammar.

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[3] The idea of a "productive lexicon" in sign language linguistics comes from the generative theory of lexical phonology (e.g., Kaisse & Shaw 1985; Padden & Perlmutter 1987). The basic idea is that the lexicon is conceptualized as containing different levels or strata which are involved in the derivation of distinct morphological/phonological phenomena. Lexical phonology is a highly assembly-driven approach to morphology/phonology, and this type of analysis, which derives linguistic expressions from an underlying representation, is fundamentally incompatible with the usage-based framework's orientation to surface forms (e.g., Bybee 1994).

If not analyzability, then what other factors determine how linguistic forms become committed to linguistic knowledge? Bybee (2001; 2007; 2010) has demonstrated that there is a direct relationship between repetition and the registration of structured chunks in memory: repeatedly experiencing and producing a string of linguistic information gradually strengthens our mental representation of that string, making it increasingly accessible as a structured unit. This continuous strengthening process is known as *entrenchment*; a highly entrenched chunk of structure is well established in our mental representation of our language. Highly entrenched patterns also become increasingly automatic in terms of mental and motor processing, in the same way that continued practice leads to increased fluency in athletic or musical performance.

Construction grammarians have also argued that recurring chunks of linguistic structure are instructive for grammatical theory, because they display idiosyncratic and regular grammatical properties simultaneously. These chunks thereby bridge the presumed gap between "lexicon" and "grammar" (see Fillmore et al. 1988; Goldberg 1995; Culicover & Jackendoff 1999; and Croft 2001 on idioms; see Pawley & Syder 1983; Jackendoff 1997: Chapter 7; Erman & Warren 2000; and Christiansen & Arnon 2017 on multiword expressions). For example, an idiom like English *pull strings* has a conventional, non-derivable meaning, 'to exert influence'. It also exhibits regular morphosyntactic structure, and the verb *pull* changes to reflect distinctions of voice and tense, when used in context (as in, *Another question that's been raised by reporters is whether or not **strings** were **pulled** to get him in the National Guard during Vietnam,* which is attested in Davies 2008–). It is not immediately obvious whether this idiom is best characterized as having been "retrieved from lexical storage" or "derived by a grammatical rule", since it clearly exhibits both "lexical" and "grammatical" properties. Along similar lines, many multiword expressions exhibit fully regular morphosyntax, yet they are also recognized by speakers as the "correct" way to express an idea, over other, non-conventionalized alternatives. An example from English is *take a picture*, which is more acceptable than *make a photo*. Though these phrases have identical morphosyntactic structure, and seem to be semantically equivalent, they differ in that *take a picture* is understood to be the conventional way to express this concept in English, and *make a photo* is less standard, and associated with non-native speech. In light of examples like these, construction grammarians view regular grammatical patterns as emergent generalizations that capture recurring aspects of form and meaning across language usage events, at varying levels of morphosyntactic structure.

Another example of a conventionalized chunk of structure in English is the sequence *I don't know*. This sequence has an interactional as well as a declarative function. For example, in addition to situations when we truly do not know something, English speakers often use this chunk of structure for polite disagreement, even if we are certain that our interlocutor is mistaken. Bybee (2001: 60) has demonstrated that such high-frequency chunks of linguistic structure also often undergo "special reduction" due to articulatory *routinization* (see also Browman & Goldstein 1992; Russell et al. 2011). This reduction is possible because highly entrenched chunks are recognizable as items, without being fully or exclusively parsed in terms of their internal structure. Accordingly, as it is used frequently in particular discourse contexts, this sequence *I don't know* becomes increasingly entrenched in linguistic knowledge, becoming repackaged and accessed as a single unit. This mental repackaging due to frequent repetition also facilitates gradual erosion of the sequence due to routinization. In some contexts, the chunk *I don't know* can be pronounced without much of its segmental content, for example as *I dunno, I'd'no,* or as a distinctive intonation contour over a nasalized central vowel (see Hawkins & Smith 2001). Other examples of special reduction in high-frequency sequences in English include the contraction of

auxiliary verbs and *not*, as in *don't* and *wasn't*, the fusion of clausal complement verbs and *to*, as in *wanna* and *hafta*, and the palatalization of alveolar sounds followed by glide-initial *you* as in *didja* and *don'cha* (see Bybee 2001 for additional examples).

The processes of chunking of linguistic structures, entrenchment of frequent chunks, and routinization of entrenched sequences all cover the same descriptive ground as lexicalization, without implicitly adopting a bifurcated, lexicon-and-grammar view of linguistic structure. Instead, usage-based approaches recognize that linguistic constructs with varying degrees of symbolic complexity can be registered as part of linguistic knowledge, with no strict divide between those items that are "listed" and those that are "derived". Figure 1 presents a visual representation of these two alternative approaches. For a usage-based linguist, linguistic constructions span a continuum from highly structured to highly holistic, with the majority of constructions exhibiting holism and structure, simultaneously. This approach leads us to expect that, though we may find instances of fully analyzable and wholly unanalyzable linguistic objects, we also should find many degrees of analyzability between these two extremes.

Though structuralist and usage-based linguists share a common goal of trying to characterize the source and nature of linguistic structures, their foundational beliefs about how language works lead them to different accounts of where linguistic structure comes from. Similarly, regardless of theoretical persuasion, sign language linguists are all studying the same "lexical" phenomena. However, while the structuralist approach asks us to decide whether or not a particular form has "become lexicalized", the usage-based approach offers a way around this imposed dichotomy, and leads us to instead see linguistic constructions as exhibiting degrees of analyzable structure.

In this section, I have suggested that the term lexicalization, as it is commonly used in discussions of sign language structure, rests on a conceptualization of linguistic knowledge where single, minimally meaningful forms are "listed in the lexicon" when their meaning cannot be "derived by grammatical rule". However, usage-based and construction-theoretic approaches instead argue that facts of language use, in particular frequency of (co-)occurrence across communication contexts, dictate the *degree to which* linguistic constructs become committed to linguistic knowledge. Rather than suggesting that listedness is an "either-or" process, in the sense that a particular item is either listed in linguistic knowledge or it is not, the usage-based approach instead highlights that, just as patterns
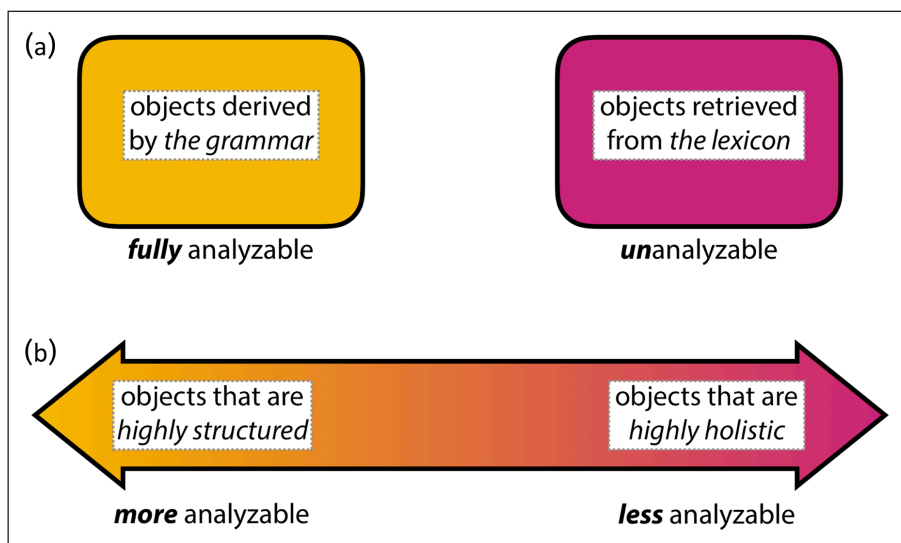
Figure 1: Visual representations of **(a)** the lexicon and grammar as separate forms of linguistic knowledge, and of **(b)** linguistic knowledge as a continuum.

of language use are gradient, so too are the degrees of analyzability, entrenchment, and reduction that any linguistic construct may exhibit.

