Abstract

It has been claimed that sign languages cannot undergo systematic phonological change. A number of tendencies towards phonological change in American Sign Language (ASL) have been proposed however, and suggested to be systematic. This paper examines one proposed pattern of phonological change—that signs articulated below the neck tend to become two-handed—and tests whether it has been applied systematically in the history of ASL. From a survey of over 20 dictionaries and compendia of signs from the beginning of French Sign Language (LSF), an ancestor to ASL, until today, the addition of the weak hand to a one-handed sign—Weak Add—was not found to be common or phonologically systematic. Instead, signs were found to add a hand due to morphological, semantic, or lexical pressures, which could then be obscured by other diachronic changes. However, phonological restrictions were observed to affect how Weak Add occurred, and a number of other kinds of change with the potential to be phonologically systematic were discovered.
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1 Introduction

Some signs are articulated with one manual articulator (1H signs), others with two (2H signs). Over time, some 2H signs become 1H in a process called Weak Drop, motivated and conditioned by a number of relatively easy to uncover factors (Battison 1974, Padden and Perlmutter 1987). However, some 1H signs become 2H, where the motivations and conditions are elusive—though Frishberg (1975) suggests that this process should have a phonological basis. This thesis attempts to find an explanation for that process, which I call Weak Add, in American Sign Language (ASL). The rest of §1 gives information about ASL and historical linguistics that will be assumed in later sections, and explains why Weak Add is difficult to account for. §2 explains why a phonological justification for Weak Add is expected, and enumerates potential phonological conditions for Weak Add. §3 explores morphological and semantic conditions in ASL where 1H signs become 2H, and considers whether these can better account for Weak Add. §4 describes the dictionary survey I carried out, and §5 gives an overview of the data uncovered in the survey. §6 gives my analysis—that the seemingly united phenomenon of Weak Add is actually the combination of a few linguistic phenomena, none of which are phonological, and includes a newly documented morpheme. §7 contains concluding remarks about whether systematic change occurs in sign language.

A note about usage: writing a paper in sign language linguistics (as with many corners of linguistics) requires making a number of political judgments. In my case, it is the decision about whether and how to use the spelling “Deaf,” which has come to indicate the culture of fluent users of sign languages, in contrast with “deaf,” which is then used specifically to indicate audiological status. I follow Bauman and Murray (2014) and Fisher et al. (2018: Footnote 2), the latter of whom explain the decision better in their own words: “Like some others in our field, we choose to break from the ‘d/D’ convention to avoid being mired in identity politics and marginalization of deaf people who might not fit squarely into these arbitrary boundaries. Doing so is not a rejection or minimization of the sociocultural tendencies of those in what we refer to below as deaf communities, but rather, is meant to be inclusive of the various and individual ways of being deaf.”

1.1 History of American Sign Language

Sign languages often emerge when multiple deaf children are brought together for the first time, particularly in a deaf school (Meir et al. 2010), and American Sign Language was no different. ASL began when the first school for the deaf in America was founded: The American Asylum for the Instruction of the Deaf and Dumb, now called the American
School for the Deaf, or ASD (Shaw and Delaporte 2015). In 1817, the ASD was founded by Mason Cogswell, a hearing doctor whose deaf daughter Alice was one of the first students of the school; Thomas Hopkins Gallaudet, a hearing clergyman who had been a tutor to Alice; and Laurent Clerc, a deaf French educator and signer. Clerc learned to sign as a student at the Institut National de Jeunes Sourds (INJS) in Paris, and brought his knowledge of both the manual equivalent of the French language created by hearing teachers (Signed French), and the vernacular sign language of the deaf at the school (Old French Sign Language; Old LSF) to the ASD.

It is unclear how much of Old LSF was actually passed down to the American students—it is likely that Clerc’s adaptation of Signed French for English was the primary language of instruction (Wilcox and Occhino 2016). However, the teaching philosophy of the INJS was first to communicate with a child through a genuine sign language, and use that to teach them the ambient spoken language. Whatever Clerc’s methodology, ASL and French Sign Language (Langue des Signes Française; LSF) have been shown to have lexical similarity much higher than chance (Woodward 1978), so it is assumed that the sign language created by the students at the ASD was greatly influenced by Old LSF—perhaps with Signed French as an intermediary (Frishberg 1975, Supalla and Clark 2014, Shaw and Delaporte 2015, Napoli and Sanders in progress).

ASL also likely had influences other than LSF: there is evidence that the students at the school were already signing in a developed way very early on in the history of the ASD (Wilcox and Occhino 2016), so ASL may have been created as a creole between Clerc’s language of instruction and whatever sign languages were already in use (Woodward 1978). In particular, Martha’s Vineyard in Massachusetts had a well established sign language due to a high incidence of deafness in their population, and sent a number of students to the ASD every year (Groce 1985). However, the influence of Martha’s Vineyard Sign Language (MVSL) on student signing at the early ASD is likely relatively small: students came from all around the north-eastern United States, including the Philadelphia and New York city areas (Tabak 2006), students from Martha’s Vineyard were always a small percentage of the student population, and they came for the first time seven years after the school was founded (Shaw and Delaporte 2015). MVSL is now dormant, so the relationship between MVSL and ASL is difficult to establish (Campbell et al. 2017).

1.2 Historical Change in ASL

The base assumption around which the field of historical linguistics is predicated is that languages change in regular ways. This Regularity Hypothesis is twofold: first, that
psychological and physiological factors that all humans have in common push towards some types of changes and not others (e.g. decreasing articulatory effort, see §1.4); second, that when a change happens to a structure in a language, it happens systematically, to all instances of the structure in a given environment. If these two assumptions were not true, changes could be said to happen essentially at random, and it would be impossible to make deductions about the history of a language. Thankfully, a few hundred years of research on spoken languages has borne out these two assumptions, and shown that spoken languages do in fact most often change in regular ways (though there are exceptions.)

One lovely example of the strength of the assumption of regular change is foundational to the study of Proto-Indo-European, the hypothetical ancestor language to Greek, Hindi, Armenian, English, and Farsi, among many others. In 1879, Ferdinand de Sassure proposed that Proto-Indo-European had some consonants that didn’t survive in any of the attested languages descended from it, but that these consonants had conditioned some regular changes (mostly notably in the vowels of Ancient Greek) which could still be detected. A few years after Sassure’s death, an Indo-European language—Hittite—was newly deciphered, and in 1927 Jerzy Kuryłowicz showed that a consonant present in Hittite exactly corresponded with one of the consonants Sassure had predicted (Clackson 2007: 54).

However, it has not yet been determined whether the Regularity Hypothesis is true in sign languages: in fact, it has been proposed that sign languages can never undergo systematic phonological change (Moser 1990). Moser suggests that tendencies for change do exist in ASL, but that they become active when signs are coined and nativized, rather than changing from one stable form into another. This view may also allow for regular phonological patterning, which does exist in ASL: §3.3.1 shows an example of one morpheme with three phonologically-conditioned allomorphs, and in §6 I argue for the existence of another. However, iconic items in spoken languages can resist otherwise systematic phonological changes (Napoli and Sanders in progress), so the extreme pervasiveness of iconicity in sign languages may block phonological change from spreading through the lexicon.

To reinforce this point, Moser points out a seeming example of phonological change, and argues that it is not systematic or phonological. I am unconvinced by her argument, and take it as a promising example of systematic phonological change: some ASL signs used to require moving the whole head, and now move the hands and keep the head still, e.g. COMPARE (Figure 1). There are still many signs that specify non-manual articulations, but to my knowledge none require moving the whole head.¹ Moser claims that this loss of head movement is not phonological change because head movement was never phonological at

¹There are a handful non-manual operators that involve whole head movement, and a few lexical items that are obligatorily marked with these operators (e.g. signs that incorporate a headshake for negation.) Operators
all. But if COMPARE was originally cited with a head shake, and a movement was added to hands to compensate for the loss of that head shake, it seems simplest to analyze the change in the sign as a compensatory change conditioned by the loss of a phonological segment. I know of no study that has systematically examined ASL signs that once had non-manual movement, but I know of at least two other signs with similar transference of motion from head to hands (HUMBLE, discussed in §5.1, and PATIENT), and expect that there are more.

Until an example of systematic phonological change is found, it will likely be impossible to prove whether the process is possible or not. This thesis examines a potential example of systematic phonological change—Weak Add—and finds that the change is not phonological or systematic. However, there are many more potential examples to investigate: along with those suggested by Frishberg (1975), Shaw and Delaporte (2015) suggest a few specific changes, and Napoli and Sanders (in progress) lay the groundwork for investigating changes in movement path that could lead to findings of systematic change. I trust that our knowledge of sign language diachronic change will continue to grow.

1.3 Sign Language Phonology

Signs can be distinguished by five parameters: “handshape, movement, location, orientation, and nonmanual signals (facial expression)” (Valli et al. 2011: 34). Each of these parameters can take on one of a finite set of values; signs can maintain one value for the duration of their articulation, or transition between values from beginning to end. These values are meaningless in themselves (i.e. they are phonological, not morphological), though there are

have their own phonological and lexical behavior (Zeshan 2006), and I therefore exclude them from this discussion.
“process” morphemes which can take the form of a change in a single parameter (e.g. the “trilled motion” of activity nouns, Padden and Perlmutter (1987); and see Wilbur (2008) for other movement morphemes). For two signs to be distinguishable by sight, they must differ in at least one of these parameters.