The following sections demonstrate how this alternate framing can be extended to illuminate three phenomena that have previously been classified as examples of "lexicalization" in ASL: multiword expressions, fingerspelled words, and morphologically complex signs. In presenting the usage-based approach, I focus on representative examples that occupy "the middle" of the continuum visualized in Figure 1b, as these objects have been largely overlooked in the sign language literature, to date.

3 Multiword expressions

Here I use the term *multiword expression* as a convenient and inclusive label for idioms, formulaic expressions, conventionalized collocations, and other examples of prefabricated language (see Jackendoff 1997: Chapter 7; Erman & Warren 2000; Ellis 2002; Wray 2002: Chapter 1; Bybee 2006). Already described in Section 2, multiword expressions are combinations of words that are conventionalized as "the right way" to say something in a given language; they are structured utterances whose usage is subject to additional learned nuance. Erman and Warren (2000: 37) demonstrate that multiword expressions make up approximately 55% of spoken and written English texts, highlighting the central role that these constructions play in the course of language use. Some additional examples of multiword expressions in English are provided in Table 1: these are all recurring "chunks" of analyzable structure in English.

Given the fact that English speakers, at least, seem to "do just as much remembering as they do putting together" (Bolinger 1979: 97), it is striking that, aside from studies on the phonological structure of so-called "lexicalized compounds", to be discussed below, there are no previous studies of multiword expressions in any sign language, as such (see Wilkinson 2016: 115).

This descriptive gap likely results from a lack of suitable corpus data. Though there are now a handful of projects to develop national sign language corpora (see Börstell *in press* for an instructive introduction), these projects have not progressed to a point where concordance for frequent collocations can be done as easily it can be done English (where it is still not at all trivial; see Erman & Warren 2000: 31–34). ASL linguistics, in particular, lags quite far behind: in 2018, there is no publically available corpus of representative ASL. Instead, previous assessments of frequency in ASL have considered only the frequency of occurrence for individual signs (e.g., Morford & MacFarlane 2003; Mayberry et al. 2014), to say nothing of the frequency of co-occurrence for two or more signs (note that Wilkinson 2016, on frequency effects in NOT-collocations, is the exception).

If it turns out that ASL actually does not have very many conventionalized, frequently-occurring multiword expressions, this could be due to a number of mutually compatible factors. For example, English is an old language with a long literary tradition. In contrast, ASL is approximately 200 years old and lacks a standardized and widely-accepted writing

Table 1: Five examples of multiword expressions in English.

Multiword expression	As analyzed by...
beyond repair	Bybee 2006: 713
can't go wrong	Bybee 2010: 158
I can believe that	Bybee 2010: 158
need help	Bybee 2006: 713
they've had their ups and downs	Jackendoff 1997: 154

system. These factors, language age and relative diversity of text genres, could conceivably influence the institutionalization and maintenance of conventionalized multiword expressions (e.g., Cutler 1982; Corson 1997). Sign languages are also often characterized by patterns of atypical transmission. The majority of deaf infants are born to hearing parents, and it is rare for deaf children to learn a sign language from caregivers who themselves learned that sign language from signing caregivers (see Mitchell & Karchmer 2004; Morford & Hänel-Faulhaber 2011; Bickford et al. 2015; Henner et al. 2016).[4] These patterns of atypical intergenerational transmission may disrupt the institutionalization and maintenance of multiword expressions in a language. This seems especially likely considering that many multiword expressions are acquired early in development (Bannard & Matthews 2008; Arnon et al. 2017). Finally, it may be that individual signs in sign languages already display high levels of idiomaticity, leaving little semiotic need for idiomatic multiword expressions, a possibility that has been suggested by Johnston and Ferrara (2012) (and see Rice's 2017 related discussion of multiword expressions and polysynthetic languages). At any rate, we will not know whether there is indeed a difference between spoken and signed languages with respect to the prevalence of multiword expressions until we look for conventional multiword expressions in individual sign languages in a systematic, linguistically-informed way.

Despite the fact that there has been little direct research on multiword expressions in any sign language, it is well-known that, in ASL, new sign forms can emerge from the phonetic fusion of certain collocations with specialized meanings or discourse functions (recall Frishberg 1975; Liddell & Johnson 1986 from Section 2). These signs have previously been discussed as examples of "lexicalized compounds". However, Lepic (2016) argues that this is an error in terminology, as these phonetically fused signs are not compounds in any synchronic sense, nor do many of them seem to be descended from former compounds, in a diachronic sense. These signs are better described as a class of constructions that have undergone phonetic reduction over time due to their patterns of use. This is consistent with Wilkinson's (2013; 2016) description of such signs as "reduced collocations" and "fused constructions" in ASL. An example is the sign glossed[5] UP-TO-YOU, which derives etymologically from the fusion of the independent signs THINK and SELF. The signs THINK and SELF have distinct handshapes and movement patterns, but the phonetically fused sign UP-TO-YOU combines the handshape and the movement patterns of these signs, repackaging them into a single unit (see Wilkinson 2013: 480–1). Similarly, the ASL sign glossed DON'T-HAVE-TO comes from the fusion of NOT and HAVE-TO. The handshapes and movements of these signs are merged in the resulting single sign DON'T-HAVE-TO (see Wilkinson 2016: 91).

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[4] An anonymous reviewer comments that sign language linguists typically work with language consultants who have acquired a sign language from birth, yet only 5–10% of the ASL signing population meets this criterion. The reviewer reminds us that if we do not study the language development and communicative practices of the remaining 90–95% of the ASL signing population, then we cannot claim to have a good idea of how linguistic constructions are represented in the minds of the people that make up the signing community (see, e.g., Morford & Hänel-Faulhaber 2011).

[5] Glossing is a fraught practice in sign language linguistics, as there is no widespread notational system for transcribing sign forms that is comparable to the International Phonetic Alphabet. Instead, it is typical to refer to sign forms with glosses that approximate their meanings, and to supplement these glosses with still images of signs and informal descriptions of the intended form. Here, glosses for individual sign forms are written in small caps, either single words (SIGN) or hyphenated groups of words (SINGLE-SIGN). Fingerspelled words are annotated with the abbreviation "fs" ($_{fs}$WORD) while more highly restructured fingerspelled words are annotated with "#" ($_{\#}$WORD). While sign glosses in this paper are assigned according to the meaning of the form in context, readers may find the following online resources helpful for accessing videos of highly conventionalized ASL signs: https://aslsignbank.haskins.yale.edu/, https://www.hand-speak.com/word/search/, and https://www.signingsavvy.com/.

The signs UP-TO-YOU and DON'T-HAVE-TO are single sign forms, shaped by special phonetic reduction of a former two-sign sequence, over time. What is implicit in this characterization is the fact that the ability to use a language rests, to some extent, on the ability to build complex linguistic constructs "from scratch", and that some sequences of items eventually co-occur with sufficient frequency that they can become phonetically eroded. But from a usage-based, construction-theoretic approach, where fine-grained patterns of use determine how recurring structures become entrenched in linguistic knowledge, we also expect to find constructs somewhere in between newly-made, one-off utterances, and highly fused constructions, at either end of a continuum of analyzability.