Sign languages are unlike spoken languages in that they have two copies of a major articulator—the arm. This duality can therefore offer totally new insights into the human linguistic faculty. One could imagine that the hands could operate identically and independently, but this is far from the case in ASL (or any sign language thus far studied). A person’s dominant hand in any other motor task also tends to be their dominant hand in signing, and the non-dominant hand (also called the weak hand, hence Weak Add) has a much more restricted set of functions and possible forms, as noted in §1.4, (though above the level of phonology, there is slightly more freedom, see Sandler (2017) and sources there.)

1.4 Articulatory Ease

All languages are constrained by articulatory effort: in both modalities (spoken and signed,) language users make changes to linguistic forms in order to articulate them more easily (Napoli et al. 2014). A movement is more effortful when it requires more muscular energy (Kirchner 1998) or computational complexity (e.g. coordinating movements across articulators, cf. Napoli and Wu 2003).

For physical effort, Napoli et al. (2014: 425) point out that direct measurement or calculation of muscular energy used is not feasible for modeling sign languages, and instead give two intuitive generalizations for understanding sign languages’ articulatory effort: more effort is expended when “moving a greater mass,” and when “moving a given mass at an increased speed.” In situations where ease of articulation is prized then, (e.g. casual or fast signing; for counterexamples see §3.2,) signers tend to reduce the number of manual articulators in use, migrate articulation to joints farther away from the torso, and reduce the amount of overall movement in a sign (Rimor et al. 1984).

Computational complexity, on the other hand, increases as the number of joints used increases, and as the phonological specification of the two hands becomes more different (Napoli et al. 2014, Napoli and Wu 2003). For example, frozen lexical signs where the two hands have different handshapes and also move independently are impossible in ASL—the hands must either move as a unit or have the same handshape (Battison 1974, van der Hulst 1996, Crasborn 2011). This limitation comes about because simultaneous movement of the

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2Some non-manual articulators also come in pairs, of course, such as the eyes, eyebrows, and lips. However these pairs are not known to function separately in ASL.

3All the movable joints from shoulder to interphalangeals.
manuals is exceedingly difficult to control if the hands are moving nonsymmetrically (van der Hulst 1996, Brentari 1998, Sandler 2006). The drive towards reduction of complexity therefore leads to using fewer joints and making both handshapes the same—in fact in casual signing, spreading of the phonological parameters of the dominant hand to the non-dominant hand and joint elimination are both common (Rimor et al. 1984).

Weak Add requires special explanation in the context of these two principles of change—there is already a pressure to use less muscle power, fewer muscles, and less cognitive work. Adding a hand doesn’t improve any of those variables. At best, it doesn’t change the amount of mental work the signer is doing, but requires more joint coordination and more muscle power. If Weak Add were purely phonological, it would be a form of fortition—which is exceedingly rare in languages (Millar 2015).

2 Potential Factors: Phonological

In this section I describe two types of phonological conditioning that could bring about Weak Add, and discuss what kinds of changes would be expected under each condition. I show in both cases that the expected changes do not occur, and that both conditions are too broad to account for the few but phonologically diverse signs that do undergo Weak Add.

In describing signs, I follow van der Hulst (1996) and distinguish between two broad categories: “balanced signs,” where the two hands have identical handshapes and symmetrically reflected location, orientation, and movement parameters; and “unbalanced signs,” which describes signs that differ in at least one parameter or move as a unit. For an explanation of my sign glossing conventions, see §4.2.

2.1 Visual Acuity

Frishberg (1975) claims that Weak Add tends to occur in signs articulated below the neck, and suggests that this is because human perceptive ability throughout the visual field is not uniform. Siple (1978) points out that since signers look at each others’ faces while they communicate, signs at or near the face will be perceived with greater acuity than those at the torso or in neutral space. (In fact under most conditions, peripheral vision grows exponentially worse the farther from the center of focus it extends, see sources at Siple 1978.) Adding a second hand to a sign therefore makes it more noticeable, and the

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4Or potentially in all signs not in contact with the face.
redundancy of having the same handshape and movement on each hand\(^5\) makes sure that the sign’s parameters are accurately observed.

Visual acuity likely plays a role in shaping sign language phonology overall, but it does not adequately account for the patterning of 2H signs. For example, Frishberg (1975) notes that some signs add a hand not by becoming more symmetrical, but by adding a base (e.g. \(\text{SHIP}\), Figure 2.) It is more difficult to argue that addition of a hand in this way clarifies the visual signal, because both hands must be observed in order to perceive the full lexical entry for the sign, and the features of one hand do not provide any information about the features of the other. (See §3.1.2 for more on this type of sign.) Additionally, both Frishberg and Siple suggest that 1H signs should only remain 1H when articulated on the face and in some small area around it (e.g. above the neck.) 1H signs away from this area should therefore be extremely uncommon. (If signs away from the face sporadically or randomly became 2H, the environment would better be described as not blocking Weak Add, rather than as a conditioning environment per se.) However, 1H signs articulated at the center of the chest, for example, are not uncommon, and a number have existed since the earliest days of Old LSF, e.g. \(\text{SORRY}\) (Figure 3). In fact, the number of signs to have undergone Weak Add may be relatively small—of the 500 etymologies in Shaw and Delaporte (2015), only 37 signs underwent Weak Add, including only 15 forms which became exactly symmetrical, as an argument from perceptibility suggests they should.

It could be that the remaining 1H signs that are articulated away from the face are blocked from adding a second hand. However no conditions for blocking are apparent. \(\text{SORRY}\) shares four out of five parameters of its parameters with \(\text{ENJOY}\) (Figure 4), a sign that did undergo Weak Add—and it is difficult to imagine why the A handshape\(^6\) as opposed to the flat-B handshape, would block Weak Add. \(\text{SORRY}\) and \(\text{ENJOY}\) are also both similarly iconic—in both, their location parameter represents the heart as the source of emotion. Though a survey of persistently 1H signs would more solidly settle the question, it seems likely that something else is conditioning Weak Add.

### 2.2 Reactive Effort & Balance

Another potential analysis for Weak Add is purely mechanical: 1H signs could be dispreferred overall, because using two hands is actually less effortful. Sanders and Napoli (2016: 275) explore two cross-linguistic trends in 2H signs: signs that cause “twisting and rocking of the torso” are cross-linguistically less common than signs that do not cause torso

\(^5\)This must be the case when both hands are moving, see §1.4.

\(^6\)The hand in a fist, the thumb beside the other fingers.
Figure 2: **SHIP**: left, Long (1918), Old ASL; right, aslpro.com (accessed January 29, 2020), Modern ASL

Figure 3: **SORRY**: left, Brouland (1855) via Shaw and Delaporte (2015), Old ASL; center, Long (1918), Old ASL; right, lifeprint.com (accessed January 29, 2020) Modern ASL

Figure 4: **PLEASE**, also glossed **PLEASURE** or **APPRECIATE** (left, Long (1918), Old ASL) and **ENJOY**, also glossed **PLEASURE** or **APPRECIATE** (right, lifeprint.com (accessed January 29, 2020), Modern ASL)
destabilization, and signs that change center of mass may also be slightly dispreferred. Both types of motion are dispreferred because they require the signer to expend effort to remain stable—minimizing this effort, which Sanders and Napoli call “reactive effort,” is another form of easing of articulation. Adding a symmetrical hand to a sign could therefore increase stability and minimize reactive effort. Though reactive effort is associated with physical balance, I continue to use the term “balanced signs” after van der Hulst (1996) to describe signs’ phonological symmetry, as opposed to their mechanical effects on a signer’s body.

To analyze reactive effort, Sanders and Napoli (2016) classify the movement parameter according to two categories: the axis of movement (up-down (UD), left-right (LR), and away-toward (AT), see Figure 5) and coordination of hands (whether the hands are moving in the same direction (+) or in opposite directions (-)). From these, only two pairings of axis and coordination do not destabilize the torso—in the same direction up-and-down (+UD), and in opposite directions left-and-right (-LR)—and the movement of both hands in different directions along any axis preserves a signer’s center of mass (Sanders and Napoli 2016). If reactive effort constrains Weak Add, 1H signs that do not exhibit these movement types should preferentially stay 1H, because the increase in mass from one hand to two hands would exacerbate the dispreferred effect. However, 5 out of 15 balanced forms (AGGRESSIVE, SHIRT, BRAG, VOMIT_1, VOMIT_2) have movement which is neither (+UD) or (-LR), and a different 5 (ANGRY, SHIRT, HUMBLE(1923), VOMIT_1, VOMIT_2) have both hands moving in the same direction. These results suggest that reactive effort and balance are not active in conditioning Weak Add.
3 Potential Factors: Other

In this section I identify a number of linguistic conditions outside the phonology that have been observed to cause signs to go from 1H to 2H.\(^7\) In each section I give examples of signs from my own data that added a hand due to that condition, and where I found no signs influenced by that condition, try to explain why.

3.1 Iconicity

It is well-known that sign languages make extreme use of iconicity to create lexemes, and that over time a sign’s iconicity can decrease to become easier to articulate (Napoli et al. 2014). However, iconicity is still an active force in shaping signing (as it is to a lesser degree in speech), and its role should not be underestimated (see Brentari (2019): Chapter 3 for discussion). This section describes circumstances where iconicity encourages signs to undergo Weak Add.