In the remainder of this section, I describe two verb + argument constructions that appear to be learned "chunks" of recurring structure in ASL, and so can be considered examples of conventionalized multiword expressions. I refer to these multiword expressions as INTERPRETER BRING-IN, meaning 'to get an interpreter' and TAKE-TO HOSPITAL, meaning 'to be sent to the hospital' (see Figure 2).[6] These multiword expressions exhibit analyzable structure, in the sense that they are composed of signs that occur independently in other contexts, and language users who have not encountered these constructions before will be able to compute the relation between the component signs in context.

Figure 2: Two multiword expressions in ASL: **(a)** INTERPRETER BRING-IN and **(b)** TAKE-TO HOSPITAL. The images in this figure have been extracted from (a) https://youtu.be/uXdL5njDiBU?t=1m48s and (b) https://youtu.be/ovkTXT9CzKw?t=5m41s.

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[6] Consistent with the discussion of morphologically complex words in Section 5, the ASL sign INTERPRETER in Figure 2a can be analyzed as having originally been formed via concatenation of INTERPRET and PERSON, however, due to its high frequency of use, this construction has undergone special reduction that obscures its etymological origins as a combination of two signs (Lepic & Padden 2017: 494).

At the same time, these two constructions seem to recur as favored, idiomatic ways to express the concepts they denote in ASL.

In contrast to the phonetically reduced, single sign forms described above, these multiword expressions are not completely fixed in form, nor have their component signs merged together to form a single sign. Instead, particular instantiations of these two constructions exhibit systematic variation in word order, timing, and form, across discourse contexts. This variation reveals that these multiword expressions are relatively loose, idiomatic chunks of structure, and that they are also subject to the requirements of the constructions with which they co-occur. This is comparable to the use of dative and phrasal verb constructions in English, which involve conventional multiword expressions that also appear in different syntactic word orders, depending on a number of structural and semantic considerations (see Gries 2003; Bresnan & Ford 2010).

The following glossed examples are attested instances of the multiword expressions (1) INTERPRETER BRING-IN and (2) TAKE-TO HOSPITAL, from ASL signing on the internet. In these glossed representations, and in the varying English free translations, there is variation in the word order and argument structure for each construction. The verbal signs BRING-IN and TAKE-TO are also directed to varied regions of signing space around the signer in each example, as they participate in discourse-level argument-structure constructions (see Janzen O'Dea & Shaffer 2001; Meir 2012; Hou & Meier 2018; Pfau, Salzmann & Steinbach 2018; Schembri, Cormier & Fenlon 2018). In (1a) and (1c), the sign BRING-IN moves from the signer's right to the space in front of the signer's body (as in Figure 2b), coding a third party as the agent of the verb. In (1b), the sign BRING-IN moves toward the signer's chest, coding the signer as the recipient of the denoted action.

(1)   a.   Source: https://youtu.be/uXdL5njDiBU?t=1m48s
              OK, **INTERPRETER BRING-IN**
              'they agreed to get an interpreter'

        b.   Source: https://youtu.be/VTE-KpB109E?t=1m4s
              FINALLY **BRING-IN INTERPRETER**
              'they finally gave me an interpreter'

        c.   Source: https://youtu.be/PhVxvTsIsrw?t=8m29s
              ASK, LAST NIGHT **INTERPRETER** WHICH AGENCY **BRING-IN**
              'I asked them, "which agency assigned you the interpreter from last night?"'

(2)   a.   Source: https://youtu.be/ovkTXT9CzKw?t=5m41s
              STILL ALIVE, BRING-OUT **TAKE-TO** TO **HOSPITAL**
              'they were still alive, so they were taken out and sent to the hospital'

        b.   Source: https://youtu.be/rOHlZGsntto?t=27s
              SINCE **TAKE-TO HOSPITAL** ENGLAND
              'they had been taken to a hospital in England'

        c.   Source: https://youtu.be/DaMD9zsZfQc?t=4m52s
              ₍fs₎AT **HOSPITAL TAKE-TO**
              'at the hospital they had been sent to'

With INTERPRETER BRING-IN and TAKE-TO HOSPITAL, we have phrases that are composed of signs that appear together often, for discourse-functional reasons. Part of the hospital "frame" (Fillmore 1982) is the knowledge that those in need of emergency care must be transported to the hospital in order to receive that care. As a result, conversations about hospitals can be expected to also include patient transport to the hospital. Similarly, for ASL signers, interpreters are often a crucial part of formal interactions with

hearing non-signers. ASL signers are therefore aware of, and often openly discuss, the various difficulties associated with securing a capable interpreter's services.

Aspects of these frame-semantic conceptualizations are also coded with the signs that are used in these conventional multiword expressions. Both INTERPRETER BRING-IN and TAKE-TO HOSPITAL make use of motivated "handling" handshape signs that show how their respective patients are conceptualized (see Engberg-Pedersen 1993; Padden et al. 2013). In INTERPRETER BRING-IN, the sign BRING-IN is a one-handed sign with a closed fist (recall Figure 2a), and evokes grabbing and physically moving an interpreter into position. In this sign, the patient is construed as an upright figure that is handled somewhat roughly. In contrast, the sign TAKE-TO is morphologically related to the signs BRING and OFFER in ASL, a two-handed sign with palms up (recall Figure 2b), portraying the (medical and grammatical) patient as though lying on a gurney designed for medical transport.

The mechanism of chunking allows us to understand how ASL constructions such as INTERPRETER BRING-IN and TAKE-TO HOSPITAL can exhibit "loose" structure of the type described above, while also participating in the learned inventory of recurring constructions in ASL: chunking is the process by which sequences of units that are used together form more complex units (Bybee 2010). With repeated use, multiword expressions become increasingly entrenched in linguistic knowledge as structured gestalts (Bybee 2006). These chunks of recurring structure facilitate faster input processing and more efficient production (Christiansen & Chater 2016b). In special cases, highly frequent multiword expressions may become highly fixed in form, and subsequently undergo more extreme phonetic reduction of the sort documented by Wilkinson (2013; 2016), as their articulation becomes increasingly routinized for language users.

The multiword constructions INTERPRETER BRING-IN and TAKE-TO HOSPITAL, however, represent more typically structured chunks of the sort that are familiar from existing research on multiword constructions in English. These constructional chunks of morphosyntactic structure reside between the two extremes of one-off utterances that are, by definition, newly made according to productive principles, and those highly entrenched, highly fixed constructions whose meanings may be dictated by linguistic convention alone.
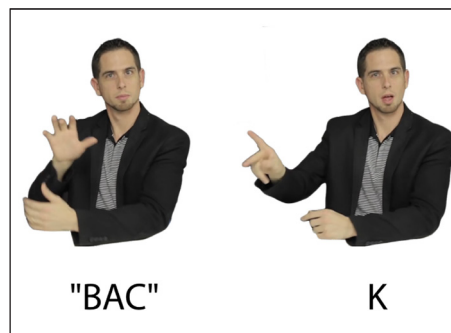
4 Fingerspelled words

Fingerspelling is a mechanism for borrowing items from a spoken language into a sign language. Not all sign languages make extensive use of fingerspelling, and fingerspelling systems vary from language to language. In ASL, a one-handed fingerspelling alphabet facilitates the borrowing of English words by representing a sequence of written letters with a sequence of ASL handshapes. Fingerspelling is very common in ASL discourse, and ASL has a large inventory of fingerspelled borrowed vocabulary, which includes proper names like *Ford* and common nouns like *broccoli* (Padden 2005). An example of an ASL sentence containing three fingerspelled items is transcribed below in (3).

(3)   Source: https://youtu.be/cckRjkJC7mE?t=5m44s
         UNDERSTAND, $_{fs}$**DRLUKE** INDEX SUE $_{\#}$**BACK**, $_{fs}$**COUNTER** SUE
         'now, **Dr. Luke** sued her **back**, it was a **counter**-suit'

The three fingerspelled items in (3) differ in their discourse function and in their phonological structure. Two of these fingerspelled words are used as part of a referential construction, the name *Dr. Luke* and the English word *counter* in the borrowed term *counter-suit*. The form of the fingerspelled word glossed as $_{fs}$COUNTER is shown in Figure 3. In this fingerspelled word, we can identify a sequence of seven independent handshapes (more or less, see Wilcox 1992; Brentari 1994). Each of these identifiable handshapes corresponds to a written letter of the borrowed English word.
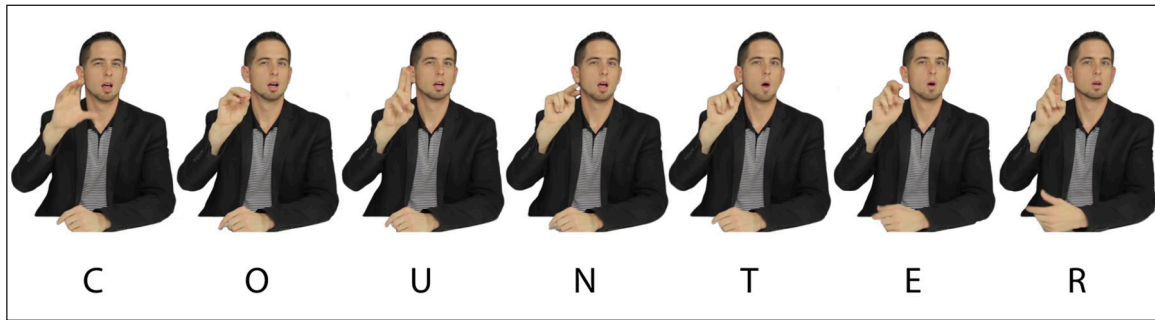
Figure 3: The fingerspelled word _{fs}COUNTER. The images in this figure have been extracted from https://youtu.be/cckRjkJC7mE?t=5m44s.

Figure 4: The ASL sign _#BACK. The images in this figure have been extracted from https://youtu.be/cckRjkJC7mE?t=5m44s.

The remaining fingerspelled word in (3) is a so-called "lexicalized loan sign", which is etymologically analyzable as related to a fingerspelled English word, but it has been heavily restructured to become a single ASL sign form (these signs are conventionally annotated with an initial #, after Battison 1978; Padden 1998; Padden & Gunsauls 2003; note that this convention imposes a categorical distinction as to whether or not any given fingerspelled word has "become lexicalized"). The form of this sign _#BACK is shown in Figure 4.

The sign _#BACK contains vestiges of the fingerspelled handshapes corresponding to the letters B, A, C, and K. In particular, the final K is retained at the end of the sign _#BACK. However, the B, A, and C handshapes have become reduced and fused together into a more holistic curling movement, which is glossed here as "BAC". In contrast to the fingerspelled word _{fs}COUNTER, the restructured sign _#BACK is also articulated with a short path movement away from the signer's body. This is because its function is closer to a predicate ('he sued her *back*') than a referential expression ('a *counter*-suit').

Parallel to the discussion of multiword constructions in Section 3, among fingerspelled words in ASL, we again see two extreme ends of a continuum of analyzability. Some fingerspelled words are *ad hoc* borrowed words in ASL discourse, resulting from productive use of fingerspelling. In these words, each of the letters must be articulated distinctly enough that the target word can be parsed and recognized by an interlocutor. However, some fingerspelled words are used with sufficient frequency across grammatical contexts that their alphabetic handshapes have fused together, obscuring the sign's original etymological structure, and the fingerspelled sequence has become increasingly sign-like, as a result. Conceptualizing this trajectory from one-off borrowings to highly "nativized" (Brown & Cormier 2017) fingerspelled loans, from a usage-based perspective, we expect to find examples of fingerspelled words falling somewhere between these two extremes.

Lepic (2018) documents fingerspelled words occurring across approximately 45 minutes of ASL signing in four consecutive broadcasts of an ASL news show, from February 22–25, 2016. The resulting dataset contains 892 fingerspelled word tokens belonging to 354 word types. The fingerspelled words in the dataset follow a Zipfian distribution, in that very few fingerspelled words occur 7 or more times in the data (n = 27, 8% of word types), and the majority of fingerspelled words in the dataset are "hapaxes" appearing with token frequency of 1 (n = 219, 62% of word types). Fingerspelled tokens are also distributed differentially across the four time points: some frequently-occurring finger-spelled words occur in all four broadcasts, while others are attested in only one of the four broadcasts. As the following tables suggest, these classes of words differ such that those words that appear frequently across different time points are highly grammatical in function (in English and as borrowed words in ASL; Table 2), while those that appear frequently only within a single time point are primarily referential in function (Table 3).

Fingerspelled words appearing frequently at a single time point are good candidates for constructions falling between the extreme ends of the continuum of analyzability described in Section 2. They are not one-off borrowings by definition, since they are attested a number of times in the data. Nor do they seem likely to be examples of highly nativized signs with highly grammatical functions, since their use is motivated by particular discourse topics. Here, two fingerspelled words of this type are described in more detail, the fingerspelled words $_{fs}$PEN, from the February 22nd broadcast, and $_{fs}$POWDER, from the February 24th broadcast. These words are instructive because, as common nouns, they provide an opportunity to see the effects of reduction on the durations of repeated fingerspelled words in a single discourse context (see also Börstell et al. 2016 on sign

Table 2: Token counts for fingerspelled word types appearing at all four time points. The most frequent 5 out of 10 such word types are shown here.

	22-2-16	23-2-16	24-2-16	25-2-16	Total
$_{\#}$NO	1	12	8	7	**28**
$_{\#}$DID	5	11	5	6	**27**
$_{\#}$DO	2	5	5	13	**25**
$_{\#}$OF	6	1	3	3	**13**
$_{\#}$OR	5	2	3	3	**13**

Table 3: Token counts for fingerspelled word types appearing at only one time point. The most frequent 5 out of 309 such word types are shown here.

	22-2-16	23-2-16	24-2-16	25-2-16	Total
$_{fs}$DR (title; *doctor*)	–	15	–	–	**15**
$_{fs}$FBI (organization name)	–	–	–	10	**10**
$_{fs}$ASLA (organization name; *ASL Academy*)	–	–	9	–	**9**
$_{fs}$KESHA (person name)	–	9	–	–	**9**
$_{fs}$LUKE (person name)	–	9	–	–	**9**

Table 4: Durations for six consecutive tokens of ₍fs₎PEN and five consecutive tokens of ₍fs₎POWDER.

Mention	22-2-16		24-2-16	
	Word	Duration	Word	Duration
1	₍fs₎PEN	0.54s	₍fs₎POWDER	1.16s
2	₍fs₎PEN	0.53s	₍fs₎POWDER	0.78s
3	₍fs₎PEN	0.36s	₍fs₎POWDER	0.79s
4	₍fs₎PEN	0.37s	₍fs₎POWDER	0.68s
5	₍fs₎PEN	0.26s	₍fs₎POWDER	0.44s
6	₍fs₎PEN	0.30s	–	–

duration). Table 4 shows the durations for each repeated word token in succession; the token durations reported here were measured through manual coding in ELAN (Brugman & Russel 2004).