3.1.1 “Plurality” (Lepic et al 2016)

Lepic et al. (2016) draw on the idea of lexical plurality put forward by Acquaviva (2008), and suggest that sign languages will tend to use two hands to represent “relations between entities or, metaphorically, between ideas,” i.e. concepts that inherently involve more than one thing. They identify four semantic categories that follow this pattern: interaction, location, dimension, and composition. They show that cross-linguistically signs in these categories are much more likely to be 2H. van der Kooij (2001: 32) suggests that the weak hand in these signs can be represented with “a semantic marker in the lexical representation.”

I found a number of ASL signs with plural meanings that started as 1H and became 2H. This suggests that the pressure to show plural concepts with two hands is not only active when signs are coined, as Lepic et al. (2016) suggests, but also remains as a sign language changes. For a full list of signs with a plural meaning that have changed to become 2H, see Appendix A.

The clearest example of a plural sign gaining a hand is \#BACK, a sign that was borrowed from English (Figure 7).\(^8\) ASL brings English words into the gestural medium by fingerspelling—using the ASL manual alphabet. This is a common strategy to fill gaps in the lexicon, e.g. “personal names, place names, brands, ...[and] technical terms,” or can

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\(^7\)This includes modifications only to a single lexeme. 2H behavior across word boundaries or in larger discourse units (e.g. buoys) are not discussed.

\(^8\)Signs created from fingerspelling are written with a \# before them.
be used spontaneously in place of lexical signs in code-mixing (Montemurro and Brentari 2018)—though in both these cases the English spellings are not fully integrated into the language. Sometimes though, when a spelling is used often, it becomes articulated as a single fluid motion, often obscuring or deleting some of the letter forms (Wilcox and Occhino 2016). When this occurs, the fingerspelling is said to have been lexicalized—fully borrowed into ASL (Supalla and Clark 2014: 108).

As a lexicalized fingerspelling, the original form of #BACK must have been the manually spelled sequence B-A-C-K, before it was treated as a single word. All letters in the ASL manual alphabet are 1H, so B-A-C-K must have been signed on one-hand as well (see Figure 6 for the individual letters.) With the letters together, B-A-C-K would have been signed with the hand moving towards the ipsilateral side, as is normal for fingerspelling in ASL. However, with the meaning of “back together” (signingsavvy.com, accessed January 29, 2020), the sign is formed with both hands moving towards each other (Figure 7). Because “together” requires the idea of two people, each hand represents one person, e.g. two romantic partners getting back together in a relationship (Valli et al. 2011: 78).

This is different from a sign changing part of speech and gaining verbal inflection (e.g. #NO, Valli et al. (2011: 79)) – the #BACK described in this section has not changed part of speech from the English word being borrowed.

### 3.1.2 Classifiers

Classifier predicates (also known as depicting verbs) are multimorphemic, and in them often both hands move in ways that are constrained by or iconic of the event that is being communicated. In all instances, the use of one or both hands is semantically motivated (Emmorey 2003). However, when a particular classifier is used frequently, it can freeze and

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9See, for example, Figure 7, where the A and C handshapes have been deleted, leaving only the transition between B and K.

10The same side of the body as the signer’s dominant arm.
enter the lexicon, sometimes even changing part of speech from a verb into a noun, e.g. KEY (Valli et al. 2011).

In my data, some signs appear to have added a second hand by integrating what was once a separate classifier into the sign’s lexical representation.\(^{11}\) (Signs in this category can be found in Appendix B.) They are largely nouns, and a few verbs. The added classifier seems to often narrow the meaning of a 1H form which was once ambiguous. The old form of SHIP, for example, is identical to the general vehicle classifier (Figure 2).\(^{12}\) The non-dominant hand in the new form iconically represents the surface of the water across which the ship is moving, distinguishing it from other kinds of vehicles. CHARACTER is similar, where for many signers the two forms (Figure 8) resolve the word’s polysemy (which is parallel to English): the 1H form, articulated near the heart,\(^{13}\) means someone’s moral character, and the 2H form means a character from a story, with the non-dominant hand iconically representing a book\(^{14}\) (Costello 1994, signingsavvy.com, handspeak.com).

The added hand can also arise from the sign becoming an agreement verb. BLEED changed to agree with the body part that is bleeding,\(^{15}\) so a classifier representing the surface of the body was added in the general case (Figure 9). CHOOSE can be marked for the number of objects being chosen between (either two or many), which is indicated on the non-dominant hand (Figure 10).

Though iconicity and disambiguation seem to be the motivators for Weak Add among these signs, the phonology is still evidently active in how the signs were formed. Other

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\(^{11}\) This discussion includes only signs without plural meanings—I do not make a claim about whether classifiers were involved in adding a second hand to the “plural” signs above.

\(^{12}\) In fact, Shaw and Delaporte (2015) suggest that SHIP is the etymon of the vehicle classifier via generalization.

\(^{13}\) For right-handed signers.

\(^{14}\) This is the established classifier for book, see e.g. READ.

\(^{15}\) This added BLEED to a family of signs which take agreement in this way, e.g. HURT, SURGERY.
Figure 8: CHARACTER: top, lifeprint.com (accessed January 29, 2020), Modern ASL; bottom, signingsavvy.com (accessed January 29, 2020), Modern ASL. An intermediary 2H form, where the non-dominant hand faces away from the signer, can be found at handspeak.com.

Figure 9: BLEED: top, Caselli et al. (2017), Modern ASL; bottom, aslpro.com (accessed January 29, 2020) Modern ASL
than the form of CHOOSE marked for two objects, all the signs in this category use a classifier with a minimally marked handshape: 5 or flat-B. Flat-B is by far the most common handshape for the non-dominant hand in the ASL lexicon, and may be the most common handshape across all two-handed signs in ASL (Napoli and Wu 2003). Brentari (1998: 276) analyzes it as having only “one fingers feature, [all].” 5 is also among the more common handshapes, and differs from flat-B in only one feature [+spread] (Brentari 1998). Both handshapes use no muscle flexion, and are close to the “passive” underspecified handshape used when a sign involves contact with the arm above the hand (Boyes Braem 2002). Thus, adding flat-B or 5 hand to a sign likely constitutes the minimum possible increase in cognitive effort when gaining a hand. This is an indication that, even when iconic concerns induce signers to take on more effort, the drive to maximize articulatory ease is still active—and that iconicity is not necessarily a force directly contrary to phonological regularity.

3.2 Register Change

Another potential explanation for the evolution of 2H signs is that the second hand was added in registers where reduction of articulatory effort is not important, e.g. formal signing. The now-2H sign could then be borrowed into regular speech under some other linguistic pressure, e.g. prestige (see §3.2.1), and never be constrained by articulatory ease. However, if signs became 2H in this way, one would expect the new 2H signs to fall into specific domains to do with their originating register, and no such domains are apparent.

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Whose non-dominant V handshape is extremely rare in the ASL lexicon.
3.2.1 Formal signing

Formal signing, the register used in public speaking, has many features that suggest effort reduction is not an active force. Zimmer (1989) notes that a signer giving a lecture will sign slower, using a much larger signing space and more magnified movements, fewer instances of assimilation, and—importantly for this paper—tends to use more 2H versions of signs. In fact, some 2H signs are felicitous only in a formal register (Kyle Rosenberg, p.c. October 2019) and others are regarded as more formal, even when the 1H form is older (e.g. HAPPY). Additionally, non-manuals are often replaced with manual morphology in this register.

All these features are likely present to account for interlocutors at a distance: when giving a lecture, for example, people at the back of the room would have trouble seeing non-manual articulations, and larger, more visually salient signs would be easier to understand. This pressure for magnification counteracts the desire to reduce effort, and helps select for 2H signs over 1H ones, but is largely irrelevant in day-to-day signing.

If signs from formal registers were being borrowed into everyday signing, one would expect the borrowed signs to pertain to domains where those registers are most often used (e.g. business, religion, academia), and potentially be words with relatively low frequency in conversational speech. Neither of these patterns is evident in the data.

3.2.2 Storytelling & Poetry

The storytelling register is overall very similar to formal signing: a larger signing space, more exaggerated movement, and more 2H signs are all still used. Here, however, formality itself is no longer a constraint, and creativity and drama are prized instead. This entails using more unusual syntactic structures, more classifier constructions, more role-shift, greater range of eye gaze and more exaggerated facial articulations, and more iconic signs (Rayman 1999). These more iconic signs can sometimes be 2H: Vicars (lifeprint.com) in his entry on CAT, says “I sometimes use two hands [to sign CAT] when I’m feeling dramatic and/or signing stories to young children but that is about it.”

Sign language poetry can be even more innovative with its use of signs—along with the same augmentations to signing that storytelling exhibits, poetry deliberately strains and breaks the constraints of its language. Sutton-Spence and Kaneko (2017) analyze this as a celebration of having access to sign language—a right which many deaf people are denied—and being fluent enough in it to play and innovate—a level which signers who learn later in life sometimes never reach. Sutton-Spence and Kaneko also note (Chapter 16) that symmetry is particularly prized in poetry, and Crasborn (2006) finds that in a corpus of Sign Language of the Netherlands poetry that both hands are active over 95% of the time.
While the motivations of poetry are distant from those of conversational sign, increasing drama and iconicity are more imaginable priorities for everyday signing, and the role of narrative in linguistic (and particularly phonological) innovation in ASL is worthy of more direct study. However, in the case of Weak Add there are no other indications that narrative signing is connected.

### 3.2.3 Humor & Taboo language

Humor and taboo are like storytelling and poetry, in that their styles prize flexibility and innovation, but are much more common in everyday signing (Mirus et al. 2012). Napoli et al. (2013) describes how ASL signers leverage this freedom around taboo signs to make morphological and syntactic innovations that are unique to those signs. They don’t describe any hand-add phenomena, but German Sign Language (Deutsche Gebärdensprache; DGS) can add a hand for emphasis in taboo terms specifically. The details of this marking are discussed in §3.3.2. However, none of the signs in my data are taboo, so taboo signing is likely not the reason they underwent Weak Add.

### 3.3 Morphology

I have found two documented ASL morphemes which cause a 1H sign to become 2H, which I discuss in this section. In §6 and §7, I will claim that morphology is the source for much of the as-yet-unexplained Weak Add as well.

#### 3.3.1 Characteristic Adjectives

Padden and Perlmutter (1987) and Sandler (1993) describe a morpheme that attaches to 1H signs and makes them 2H with circular alternating motion, with the meaning “CHARACTERISTICALLY-X”. For underlyingly 2H signs, the morpheme surfaces on balanced signs as non-alternating circular motion, and on unbalanced signs as only the dominant hand moving—the non-dominant hand, functioning as a location, does not move (Sandler 1989). Though neither Padden and Perlmutter nor Sandler suggest an origin for this allomorphy, they agree that it is conditioned by number of hands, as well as by balanced vs. unbalanced signs. See Figure 11 for one example of each type.

#### 3.3.2 Emphasis

There are four signs—THANK-YOU, HONOR, RESPECT, DETEST—which have an emphatic form created via Weak Add (see figures below for examples). To my knowledge this strategy
Figure 11: Examples of the characteristic adjective morpheme. From top: 1H, 2H balanced, 2H unbalanced (Sandler 1993: Figures 19-21)
for adding emphasis has not been observed as a productive morphological pattern in ASL, and can apply only to these few signs. However, because these four signs create their emphatic forms in the same way (see below for a phonological description), I suggest that morphological derivation is actually occurring.

Among these four, THANK-YOU is by far the best attested, and most common. The NAD films (see §4.1.2) contain examples of both the non-emphatic and emphatic forms, which are phonologically identical to the forms still in use today (Figure 12). The emphatic form is glossed THANK-YOU-VERY-MUCH (handspeak.com, accessed January 29, 2020) or “THANK-YOU as in ‘very thankful’” (signingsavvy.com, accessed January 29, 2020).

The modern form of THANK-YOU-VERY-MUCH, with the non-dominant hand translated away from the signer, is likely derived from the form signed by George Veditz (Figure 12, top right) where the hands are parallel: signs with two hands on the face are dispreferred (Frishberg 1975). Thus the emphatic morpheme’s underlying form is a reflection of the dominant hand across the midsagittal plane.

HONOR and RESPECT have the same location and movement, but are initialized with H and R handshapes respectively. The 2H forms are not attested before 1965, but in 1975, Frishberg calls the 2H forms “formal” and “hypercorrect.” The 2H forms cited on signingsavvy.com are described as showing “more admiration” (HONOR) and “more respect” (RESPECT). I do not have an attestation of either of these signs with the two hands next to
each other, but the non-dominant hand is glided\textsuperscript{17} away from the signer in the same way as in \textsc{thank-you} (and in \textsc{detest} below.) The record is sparse enough that it is entirely possible that the parallel form existed and was not recorded.

\textsc{detest} is a slightly more complicated case, because it is close to homonymous with \textsc{vomit}, from which it appears to be metaphorically derived.\textsuperscript{18} Dictionaries show both 1H and 2H glided forms (Figure 14, left and right), without distinguishing whether the form is emphatic or not. However some signers still have a distinct emphatic form of \textsc{detest} which resembles Figure 14, center. All three—1H, 2H, 2H glided—are also citation forms for \textsc{vomit}. Here again we can assume that the glided form (Figure 14, right) is historically derived from the parallel one (Figure 14, center): either some dictionaries are providing only the emphatic form without noting it as such, or, as I will argue in §5.1.2, the emphatic form has replaced the non-emphatic form in the lexicons of the signers of those dictionaries. This is supported by the fact that \textsc{vomit}, which seemingly should not be able to be semantically emphasized in this way, has also become 2H for some signers, under the influence of \textsc{detest}.

This morphological process—the reflection of the dominant hand across the midsagittal

\textsuperscript{17}i.e. moved along one plane
\textsuperscript{18}Some dictionaries have them as identical: signingsavvy.com shows identical location and movement, but \textsc{vomit} with an extra non-manual. aslpro.com has no non-manual in \textsc{vomit} but a non-manual in \textsc{detest}, which also has a more abrupt motion.
Figure 14: VOMIT: left, lifeprint.com (accessed January 29, 2020)—homonymous with DETEST; center, Caselli et al. 2017—homonymous with DETEST (emphatic); right, aslpro.com (accessed January 29, 2020)—homonymous with DETEST.

Figure 15: ZUM-KOTZEN ‘disgusting’: left, “somewhat offensive”; right, “very offensive” (Loos et al. 2019: Figure 20)

plane, with translation away from the face—is also attested in DGS with identical form and near-identical semantics (Loos et al. 2019). In DGS, Weak Add of this kind is productive among taboo terms, and adding the non-dominant hand makes a term more offensive. One example, ZUM-KOTZEN ‘disgusting’, has an identical form to ASL VOMIT, including the non-manual that evokes vomiting—like ASL DETEST, it is probably a metaphorical extension of ‘vomit’. (This may be under the influence of German—zum Kotzen is itself derived from Kotze, “vomit.”) Loos et al. (2019) call the 1H form “somewhat offensive” and the 2H form “very offensive” (Figure 15).

I will suggest that the morphological process present in DGS taboo terms, and suggested by the few ASL signs above, is actually more prevalent in ASL than previously recognized, and that it is the cause of Weak Add in a class of otherwise inexplicable signs (§6).

4 Methodology

Though a few ASL derivational strategies can create 2H signs from 1H ones (§3.3), the lexical addition of the non-dominant hand has not yet been systematically examined. In
order to do this, I looked at dictionaries of ASL written at different points in the history of the language, stretching from Old LSF to Modern ASL.

Dictionaries are by no means a perfect record of a language at a given time, and their static nature (until the advent of DVDs) creates a host of problems for documenting a sign language. The earliest French sources on sign language are largely of Signed French, a visual version of the French language invented by hearing teachers, that drew from and influenced Old LSF (Shaw and Delaporte 2015: Introduction). Many dictionaries throughout time (though not all!) have been produced by hearing non-native signers who worked educating the deaf (often with respect to religious instruction), and their work may therefore represent the hearing compiler’s own imperfect signing. Both deaf and hearing lexicographers had their own linguistic agendas, and many dictionaries represent a prescriptive pedagogical outlook instead of an accurate chronicle of speech. Nevertheless, they are the best sources that sign language linguists have from before video technology was available. With these caveats, the dictionaries that exist are an invaluable source of information, and should not be disregarded for the great amount they can teach us about ASL diachronic change.

4.1 Data Sources

In order to navigate the complexities of these sources, my first path into the historical data is Shaw and Delaporte (2015), *A Historical and Etymological Dictionary of American Sign Language*. They are the first to have gone through the entire written, photographed, and videotaped history of Old LSF and ASL, to propose more than 500 sign etymologies. They suggest sources of iconicity and trace intermediate forms, but never confine themselves to a theory of phonological change: this makes the dictionary an ideal source of data to which any analytical framework can be applied. They are also a guide to some of the earlier, smaller, and less reliable resources—for all French sources before 1856, and the two American sources before 1900, all data I cite comes through Shaw and Delaporte (2015). Other than those, I examined all dictionary citations directly.

I divide my sources into four chronological groups, reflecting the history of transmission of sign language to and within the United States, as well as the history of sign language lexicography. First are sources on Old French Sign Language, which extend from close to the founding of l’Épée’s deaf school in 1760 (Shaw and Delaporte 2015: x) until a few decades after the founding of the first deaf school in the United States, the American School for the deaf (ASD). Sources in the 1850s and 1860s are the first to be dedicated primarily to signs in actual use among deaf people, and we can be confident that the LSF of that time was very close to the signing of Laurent Clerc, the deaf Frenchman who co-founded the
ASD. About Pierre Pélissier, the first deaf person to systematically catalogue LSF signs, Supalla and Clark (2014: 7) say “The LSF signs imported to America in 1817 by Clerc and Gallaudet were very similar to the forms in [his] dictionary.” Second are signs documented in the United States before the Dark Period. Many of the sources on ASL from this period are from the 1910s, and were made as a response of prominent members of the deaf community to the rise of oralism and anti-sign language sentiment (Supalla and Clark 2014). In accordance with common practice, I call the language of these eras “Old LSF” (oLSF) and “Old ASL” (oASL) respectively (Napoli and Sanders in progress).

The third and fourth groups are all dictionaries from after the Dark Period, and the division between them is more incidental than historical. The majority of my sources created since that point are online dictionaries which are continuously updated, and have existed since 1997 or later. The handful of dictionaries from before this point are largely similar to the online dictionaries, but do represent the language of a different generation—and not grouping them differently could obscure information about the most recent trajectory of change. I therefore take 1997 as the diving point, and call signs from before that year “Recent ASL” and those from after it “Modern ASL.”