In Table 4, across repetitions of both ₍fs₎PEN and ₍fs₎POWDER, that there is a general pattern such that the first articulation of the fingerspelled word is longer, and subsequent mentions become shorter in duration (consistent with Halliday 1967; Fowler & Housum 1987). This difference in durations has a functional motivation: a longer first mention facilitates better parsing of the fingerspelled word and recognition of the intended referent (consistent with Fowler 1988; Jurafsky et al. 2001; Pluymaekers et al. 2005). Subsequent mentions of the same referent serve a different function: rather than introducing a new referent, they re-introduce an already-mentioned referent. Because they refer to an already-mentioned referent, these forms do not need to be as prominently articulated in order to be successfully processed and recognized (Lieberman 1963; Lam & Watson 2010; Vajrabhaya & Kapatsinski 2011).

In other words, when mentioning a fingerspelled referent for the first time, the letter handshapes making up the internal structure of the word provide necessary cues to the identify of the intended referent. However, on subsequent mentions, the fingerspelled word as a holistic chunk takes increasing precedence over its component letters. Viewers do not need to identify but merely recognize the already-mentioned fingerspelled referent. As a result, these repeated mentions may become phonetically reduced and fused together for the sake of articulatory efficiency, reducing to around half their original duration (consistent with Gahl et al. 2012).

The first and final mentions of ₍fs₎POWDER and ₍fs₎PEN are shown in Figures 5 and 6. In both cases, the first mention is an appreciably fuller articulation, and is formed with (comparatively) more distinct handshapes for each letter. In contrast, by the final mention, the holistic shape of the fingerspelled word takes precedence over its parts, and the individual handshapes become somewhat merged with their neighboring handshapes. This phonetic reduction is a result of articulatory routinization due to repetition in a single context, and is driven by the discourse-familiarity and high predictability of the particular items. Note that even the word ₍fs₎PEN, which is already very short, reduces to approximately half of its original duration, and in the more reduced form, executes a single twisting (or "pronating") movement from the P handshape to the N handshape.

The mechanism of chunking allows us to understand how repeated fingerspelled words such as ₍fs₎POWDER and ₍fs₎PEN can shift, over the course of a few minutes, from more highly structured fingerspelled words, where each letter handshape can be identified, to more reduced articulations where the individual letter handshapes become increasingly obscured. As they are used together, the handshapes that make up these fingerspelled words gradually become fused together, for the sake of efficient production. Though initial
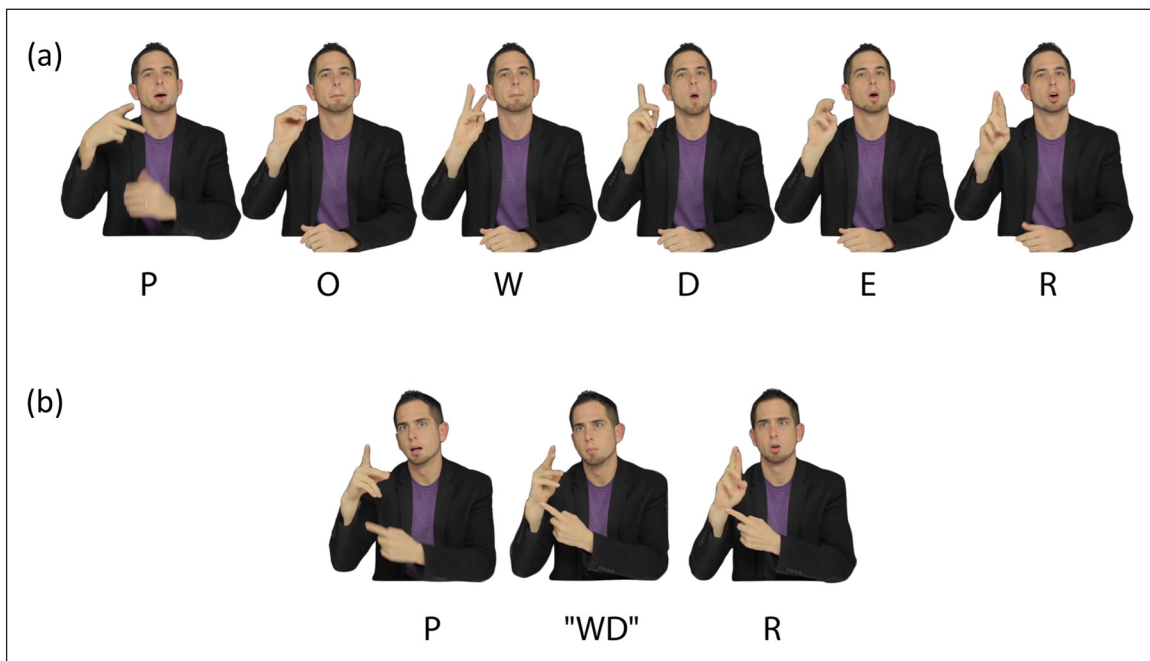
Figure 5: Comparison of the fingerspelled word _fs_POWDER on **(a)** the first mention vs. **(b)** the fifth mention. The images in this figure have been extracted from https://youtu.be/HZVs620-Fes?t=1m59s.
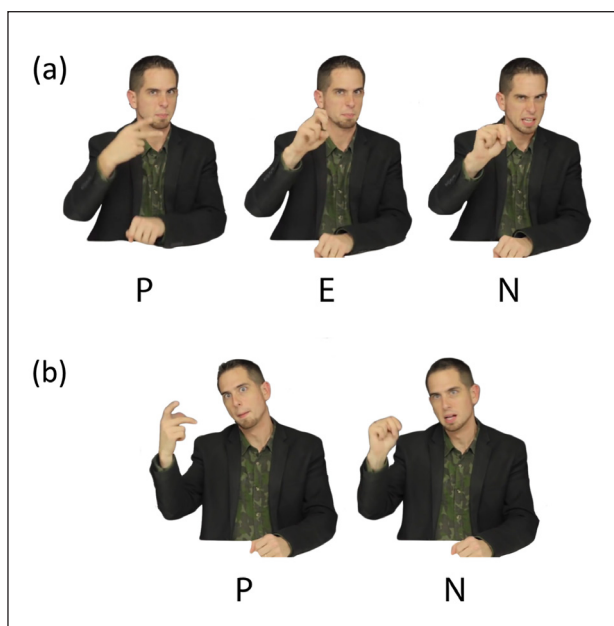
Figure 6: Comparison of the fingerspelled word _fs_PEN on **(a)** the first mention vs. **(b)** sixth mention. The images in this figure have been extracted from https://youtu.be/DYofwzZ8_Gw?t=9m1s.

mentions of a fingerspelled referent need to be processed as a sequence of independent letters, subsequent mentions are more holistic. The result is that individual fingerspelled words reside along a continuum of analyzability, and shift along this continuum according to how they are used within and across discourse contexts.

It is important to note that this phonetic fusion due to chunking is not a monolithic process. In a different discourse context, where these fingerspelled words again function to introduce rather than to re-introduce particular referents, they should again exhibit fuller,

more distinct internal structure. This functional pressure causes these content words to retain higher degrees of analyzability, overall. Conversely, more highly grammatical fingerspelled words, whose functions require them to occur in a wider range of discourse contexts, in combination with different construction types, will be produced more often, and accordingly are subject to further reduction. In these cases, their overall shapes as frequently occurring single sign forms, rather than structured sequences of individual letter handshapes, will facilitate their recognition in signed discourse.