4.1.1 Sources on Old LSF (1784 - 1868)

Shaw and Delaporte (2015: xviii) “collected and scrupulously examined all of the known historical texts of LSF signs.” Many are manuscripts by various abbots affiliated with l’Épée’s school, beginning with l’Épée’s own writings about educating the deaf. As mentioned above, these texts deal with two kinds of visual communication: first, Signed French, or “methodical signs,” which were invented by hearing teachers to teach the deaf to use French; second, “colloquial” or “natural signs,” which the students created themselves (Supalla and Clark 2014: 17). Unfortunately for us, the majority of the work from this period is dedicated to describing the former—“natural signs” were thought to be “universal,” and therefore not necessary to describe or teach to hearing teachers (Supalla and Clark 2014: 3). I therefore rely on Shaw and Delaporte (2015)’s careful reading of these sources for which signs were genuinely created by deaf people, and which signs from the methodical curriculum (though there are very few) made it into the day-to-day speech of the French deaf, and then Laurent Clerc.

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19A span from the 1930s–1960s during which sign language pedagogy was severely diminished in the United States (and around the world), and there is little record of signing.

20These are slight misnomers: “Recent ASL” is likely still signed today by the oldest living signers—“Modern ASL” probably reflects the signing of those currently middle-aged and somewhat younger.
There are, however, two dictionaries which do document the “natural signs” of the deaf, which I drew from directly as well. The first is *Iconographie des signes faisant partie de l’Enseignement primaire des sourds-muets*, “Iconography of the signs forming part of the primary education of deaf-mutes,” written by Pierre Pélissier in 1856. Pélissier was deaf, first a student at the INJS, where he studied under Laurent Clerc, and then a teacher there (Supalla and Clark 2014: 152). In his book signs are organized by topic, so some domains are totally documented while others are entirely left out. However, each description of a sign is accompanied by an illustration. As the only deaf lexicographer of Old LSF, his insider perspective is valuable, but as a teacher at the INJS, his language philosophy still aligns with that of his hearing employers (Supalla and Clark 2014: 152). The second has the catchy name *Le Langage de la physionomie et du geste mis à la portée de tous, suivi d’une méthode courte, facile et pratique d’enseignement des sourds-muets illétrés, qui sont hors des instructions spéciales et des élèves arriérés de ces mêmes écoles*, or “The language of physiognomy and gesture made available to all, followed by a short, easy and practical method of teaching illiterate deaf-mutes, who are outside of the special instructions and subnormal pupils of these same schools” and was published in 1865. Abbé Louis Marie Lambert, its hearing author, taught at the INJS, and created the dictionary specifically to supplement others’ work on Signed French by in his work including only “methodical signs.” His organization is alphabetical, and the dictionary itself contains more forms, though some are only described instead of illustrated (Supalla and Clark 2014: 153).

Both books are in the public domain, so PDF copies are available (see Bibliography for links), but I largely used The Historical Sign Language Database. They have an incomplete but growing searchable index of these two books, including the pictures associated with each entry.

4.1.2 Sources on Old ASL (1856 - 1923)

In the same year that Pélissier published his dictionary, Jerome S. Brown published the first American compendium of signs, *A Vocabulary of Mute Signs*. Unlike Pélissier, however, Brown was imprecise in his descriptions of signs, and did not include any drawings or pictures, so according to Shaw and Delaporte (2015) little of what he wrote is useful for historical phonology. (Supalla and Clark (2014) note that he was very cognizant of the variation between signers in the forms of signs that they used—this may be why he did not give more exact descriptions.)

The first book with more immediate value for the etymology of ASL is William Philo Clark’s 1885 book on Plains Indian Sign Language (PISL). Though PISL has been argued
not to be related to ASL (Hammarström et al. 2019), Clark compares “over 1,000” PISL forms to their ASL translations, on which he consulted two prominent ASL educators from the Illinois and Indiana Schools for the Deaf (Shaw and Delaporte 2015: xviii). He unfortunately also does not include any images of signs.

The weaknesses of these sources are perhaps made up for by the Gallaudet Lecture Film Series, created under the direction of the National Association of the deaf (NAD) between 1910 and 1920. Supalla and Clark (2014) is an entire book on the project that created these films, its historical context, the people involved, and how the resources that it created can be interpreted. It also contains a more general exploration of the principles of sign language etymology—an essential read for anyone interested in the historical linguistics of sign languages. The materials discussed in the book are also indexed and searchable online.

The series was conceived under the threat of oralism, which was gaining currency in pedagogy for the deaf (Supalla and Clark 2014: 28). Important members of the deaf community were selected to be filmed, giving speeches about the history of the American deaf community and the importance of sign language, as well as telling stories, reciting poetry, and giving lectures on science. The goal was to preserve the language and style of the “sign masters,” and show the beauty, versatility, and importance of sign language. These videos are an invaluable resource into the history of ASL for many reasons, but also because they show signers of various ages and backgrounds, from what Supalla and Clark (2014: 9) called the second, third and fourth generations of signers since the founding of the ASD and the creation of ASL. (The fifth generation, as of 2019, would now be in their eighties.) This provides a window into a large section of the early development of ASL, despite the relatively short timespan over which the films were made. When I cite a film, I will cite the name of the speaker and the year of the recording of the film. Of the 22 films created, 15 survive.

As the film series was being organized and funds raised, a member of the NAD was compiling the largest and most comprehensive ASL dictionary to date—The Sign Language: A Manual of Signs. It was first published in sections from 1908-1910, with a new edition (which I cite) in 1918. The dictionary was compiled (and the pictures of signs modeled) by J. Schuyler Long, an NAD member, deaf teacher at the Iowa School for the Deaf, and something of a prescriptivist, like many members of the NAD at the time. Though the

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21The instruction of deaf children only in spoken language, which valued the integration of deaf children into hearing society extremely highly. Subscribers to this pedagogy view sign language as damaging to the development of a child, which has been thoroughly refuted by current developmental and psychological research.
dictionary had its inception as a teaching tool for hearing students of ASL (Long 1918: 5). Long describes his hope in the introduction to the dictionary that the work will serve to standardize ASL across the country, and that ASL “is not acquired by the rising generation in that purity and perfection attained by the deaf and their instructors during the early decades of its use in this country” (Long 1918: 6). Despite this philosophy, Long notes many alternate articulations and variations in meaning which help connect old and modern forms.

Two other dictionaries were published a little after Long’s, both in 1923 by hearing clergymen in different parts of the United States. One, by John Walters Michaels, is relatively short and contains few illustrations, though it documents some regional forms not present in other dictionaries of this period (Shaw and Delaporte 2015: xix). Its inexact description of signs make it of limited use for a phonological comparative project. The other dictionary however, is in some ways the most impressive work from this period. *How to Talk to the Deaf*, by Daniel D. Higgins, is more extensive even than Long’s dictionary (with around 1,600 signs to his 1,400) and had a photograph for every sign cited, which Long did not (Shaw and Delaporte 2015). It also notes variations in form and meaning, though Long’s entries often better match the usage shown in the Gallaudet Lecture Film Series. While *How to Talk to the Deaf* is an extremely useful resource in its own right, and I have used it to its fullest extent, I often defer to Long’s citations when there is a minor difference in articulation, or to find images of signs, because Long’s deafness makes it more likely that his forms better reflect the language of the day.

4.1.3 Sources on Recent ASL (1965-1994)

It took the hearing world a few more decades to start the turn-around back towards sign languages. William C. Stokoe Jr., a hearing English Professor at Gallaudet University (then Gallaudet College) introduced hearing linguists to American Sign Language for the first time in 1960 (Stokoe [1960] 2005). In that paper, he laid the groundwork for the linguistic study of sign languages across the world, and helped forward and legitimize a movement that continues until today to give deaf people access to their languages. Five years later, he collaborated with Carl Croneberg and Dorothy Casterline, two deaf members of the Gallaudet faculty, to write *A Dictionary of American Sign Language on Linguistic Principles* (DASL), which exhibited recent linguistic discoveries via the ASL lexicon, as well as providing some notes on deaf culture and language use. The dictionary uses a now-defunct notation and terminology system that Stokoe invented (Stokoe [1960] 2005) which are in some ways more precise than verbal descriptions, but are often difficult to interpret (for an example, see Figure 20). The DASL preserves the signing of the fifth and sixth generations
of ASL signers since the founding of the ASD, according to the system of Supalla and Clark (2014: 8).

The next major dictionary, compiled by Martin Sternberg, was an effort from the old guard of “classical signers” to preserve their dialect, similar to Long (1918). Sternberg was the student of Elizabeth Peet, a longtime Gallaudet dean who is remembered as being particularly prescriptivist (Supalla and Clark 2014: 10-11). Though this caused Sternberg to preserve some forms that were considered archaic by most when he published the dictionary in 1981, the signs he captures overall align with the other lexicographers of the Recent ASL period.

The last dictionary I consulted from this period was compiled by the Editor in Chief of Gallaudet University Press, Elaine Costello. It seems to be less conservative than Sternberg (1981), and was published more than 10 years later in 1994, but is designed and organized in much the same way. Both books have an illustration for every sign, and are agnostic to any particular theory of sign language (unlike Stokoe [1960] 2005). They both have a large number of signs and many alternate glosses; they are overall functional sources for insight into the signing of a particular time period.

4.1.4 Sources on Modern ASL (1997-2019)

The first contemporary dictionary I used (and the only one that is still on paper) is Tennant and Brown (2010). It is organized by handshape and number of hands, with phonetically similar signs appearing next to each other, and minimal information in each entry beyond the citation form and gloss. Napoli and Wu (2003: 125) call an earlier edition of this dictionary “admirably clear” and note that the dictionary is designed to be as accessible as possible to the general public. These design features make it slightly less useful to the historical linguist, however, because each sign is essentially contextless. Related words are not marked (though 1H vs 2H alternate forms are usually cross-referenced), and glosses are often a long list of synonyms.

The dictionary with the most cross-referencing and best record of variation is signingsavvy.com. One gloss can have videos of multiple variants, and ambiguities or small meaning differences among glosses are given their own subentries. Agreement signs are shown in different grammatical forms. The list of glosses is exhaustive, and each video has a list of all the glosses with which it is connected, each of which is hyperlinked to its own series of videos—this means that two signs that share a possible English gloss can both be linked to that gloss, while still also being associated with other different glosses that show the difference in their meaning. There are also example sentences and many resources for
learners. signingsavvy.com is unparalleled for finding a sign with the exact meaning you want and learning how to use it, and the website is well-designed for systematic exploration of the lexicon. The only downside of the dictionary is that the forms it shows are rather stilted: the trove of semantic details it offers often does not include casual usage, and Napoli et al. (2014: 434) call it “more formal” and “more conservative.” Its two sign models are both hearing interpreters, though the dictionary has an executive board that includes native deaf signers.

handspeak.com is similar to signingsavvy.com in its attempts to cover as many glosses of English as possible, but with fewer cross-references and examples, and more colloquial articulations. The colloquial articulation and wide coverage make it a good first source for finding what the common sign for a particular meaning is likely to be today. However, for linguistic analysis the lack of cross-referencing is problematic: since the dictionary is organized by English gloss, and glosses of the same sign are not connected, one cannot be sure whether two English glosses are showing two videos of the same sign. Though some entries show variations or offer alternate meanings, it is often impossible to tell from an entry what other glosses can be applied to the sign, or whether an English gloss is a sign’s primary or secondary meaning. Thus the dictionary is better suited for corroboration of forms than for primary research. Unfortunately, the compiler and sign model of handspeak.com, Jolanta Lapiak, does not grant license for any of her content to be reproduced, so none of her signs are used as examples in this paper.

One dictionary I cite often, though it has its own problems, is aslpro.com. As of November 2019, the website was broken, and videos were not viewable in Firefox, Chrome, or Safari. Each video is downloadable, however—I succeeded in downloading all of the videos, though if there was any other information besides a sign and a single-term gloss, I do not have it. This is a significant limitation, and causes the same problems with a lack of cross-references that exist with handspeak.com. However, the contents of the dictionary are somewhat unique. It often contains forms of signs that are different from the other dictionaries, and had the most 2H versions of signs of any of my sources. This fact, along with the fact that the sign models generally look younger, lead me to believe that this dictionary represents a different generation of signers—the seventh generation from the ASD (now ages 20-30). Napoli et al. (2014: 434) suggest that the signs on aslpro.com are still formal, but less so than signingsavvy.com. The sign models for this dictionary are a mix of deaf people and hearing interpreters.

A solid exemplar of the Supalla and Clark’s (2014) sixth generation of signers (now middle aged) is lifeprint.com, also called American Sign Language University. Its compiler and sign model, Bill Vicars, is a deaf professor of American Sign Language and deaf Studies
at California State University - Sacramento. While signingsavvy.com gives the user a very detailed sense of signs by being systematic and exhaustive, lifeprint.com achieves the same effect through description, discussion, and anecdote. (An odd distinction, lifeprint.com is by far the most humorous of the sources I use in this paper.) The entries are idiosyncratic, but all contain a description of the sign, either a video or a series of images of it being signed, and at least a mention whether there are acceptable variants. lifeprint.com is also the oldest of the modern dictionaries, being continuously updated since 1997, so entries are an amalgam of information gathered across this period, and there is no standard format. Some entries show questions from dictionary users along with Vicars’ response, advice on how to remember or properly articulate signs, or usage notes of various kinds (e.g. “if you are holding a sandwich in one hand”). The website also has a lot of other pedagogical material, so the dictionary section has more of the feel of teacher notes to individual signs. Luckily, Vicars is a teacher who is very interested in variation and change, and so the extended notes on signs can contain descriptive notes of ongoing variation and semantic shift. (For an example of this, see §6.3.) Overall, this means that some signs have much more information about them than any other dictionary, but that the number of signs covered is somewhat smaller, and that the site is somewhat more difficult to navigate. On a technical note, many of lifeprint.com’s videos will likely soon go the way of aslpro.com, as Adobe Flash Player (a staple of the 2000’s internet) stops being supported by more browsers.

ASL-LEX, on the other hand, is the most technologically sophisticated dictionary out there: all the signs have been ranked for subjective frequency and iconicity according to hearing non-signers, and have been annotated for many phonological and lexical properties (Caselli et al. 2017). Signs are organized by phonological similarity, and can be filtered for any combination of variables. As a corpus for investigating the modern ASL lexicon, it is nonpareil—but it is difficult to use its resources for a larger diachronic study. Because of the richness of the annotation, the number of signs is small, around 1000 (though a 2,700 sign version with even more features is currently in development.) Many signs in my data do not appear in ASL-LEX, and, because it is a modern dictionary, many that do are already 2H. Even for those signs in my data that do appear in Caselli et al. (2017), my research largely requires comparing between different forms of the same sign with respect to the listed metrics. One direction for future research (once ASL-LEX 2.0 is released) could be leveraging Caselli et al.’s (2017) statistics to investigate distribution or conditioning environment of 1H signs becoming 2H—e.g. if all 1H signs with plural semantics (§3.1.1) are rated as less iconic than 2H with plural semantics.

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²²Since it is really a linguistic corpus rather than a dictionary.
4.2 Data & Annotation

Out of the more than 500 sign etymologies in Shaw and Delaporte (2015), I found 37 signs that I was confident began as only 1H, off of which a 2H form was later coined. By finding a few other examples on my own, and some words with multiple 2H forms, I have a total of 15 balanced forms that descend from signs whose first attestations are all 1H. The signs in Shaw and Delaporte (2015) may not be a representative sample of the whole language, but it seems probable from the small number of examples that Weak Add is fairly uncommon. (Its rarity makes it no less worthy of linguistic attention, of course, but suggests that it is less active in shaping the lexicon.) A few signs could not be definitively categorized as undergoing Weak Add or Weak Drop: they showed variation within the first period of LSF/ASL in which they were attested, and had no recognizable source for their second hand, and no iconic reason to be coined as 1H. Since I could not definitively establish whether these signs began as 1H and underwent Weak Add, or began as 2H and underwent Weak Drop, or both versions of the sign were lexicalized at the same time, signs that patterned this way are explicitly caveated when mentioned, and were excluded from my final dataset.

Signs are given with the gloss that I take to be most conventional. A gloss ending with an underscore and a number (e.g. HAPPY_2) indicates an alternate 2H form of a sign, with no known difference in meaning from the other forms. Glosses followed by a year number in parentheses (e.g. HUMBLE(1923)) were found with that form only once, in a dictionary published in the given year.

5 Data

§2 and §3 go through documented circumstances under which ASL signs undergo Weak Add, and give examples of signs where the derived 2H form has entered the lexicon. This section shows all the signs in my data whose added hand has not been explained by any of those documented circumstances. §5.1 shows that many of the remaining signs have significant phonological, syntactic, and semantic commonalities, and §6.3 deals with signs that do not share those commonalities.

5.1 Balanced Signs

The vast majority of signs I found to have added a hand with no obvious motivation became balanced: they copied the handshape of the dominant hand, and reflected its location, movement, and orientation (van der Hulst 1996). Napoli and Wu (2003) show that signs can exhibit numerous types (and subtypes) of reflection, and I use their system to categorize
the signs in my data: these consist of four mathematical symmetries that ASL can exhibit (Table 1), three basic planes relative to the body that these symmetries can be defined with respect to (midsagittal,\textsuperscript{23} horizontal, vertical), and inverse or identical motion of the hands. The categorization is shown in Table 2, and the signs are listed in Appendix D.

One sign, HUMBLE, continued its phonological development after becoming balanced: the added non-dominant hand underwent Weak Freeze, losing its movement parameter but maintaining its other features (Padden and Perlmutter 1987). Both hands then moved to the center of the chest: this is another tendency of phonological change that Frishberg (1975) observed in ASL, but may also be due to a compounding of the original sign HUMBLE with the gesture of the index finger over the lips indicating silence (Shaw and Delaporte 2015: 138). There is some connection between the ideas of humility and silence, but the added gesture may have also been under the influence of QUIET, which had two forms: one which seems to have been nearly identical to the balanced form of HUMBLE, and another which incorporated the finger at the lips (now often glossed SILENT). Figure 16 shows the full evolution of HUMBLE, and Figure 17 shows the two forms of QUIET. In order to avoid confusion, in this section I will cite only the historical version of HUMBLE that became balanced before undergoing other changes—this is HUMBLE(1923).