This difference can be seen by comparing the fingerspelled content words fsPEN and fsPOWDER with the fingerspelled function word #DID.[7] In this dataset, #DID occurs more frequently than either fsPEN or fsPOWDER. Recall from Table 2 that #DID is attested 27 times across the four broadcasts that were analyzed; unlike the content words fsPEN and fsPOWDER, the distribution of #DID goes beyond specific discourse topics. At the same time, #DID is attested 5 times in both of the broadcasts that fsPEN and fsPOWDER appear in, and, like *pen*, English *did* is a three-letter word. This provides a point of comparison for the trajectory for words with similar structure but with different discourse functions.

Table 5 shows the durations of the 5 tokens of #DID from the broadcasts that contain the tokens of fsPEN and fsPOWDER described above. Also listed in Table 5 are the time codes that mark the onset of each fingerspelled token, within their respective video broadcasts. From this data, we can see that the tokens of #DID are more spread out in each broadcast, while the tokens of fsPEN and fsPOWDER are more localized, occurring within shorter, one-to two-minute windows.

Unlike the fingerspelled words fsPEN and fsPOWDER, #DID has a consistent, very short duration, regardless of whether it has been previously mentioned in the local discourse. This can be interpreted as the cumulative result of articulatory routinization of a frequent, highly entrenched construction; this borrowed word has been continually re-shaped as it has been used across a variety of contexts in ASL. As a grammatical function word, #DID is

Table 5: Duration and distribution for five consecutive tokens of #DID from two time points, compared with the duration and distribution of consecutive tokens of fsPEN and fsPOWDER.

22-2-16						
Mention	**Word**	**Duration**	**Time (onset)**	**Word**	**Duration**	**Time (onset)**
1	#DID	0.25s	00:34.7	fsPEN	0.54s	09:03.7
2	#DID	0.26s	03:50.1	fsPEN	0.53s	09:10.1
3	#DID	0.33s	05:55.2	fsPEN	0.36s	09:13.1
4	#DID	0.29s	06:14.4	fsPEN	0.37s	09:18.9
5	#DID	0.30s	06:17.9	fsPEN	0.26s	09:25.5
6	–	–	–	fsPEN	0.30s	09:26.7
24-2-16						
Mention	**Word**	**Duration**	**Time (onset)**	**Word**	**Duration**	**Time (onset)**
1	#DID	0.25s	00:53.5	fsPOWDER	1.16s	02:21.4
2	#DID	0.27s	05:16.0	fsPOWDER	0.78s	02:27.6
3	#DID	0.26s	07:05.5	fsPOWDER	0.79s	03:10.6
4	#DID	0.23s	07:21.2	fsPOWDER	0.68s	03:27.8
5	#DID	0.32s	11:21.9	fsPOWDER	0.44s	04:44.3

---

[7] Thank you to two anonymous reviewers for suggesting this further discussion of the function word #DID.

used more often than ₍fs₎PEN, and this increased frequency of use has allowed this borrowed word to shift farther toward becoming a holistic sign exhibiting remnants of analyzable internal structure, to an extent that the content word ₍fs₎PEN has not.

In this section, I have argued that ASL fingerspelling, like any other aspect of language use, is an inherently gradient phenomenon. Individual fingerspelled words fall along a continuum (or, more accurately, along many related continua) with respect to their function in discourse, their frequency of use, and the amount of phonological transparency or reduction that they display. This is consistent with a usage-based approach in which mental representations of linguistic constructions reside along a continuum from more highly analyzable to more highly holistic, with the majority of constructions having both an analyzable and a holistic character. In this framework, fingerspelled content words like ₍fs₎PEN and ₍fs₎POWDER can be considered to be chunks residing between one-off borrowed words and highly routinized loan signs, as structured wholes exhibiting degrees of analyzable internal structure.

5 Morphologically complex signs

New ASL signs can be created (that is, single word forms can become conventionally paired with relatively fixed and "listable" meanings within the ASL signing community) through the phonetic fusion of conventional multiword constructions, as discussed in Section 3, or they can be borrowed from English via the conventions of fingerspelling, as discussed in Section 4. However, ASL also has a number of productive word-formation processes that exploit relationships among conventional sign constructions. For example, ASL has grammaticalized a family of productive morphological schemas in which verbal signs are articulated with longer, continuous movements that lead them to be classified as processes, while related nominal signs are articulated with shorter, reduplicated movements that instead lead them to be classified as things (Supalla & Newport 1978; Wilcox 2004; Lepic & Padden 2017). These productive morphological schemas license verbal signs that are conventionally signed with longer, continuous movements to instead be formed with shorter, reduplicated movements, in order to function as nominal signs, and vice versa.

Perhaps one of the more well-studied word-formation processes in ASL is the diachronic "freezing" of "classifier constructions" to yield "lexical signs" (see Klima & Bellugi 1979: Chapter 1; Supalla 1986; Aronoff et al. 2003; Liddell 2003; Eccarius & Brentari 2007). "Classifier construction" is a broad and somewhat controversial label for a morphological class of predicate signs of motion, location, handling, and visual description that are often found across sign languages (see Liddell 2003a; Schembri 2003 for overviews and discussion). These predicate construction types have in common that they are highly productive, and that their forms are also motivated by visual images associated with meanings they convey. For this reason, some scholars prefer to refer to these constructions as "depicting signs", to foreground their visual nature and their typical function in discourse (e.g., Liddell 2003b; Cormier et al. 2012). Many "listable" ASL signs, as highly conventionalized pairings of form and meaning, can be analyzed as deriving etymologically from these symbolically complex "classifier construction" signs: Lepic and Occhino (2018: 150, 158) demonstrate that the ASL signs MEET and CHALLENGE are synchronically related to other visually motivated, morphologically complex constructions that code 'two upright figures coming together' or 'one entity contacting a similar entity head on', respectively. They suggest that from a usage-based perspective, the "lexicalization" of "classifier constructions" to derive "lexical signs" can instead be re-framed as involving grammatical schemas that are emergent from networks of related morphological

constructions, whose particular members exhibit greater or lesser degrees of entrenchment and fixedness.

Here, this usage-based perspective is extended to another class of ASL signs that have acquired conventionally fixed, idiosyncratic meanings, however these sign forms do not derive etymologically from "classifier construction" signs. The examples discussed here are glossed RENT and HASH-THINGS-OUT, and these signs exhibit phonetic and semantic vestiges of morphological reduplication. In ASL, formal reduplication serves many functions, and is used for the formation of nominal signs, as mentioned above, for plural inflection in particular classes of nominal signs (Pfau & Steinbach 2006; Wilbur 2009), and for aspectual inflection in particular classes of verbal signs (Klima & Bellugi 1979: Chapter 11). As in many spoken languages, the use of formal reduplication for conceptual iteration in ASL can be considered iconic, following the semiotic principle "more of form is more of meaning" (e.g., Kouwenberg & LaCharité 2001).

The ASL signs RENT and HASH-THINGS-OUT result from a reanalysis of the reduplicated form of another sign: RENT is etymologically related to a reduplicated form of the nominal sign MONTH, and HASH-THINGS-OUT is related to a reduplicated form of the sign DEBATE. The sign MONTH is formed with the index finger of the dominant hand extended horizontally, and sliding down the back of the index finger of the non-dominant hand, held vertically, in a single movement. In the reduplicated form, the dominant index finger repeatedly strokes the non-dominant index finger, and codes either a plural interpretation, as in 'many *months*', or an adverbial interpretation, as in 'happening *monthly*'. The ASL sign RENT is formed similarly, in that it is also formed with the horizontal index finger of the dominant hand repeatedly contacting the vertical index finger of the non-dominant hand. A typical use of this sign can be seen in (4) and in Figure 7.

(4)   Source: https://youtu.be/HX7dDWz8W9g?t=4s
         YOU OWN VACATION HOME, SOMETIMES **PEOPLE RENT YOUR HOME**,
         QUESTION-PARTICLE
         'do you own a vacation **home that people** sometimes **rent**?'