HUMBLE is a rather extreme example of how individual variation can obscure phonological commonalities between signs in this set of 15 balanced forms. In this section, I will show why this set of balanced signs can all be described to have undergone one phonological process, and how seeming exceptions have their own systematicity, and, as with HUMBLE,

\textsuperscript{23}The plane that splits a person into left and right halves.
5.1.1 Motion

The movement parameter of signs can be divided into two types: inverse and identical. Between the two types, inverse motion is analyzed to be more marked (van der Hulst 1996, Brentari 1998, Napoli and Wu 2003). Brentari analyzes inverse and identical motion as the presence or absence of an [alternating] feature to the non-dominant hand. One would expect that, when adding a movement parameter to the non-dominant hand for the first time, the unmarked movement would be chosen by default, and this seems to be the case: out of 15 balanced forms, only three use inverse motion. Because almost all signs are assigned the unmarked motion parameter—non-alternating motion—one would expect that certain environments condition particular signs to become alternating. This seems to be the case,
Figure 17: QUIET, also glossed as CALM or STILL: left, Higgins (1923), Old ASL; right, Long (1918), Old ASL. Both forms remain essentially identical until today.

Figure 18: MYSELF: left, Lambert (1865), Old LSF; right, lifeprint.com (accessed January 29, 2020) Modern ASL. In some Modern ASL dialects, such as the one shown here, this sign seems to have remained the same since the early history of the language. For many signers, however, the orientation of the hand has reversed (handspeak.com, accessed January 29, 2020) though the nature of the conditioning environment is unclear. Two of the three inverse signs, AGGRESSIVE and BRAG, are derived from the same etymon, MYSELF (Shaw and Delaporte 2015), shown in Figure 18-19.24

The only other alternating sign in my data is a form of CHOOSE from Stokoe et al. (1965), shown in Figure 20. (A translation of the notation is provided below the image, which shows a text entry.) CHOOSE has been documented with many forms, both 1H and 2H, throughout the years, but Stokoe et al. are the only ones to show a balanced version.

Unfortunately, the 1H sources for these signs, CHOOSE (Figure 10) and MYSELF (Figure 18), seems to have little in common. With only two data points, it’s difficult to make a claim

24The sign THEATER/ACT appears to be of a kind with AGGRESSIVE: they are almost identical, except that their directions of motion are reversed; and the semantic connection between theater and egotism (via stereotypically vain & self-important actors) is not difficult to imagine. These signs may have influenced each other for this reason, but in fact THEATER is totally etymologically unrelated. Forms in Long (1918) and Higgins (1923) show that the original sign did not even touch the chest, and could also be articulated with a flat-B hand.
about whether something has conditioned the inverse motion, or if it is totally idiosyncratic. However, the fact that two signs descended from the same etymon pattern together suggests that MYSELF has some feature that conditioned the inverse motion in both cases. Also, as discussed in §6.3, CHOOSE(1965) is semantically exceptional, and may have been formed by a different mechanism altogether.

5.1.2 Symmetry

When Frishberg (1975) talks about signs becoming more symmetrical, she gives six examples: ANGRY, DIE, HURRY, TRAVEL, AGGRESSIVE, BLUSH. Of these, I was only able to independently confirm that two—ANGRY and AGGRESSIVE—had begun 1H and become 2H.

In addition to the three signs discussed in the previous section (AGGRESSIVE, BRAG, CHOOSE(1965)), I found 12 more balanced forms that originated as 1H. All 15 balanced forms, shown in Table 2, are near-identical in the symmetry of their non-dominant hand: every one is reflected over the midsagittal plane. Five signs exhibit translation in addition to reflection: these signs are categorized under “glide reflection,” which is reflection followed by translation (see Table 1 for diagrams.) The added translation will be shown to be conditioned by aspects of the reflection done in certain articulatory locations.
<table>
<thead>
<tr>
<th>Types of Symmetry</th>
<th>Signs</th>
<th>Planes of symmetry</th>
<th>Inversion?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflection</td>
<td>AGGRESSIVE</td>
<td>midsagittal</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>BRAG</td>
<td>midsagittal</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>CHOOSE(1965)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>ANGRy</td>
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<td>No</td>
</tr>
<tr>
<td></td>
<td>CARELESS_1</td>
<td>midsagittal*</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>CELEBRATE</td>
<td>midsagittal</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>HAPPY_1</td>
<td>midsagittal</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>QUICK(ER)</td>
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</tr>
<tr>
<td></td>
<td>SHIRT</td>
<td>midsagittal</td>
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</tr>
<tr>
<td></td>
<td>VOMIT_1</td>
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</tr>
<tr>
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<td>none</td>
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</tr>
<tr>
<td>Translation</td>
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<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Glide reflection</td>
<td>CARELESS_2</td>
<td>midsagittal</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>ENJOY</td>
<td>midsagittal</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>HAPPY_2</td>
<td>midsagittal</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>HUMBLE(1923)</td>
<td>midsagittal</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>VOMIT_2</td>
<td>midsagittal</td>
<td>No</td>
</tr>
</tbody>
</table>

*“imperfect reflection” due to crossing of the plane (see Napoli & Wu 2003: 156)

Table 2: Table of balanced 2H ASL signs that are descended from 1H signs—hyperlinks to images/videos of signs. Categorizations of plane of symmetry and inversion written in bold are from Napoli and Wu (2003), others are mine.
The signs that make use of glide reflection have their own phonological commonalities. First, all translations take place along the plane representing the dominant hand’s orientation. For example, in ENJOY and HAPPY_2 (Figure 21, top) the palms face toward the signer, so translation happens along the vertical plane. Secondly, in the 1H forms from which the glided 2H forms derive (shown in Figure 22), it would be either physically impossible or phonologically dispreferred to perfectly reflect the dominant hand. In ENJOY and HAPPY_2 (Figure 21, top), the dominant hand is already in the middle of the chest—a copy of the dominant hand reflected across the midsagittal would have to occupy exactly the same physical space as the dominant hand. In HUMBLE(1923), CARELESS_2, and VOMIT_2 (Figure 21, bottom), the location of the dominant hand is in front of the face, a region in which the non-dominant hand is commonly moved downward or deleted (Frishberg 1975). This is only a dispreference, however, and not a phonological rule: CARELESS_1 and VOMIT_1 (Figure 23-24) both show citations of the same signs without any translation.

All five signs without perfect reflectional symmetry therefore all have specific phonetic or phonological motivations for their non-dominant hand to be translated. Thus we can reconstruct an underlying form for the added hand in all 15 non-iconic balanced signs—co-indexed with the movement, handshape, and orientation parameters of the non-dominant hand, with a location derived from the location of the dominant hand by reflection across the midsagittal plane.
Figure 22: 1H etyma for signs with imperfect reflectional symmetry. From top left: PLEASE/PLEASURE (Long (1918), Old ASL), HAPPY (Long (1918), Old ASL), GOD (Hotchkiss (1913), Old ASL), CARELESS (Tennant and Brown 2010, Modern ASL), VOMIT (lifeprint.com, accessed January 29, 2020, Modern ASL).

In GOD, Hotchkiss’s non-dominant hand is at rest, and not a part of the sign’s articulation—this location is a common rest location for the non-dominant hand in Old ASL.

Figure 23: CARELESS (top, Tennant & Brown 2010; center, lifeprint.com, accessed January 29, 2020; bottom, aslpro.com, accessed January 29, 2020), all Modern ASL
This seems to be the least marked possible way to add a second hand to a sign. Besides the specification to add the weak hand itself, the only information that is not duplicated from the dominant hand is the means of deriving the non-dominant hand’s location. This, however, is likely the location choice that requires the least cognitive effort: Napoli and Wu (2003: 143) “conclude that since reflection across the vertical midsagittal plane does not constrain handshape in any way, this is the least marked of the symmetry transformations.” Thus, ease of articulation (see §1.4)—specifically minimizing cognitive effort—seems to have been active in the creation of these signs; the same as in the lexicalization of classifiers in §3.1.2. §6.1 suggests the origin of this form, and §6.2 explains how it entered the lexicon.

5.2 Unbalanced Signs

There are also a few unbalanced signs that seem to have undergone Weak Add, but not increased in iconicity, as the other unbalanced signs in my data did (see §3.1 for a more detailed explanation.) I mention all unexplained signs and offer tentative suggestions for each, for the sake of completeness. A number of signs have some phonological commonalities, which I describe. All the unbalanced signs in this section can be found in Appendix C.

The majority of signs in this category—BAD, CHOOSE, GOOD, IMPOSSIBLE—have a flat-B handshape on the weak hand, similar to signs where that handshape was a classifier (see §3.1.2). In all of these, the non-dominant hand is inserted at the terminus of movement (Figures 25 - 27). THAT (Figure 28) also fits in this category, though it is unclear whether the sign began 1H or 2H. Including THAT, the majority of etyma for signs in this section have movement towards or away from the signer, a relatively rare lexical feature in ASL. The added hand may therefore constitute a phonologically conditioned change, but more research is required. For a full analysis, see §6.4.