The verbal sign RENT comes from an adverbial use of the nominal sign MONTH, in the sense that rent is 'an amount paid monthly'. However, as a predicate, this sign has also taken on a more general meaning that parallels many uses of the English word *rent*: ASL RENT can be used to describe rental periods that do not involve monthly payments, such as renting a boat at an hourly rate, or renting a home for an unspecified period of time, as in (4) above.

In this example, then, the sign RENT codes an idiosyncratic meaning that goes beyond the analysis of the sign as describing 'monthly' events. This parallels Aronoff's (1974:

| PEOPLE | RENT (**1**) | RENT (**2**) | YOUR | HOME |
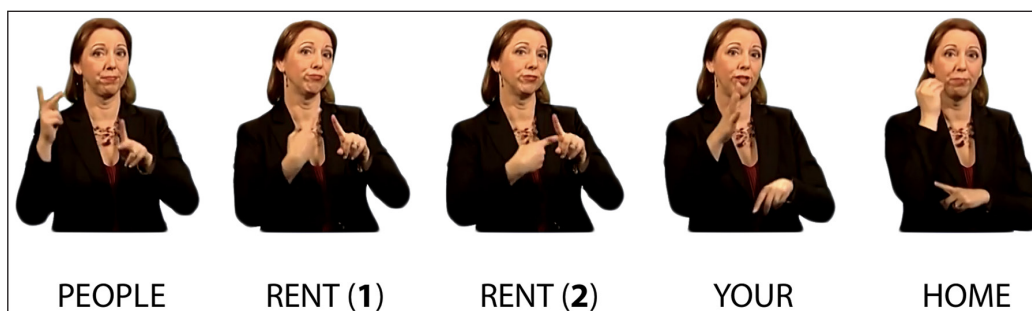
Figure 7: Highlighted signs PEOPLE RENT YOUR HOME in (4). The images in this figure have been extracted from https://youtu.be/HX7dDWz8W9g?t=4s.

34, 43; 1976: 25) discussion of English words like *transmission* and *prohibition*, which can be structurally analyzed as combinations of a verb and affix, and also exhibit a partially-systematic relationship between meaning and form. The English noun *transmission* derives from the base verb *transmit*, and can be used to mean 'the process of transmitting something'. Similarly, the noun *prohibition* derives from the base verb *prohibit*, meaning 'the process of prohibiting something'. However, *transmission* and *prohibition* are also conventionally associated with specialized meanings that cannot be derived from their internal structure alone: the *transmission* of a car transmits power from the engine of a vehicle to the wheels, and the period of *Prohibition* (with a capital *P*) in United States history was defined by federal law prohibiting the manufacture and sale of alcohol.

In these cases, it is clear that the relevant words have been committed to linguistic knowledge, while also retaining aspects of analyzable internal structure. These structurally compositional and semantically idiosyncratic words can be best understood as having taken on newer meanings through the cognitive process of *metonymy* (Langacker 1993; Barcelona 2003; Janda 2011). Metonymy is a semantic relationship where a part stands for its larger whole. Common examples of metonymy include 'part for whole', as in the English phrase *lend a hand*, and 'contained for container', as in *pass the sugar*. In both of these phrases, the word form that is used is a stand-in for a larger conceptualization of the referent (an assistant and a container, respectively). Similarly, the words *transmission* and *Prohibition* have become conventionally associated with particular meanings by virtue of the fact that they represent a salient aspect of that concept: the *transmission* of a car 'transmits power', and *Prohibition* was a period of 'prohibition against alcohol'. It is the contexts in which these words are used, not their structure alone, that has shaped their meanings. Along similar lines, in the absence of other etymological data, ASL RENT can be analyzed as having become associated with a particular meaning due to the use of the sign MONTHLY in contexts where 'rent is an amount that is paid monthly'. This sign form has acquired a newer meaning as a result of the discourse contexts in which that form often appears.

The sign HASH-THINGS-OUT has been formed similarly to the sign RENT in some respects, but it highlights different aspects of the process of metonymic extension and formal fixedness that characterize the formation of new signs. Lepic and Padden (2017: 500) have traced the etymological source of the sign HASH-THINGS-OUT, outlining its synchronic morphological relationship to the ASL signs ARGUE and DEBATE. In particular, the ASL sign DEBATE is formed with the signer striking the palm of their non-dominant hand with the index finger of their dominant hand, and then switching the dominance of their hands to strike the palm of their dominant hand with the index finger of their non-dominant hand. The iconic motivation that can be attributed to this sign is that a debate is conceptualized as a process in which each of two sides formulate their side of an argument, in turn. The sign glossed HASH-THINGS-OUT is formed similarly to DEBATE, however it is a reduplicated sign, and is articulated very quickly, with the index finger of one hand sliding down the palm of the other hand, rather than merely striking it. An example of this sign as it is used in context is shown in (5) and in Figure 8.

(5)   Source: https://youtu.be/rAX-Cpm1Krg?t=23s
            WE HASH-THINGS-OUT ALRIGHT GO-AHEAD POSTPONE NEXT SPRING 2018
            '**we talked it through and** decided to postpone to the upcoming spring of 2018'

In this context, the sign HASH-THINGS-OUT refers to an organizing body deciding to delay a scheduled event. As such, there is no mention of a "formal" debate, in which two sides present their argument in turn. Instead, (5) states that a group has discussed a topic and

| WE | HASH-THINGS-OUT (**1**) | HASH-THINGS-OUT (**2**) | HASH-THINGS-OUT (**3**) | ALRIGHT |

Figure 8: Highlighted signs WE HASH-THINGS-OUT ALRIGHT in (5). The images in this figure have been extracted from https://youtu.be/rAX-Cpm1Krg?t=23s.

come to a decision. At the same time, as the blurred hands in Figure 8 suggest, the sign HASH-THINGS-OUT is articulated quite quickly, with three striking movements and two dominance reversals executed in rapid succession. In this example, especially relative to the sign DEBATE, HASH-THINGS-OUT has a more idiosyncratic meaning and a repeated, yet more phonetically reduced, form.

The form of the sign HASH-THINGS-OUT is somewhat unusual in ASL. A key difference between spoken language phonology and sign language phonology is that, while spoken words are sequences of many independent segments (more or less, see Browman & Goldstein 1992; Bybee 2001; Pierrehumbert 2003), the majority of sign forms involve one or at most two sequential hand movements (Corina & Sandler 1993; van der Hulst 1993). As a result of this tendency, sign forms typically have very similar overall durations (relative to spoken words), with longer signs resulting from repetition of the same movement (Klima & Bellugi 1979: Chapter 12; Emmorey & Corina 1990). This general tendency with respect to sign length also shapes the form of the sign HASH-THINGS-OUT as a reduplicated form of the dominance-reversing verb DISCUSS. In order to iterate the dominance-switching movement of the sign DEBATE, while also maintaining a short overall length, the hands must move very quickly, and must assume a more relaxed posture. Lepic and Padden (2017: 506) suggest that this reduction in form is also consistent with the newer meaning of the sign, reflecting the degree to which it has drifted from its source DEBATE. Just as HASH-THINGS-OUT no longer involves a conceptualization of two separate groups presenting an argument, neither does its form retain a crisp articulation of the 'two sides'.

The mechanisms of continuous entrenchment and special reduction allow us to understand how the signs RENT and HASH-THINGS-OUT came to be formed. At one point, these signs were formed from the unification of a relatively fixed sign construction with a morphological constructional schema involving repeated movements (Booij 2013; Lepic & Occhino 2018): iteration of the ASL sign MONTH to form a sign MONTHLY, and alternation of the movement of the sign DISCUSS to form the verb DEBATE. However, as these signs gradually came to be used in contexts that differ from their source signs, they became increasingly "idiosyncratic" in meaning and increasingly efficient in form. As entrenched wholes, these two signs show signs of semantic holism and phonetic reduction, and have become less internally analyzable, as a result.

However, here we have also seen that idiosyncrasy is perhaps a misleading term: it is possible to trace the development of these signs and explain their newer meanings in terms of their contexts of use. As they are used in particular contexts, sign forms become conventionally associated with additional aspects of meaning. At the same time, articulatory schemas that characterize prototypical ASL signs may also work to erode the analyzable internal structure of these signs to some degree (see also Tyrone & Mauk 2010; Wilkinson

2016; Silva & Xavier 2018). These two processes shape the development of morphologically complex signs, causing them to gradually drift from the constructions that led to their original formation and to instead become increasingly entrenched as autonomous, more holistic constructions for ASL signers.

6 Conclusion

In this paper, I have shown how phenomena that are often discussed under the heading of "lexicalization" in sign language linguistics can be re-framed within a theory that does not presume the existence of "the lexicon" in opposition to "the grammar". As Elman (2004; 2009) has suggested, rejecting the notion of the lexicon does not entail that we must also throw words, and the many things that we know about them, out with the structuralist bathwater. Instead, as a proof of concept, I have considered the processes by which linguistic items become conventionally fixed in meaning and in form, without assuming that linguistic forms must either be "lexicalized", that is, fully fixed, or otherwise "generated", and derived anew through the application of a grammatical rule.

Under a usage-based approach, linguistic knowledge is emergent from language experience, with abstract schematic representations arising from our human ability to recognize correspondences in form and meaning across our individual experiences with language (Langacker 1988; Bybee 2006; 2010). Similarly, in construction-theoretic approaches, the descriptive and theoretical work that was once split between "lexicon and grammar" is instead attributed to the "constructicon", a highly structured network which comprises all of our constructional knowledge of our language(s) (Traugott & Trousdale 2013; Traugott 2014). The advantage of the usage-based, construction-theoretic approach over the lexicon-and-grammar approach is that it directs us to look for phenomena that rest in between the far extremes of items with meanings which must be learned and items with fully componential structure.

Looking at three "lexicalization" phenomena in ASL, here I have discussed examples that fall somewhere in the middle of the spectrum of analyzability, as structured gestalts with partially-analyzable forms and meanings. Examples of multiword expressions such as INTERPRETER BRING-IN and TAKE-TO HOSPITAL are straightforwardly analyzable in terms of the meanings of their parts. At the same time, these constructions recur across usage events as "the right way" to express the concepts they denote in ASL, and this fact must also be represented in linguistic knowledge as a part of the construction. Like the idioms and other examples of formulaic language that construction grammarians are used to analyzing, these constructions may feed the formation of new word forms through gradual etymological fusion, but also motivate more abstract grammatical schemas that govern productive language use.

Examples of fingerspelled words such as $_{fs}$POWDER and $_{fs}$PEN present a different lens through which to view the process of structural fixedness and phonetic reduction that often characterizes "lexicalized" signs in sign language linguistics. These fingerspelled words are articulated differently according to the function that they accomplish in discourse: those items that serve to introduce a new referent are articulated more fully, with their internal structure playing a key role in identification of the intended referent. In contrast, subsequent repetitions of the same fingerspelled word in the same discourse context are somewhat reduced in form, in a way that is reminiscent of, but not as advanced as, so-called "lexicalized loan" signs in ASL, having undergone some degree of articulatory routinization as they are repeated in a single context. These examples illustrate the gradual and continuous nature of the processes of entrenchment and reduction, across language timescales.

Finally, examples of conventional, morphologically complex signs such as RENT and HASH-THINGS-OUT present an opportunity to re-examine the "idiosyncratic" meanings that are often thought to be the defining characteristic of "lexicalization". I have suggested here that, like morphologically complex words in English, these signs have acquired their conventional meanings through their contexts of use. As they recur in particular contexts, the structurally complex signs MONTHLY and DEBATE become metonymically associated with additional senses that go beyond the meaning of the complex signs as they were originally composed. As these sign constructions become conventionally paired with new senses in the course of language use, they may also undergo some degree of subsequent phonetic reduction that obscures their original internal structure; this articulatory routinization reflects higher degrees of entrenchment in linguistic knowledge, and also feeds the formation of increasingly autonomous constructions.

Proponents of a lexicon-and-grammar view may be accustomed to thinking of these outcomes as evidence that both the lexicon and lexicalization are indispensible tools for linguistic analysis. On the contrary, here I have demonstrated that sign language linguists can address these phenomena directly, whether highlighting the ways in which structured items may take on increasingly conventional aspects of meaning, or how items that have become highly fixed in form may reduce in ways that obscure their original structure, without any prior commitment to "the lexicon". The explanation that I offer is that linguistic forms do not acquire idiosyncratic meanings and undergo formal reduction at the moment that they become "lexically listed" in linguistic knowledge. Rather, the fact that these constructions have taken on conventionalized meanings and routinized pronunciations instead reveals that they have become entrenched *to varying degrees* in our mental representation of our language.

The notion of a "lexicon" that is separate from "the grammar" may be useful for technical and descriptive purposes, for example when linguists set out to document a language, and in so doing, must create a list of fixed "lexical items" and identify how they can be "combined" via abstract "grammatical rules". However, the utility of these tools does not justify theoretical appeals to a "mental lexicon" in the minds of speakers, which stores all and only those items whose idiosyncratic meanings must be conventionally learned. In fact, I have suggested here that the lexicon-and-grammar view of language predisposes us to overlook those partially analyzable, variably entrenched linguistic expressions that fall somewhere between "lexicon" and "grammar". This is unfortunate, because these "in-between" cases are typically the most instructive for understanding the productive capacity of human languages.

I do not wish to offer a single term to replace "lexicalization" in sign language linguistics, because I believe that we sign language linguists must be more precise in saying what we mean when discussing so-called "lexical signs". If what one intends by the term lexicalization is that a given linguistic expression has become "a fixed, highly conventional pairing of form and meaning", I propose to instead describe that linguistic expression as having been *entrenched* in linguistic knowledge as a *chunk* of recurring structure, whose function is to facilitate efficient language use and processing. This characterization prevents us from overlooking or otherwise misanalysing recurring items that display varying degrees of analyzable internal structure. Similarly, if what one intends by the term lexicalization is that a given linguistic expression has become "formally reduced in a way that obscures its former etymological structure", I propose to instead describe that linguistic expression as having undergone these changes due to gradual *routinization,* where repeated items are processed and produced with increasing efficiency, across language timescales. This characterization prevents us from assuming that phonetic reduction is an either-or, all-or-nothing process.

Though in sign language linguistics, and particularly in studies of ASL structure, we are used to discussing multiword expressions, fingerspelled words, and morphologically complex signs in terms of whether or not they "are lexicalized", here I have shown that ASL signs can instead be analyzed as meaningful wholes that exhibit degrees of analyzable internal structure. A usage-based approach does not focus on whether or not particular items are committed to "the lexicon", but rather seeks to understand the *degree to which* linguistic constructs are committed to our mental representation of our language, as a function of how they are used. By revisiting our foundational analytic assumptions, including cherished notions such as "the lexicon" and "lexicalization", we can continue to develop frameworks for sign language analysis that account for the myriad sign constructions that display varying degrees of analyzable internal structure.

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Competing Interests

The author has no competing interests to declare.

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