The last two signs in this category likely changed due to different proximity effects. The first, USE, may have been altered due to its proximity to similar signs in the lexicon.
Figure 25: GOOD (top) BAD (bottom) (lifeprint.com, accessed January 29, 2020, Modern ASL)

Figure 26: CHOOSE_3, “to appoint or elect” (signingsavvy.com, accessed January 29, 2020, Modern ASL)

Figure 27: left: JAMAIS ‘never’ (PéliSSier 1856, Old LSF); center: “older variant” of IMPOSSIBLE observed by Shaw and Delaporte (2015: 143); right: IMPOSSIBLE (Shaw and Delaporte 2015, Modern ASL)
There are many groups of signs which share four out of five parameters, and whose differing handshapes are drawn from different letters of the manual alphabet. USE may have been influenced to become 2H by WORK and BUSY—the 2H form now resembles a version of WORK initialized with the manual letter U. EACH, on the other hand, may have undergone change due to common collocations: Supalla and Clark (2014: 195-200) discuss how WHO split into many forms with different phonological modifications by assimilating with signs with which it was commonly articulated (e.g., gaining a bent index finger from ASK, due to the common collocation ASK WHO.) EACH, as the only quantifier in my dataset, is likely among the highest frequency signs represented, and therefore most vulnerable to features spreading from neighboring lexical items.

6 Analysis

The handful of signs identified in §5.1 seem to truly undergo Weak Add. The new weak hands in them have no synchronic explanation, are not iconic, and were added in a phonologically regular way—which makes a phonological explanation for their addition seem promising. However, §2 showed that current proposals about phonological conditioning are

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26 The sign CHORES, a version of the sign DUTY, may also be part of this family.
not sufficient to explain the distribution of these Weak Add signs. §6.1 suggests that instead the phonological commonalities between 2H balanced forms arose from all being marked with the same morpheme—the emphatic morpheme from §3.3.2. §6.2 explains how this morpheme may have lost its meaning in these signs and been lexicalized via hyperbole and conventionalization. §6.3 offers a non-phonological explanation for Weak Add that unites the remaining unexplained balanced signs with some of the unexplained unbalanced signs, while §6.4 gives a competing phonological explanation which accounts for different forms.

6.1 Formerly Emphatic Forms

There are 11 etyma which became non-iconic balanced 2H signs (§5.1). Besides the fact that they are all necessarily 1H, they have very little in common phonologically. They move along all three main axes of the body (ANGRY upwards, VOMIT outwards, and CARELESS to the side.) They have different movement paths (CELEBRATE is circular, VOMIT is curved, BRAG is back-and-forth along straight paths.) They have various handshapes, with different and different numbers of selected fingers. They are not even all below the neck or away from the face—the environments that Frishberg (1975) associated with Weak Add. However, all the etyma of unexplained forms can function as either verbs or adjectives. All of the adjectives describe emotions or personal traits (AGGRESSIVE, ANGRY, CARELESS, HAPPY, QUICK, HUMBLE), and the verbs all involve feeling or expressing an emotion (BRAG, CELEBRATE, ENJOY). These are signs that semantically could take on the emphatic morpheme described in §3.3.2. (The four signs which canonically can take this morpheme, THANK-YOU, HONOR, RESPECT and DETEST, all also act as verbs.)

As discussed in §3.3.2, variation exists around the form and semantics of DETEST: for some signers the 2H form is still bimorphemic and emphatic; for other signers, DETEST is opaque, and the formerly emphatic 2H form is now the standard (and only) lexical form. I claim that the balanced forms that seemed to have undergone Weak Add were once in the exact same position of variation, and that the non-emphatic forms were entirely replaced in the lexicon. This is a form of hyperbole, where the semantics of a lexical item are weakened.

6.2 Conventionalization of Hyperbole

When language users make frequent use of a hyperbolic expression, the hyperbolic meaning of that expression can become weakened (Campbell 2013). Claridge (2010: Chapter 6) gives numerous examples of English words whose meaning has changed this way—\textit{incredible}, for example, no longer has to mean “literally unbelievable,” and is often used to mean

\footnote{Except for VOMIT, whose form is modeled after DETEST, as shown in §3.3.2.}
something like “very good.” The weaker usage of “incredible” is no longer thought of as a hyperbole by many English speakers: in the sentence “You look incredible!” there is no ambiguity as to the intended meaning, and no other context is required to judge the sentence felicitous. Claridge (2010: Chapter 6) calls the hyperbolic meanings in cases like this “conventionalized.”

I suggest that the unexplained balanced signs in my data replaced their 1H counterparts due to becoming conventionalized. Emotion words like these can easily be imagined to be used hyperbolically often—if someone wants to express an already strong emotion, they are more likely to want to express it as strongly as possible. As the meaning of the 2H forms weakened, it would be used even more often, potentially weakening the 1H form in turn, and eventually driving the 1H form out of the language altogether. Eventually, the emphatic meaning of the non-dominant hand would be weakened into non-existence, and the 1H form would be entirely replaced by the 2H form. This is the process is still in progress with DETEST.

Changes like the one I am hypothesizing are well-attested in spoken languages. A number of words in Vulgar Latin, for example, were replaced by forms in French that are derived from diminutives, but have no diminutive meaning. Animals words were a common domain where this process occurred. The Latin word for “crow” was corvus. A diminutive form, corvellus arose in Vulgar Latin, which in turn became French corbeau. -eau (from -ellus) is still a productive diminutive morpheme in French, but the word corbeau is now the only word for crow: a form without the diminutive -eau does not exist.

The same process—a morphologically diminutive form replacing the form from which it was derived—also happened in German with the word Mädel “girl”. -chen is a still-productive diminutive morpheme that was once applied to Magd. Mädel is now the standard word for “girl,” with no diminutive meaning, and Magd or Maid are much more rarely used, with more specialized meanings. Though the diminutive has nothing in common semantically with the emphatic ASL morpheme, the path of change and result are the same: a morphologically complex word becoming opaque and replacing the morphologically simple word from which it was derived.

### 6.3 Avoidance of Homonymy

There are two non-iconic balanced signs that do not fit within any of the pressures to add a hand to a sign described in §2, and which also cannot be analyzed as formerly emphatic. The emphatic morpheme also does not account for as-yet unexplained unbalanced signs.
However, a number of these signs, including both remaining balanced signs, share an uncommon trait in the ASL lexicon: they have homonyms.

Homonymy is claimed to be dispreferred in ASL (Moser 1990, though she gives no evidence and I have found no sources that have researched the question).\(^{28}\) ASL has more possible unique syllables than most (if not all) spoken languages, potentially making the creation of homonymous words statistically more unusual and therefore more marked. Additionally, children learning spoken language have been observed to make idiosyncratic phonological changes in new words to avoid homonymy (Leonard et al. 1989). I suggest that some of the unexplained Weak Add changes are due to a similar desire among signers to distinguish homonyms.

A prime example of signs shifting to avoid homonymy is the triply homonymous set SHIRT/APPLY-FOR/VOLUNTEER (Figure 29): VOLUNTEER does not seem to be undergoing any changes. SHIRT now has an alternate 2H balanced form (Figure 30, left) with no difference in meaning from the 1H form. APPLY-FOR is now being replaced in some contexts by APPLY-TO (Figure 30, right): signingsavvy.com and handspeak.com (accessed January 29, 2020) agree that the two signs are distinct in meaning and cannot be interchanged, though the latter notes that “many VRS [Video Relay Service] interpreters” have recently been using APPLY-TO instead of APPLY-FOR “when referring to a job application.” lifeprint.com (accessed January 29, 2020), on the other hand, believes that a broader semantic change is indeed occurring:

For the record, I personally think that “semantic shift” has occurred and the range of meanings of APPLY-to does indeed now include “submitting or having submitted an application to a potential employer, agency, or program” \[sic\]

We see this usage often in the Deaf Community by Deaf individuals when discussing having applied for a job or for some sort of program. This usage isn’t limited to just VRS interpreters—it is widespread.

It seems as though two of the three different meanings for the form shown in Figure 29 are being assigned to different forms—so the desire of signers to disambiguate is a likely motive.

The 1H version of CHOOSE is also nearly homonymous\(^{29}\) with two signs, FIND/DISCOVER and PICK-UP, which are identical. As described in §5.1.1, only Stokoe et al. (1965) lists a balanced 2H form of CHOOSE with alternating movement (Figure 20)—this

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\(^{28}\)However, Siedlecki and Bonvillian (1998) claim that homonymy is entirely absent in ASL. This will be shown to be false here, but the fact that Siedlecki and Bonvillian make this claim suggests that homonymy is quite rare in the language.

\(^{29}\)Or for some signers totally homonymous, e.g. CHOOSE, FIND.
may have been a short-lived attempt to differentiate CHOOSE from the other two signs. FIND and PICK-UP have also developed an alternate 2H form, where the non-dominant hand iconically represents the side of a container (Figure 32), which cannot be used for non-literal senses of PICK-UP (e.g. “pick up from school.”) This may be occurring for independent iconic reasons (see §3.1.1), but could also be related to the desire to differentiate homonyms.

In fact, a pressure from homonymy to change forms can explain why CHOOSE has so many forms overall—it is the etymon in my data with the most alternate 2H forms, five. All the different forms may be attempts by different groups of signers to fix the homonymy, and no one sign has won out yet.

A final group of exceptional signs whose added hand may be explained by homonymy avoidance is GOOD and BAD. The 1H form of GOOD is identical to the 1H form of THANK-YOU (Figure 12). Both signs have also had their 2H forms since very early on in their attestations—the first instance of 2H THANK-YOU is Péllisier (1856), and the first instance of 2H GOOD was in one of the NAD films (1910). However, the 2H version of THANK-YOU is emphatic, but the 2H GOOD is not: emphatic 1H GOOD has a lengthened hold at the end of the sign, which is a common emphatic strategy in ASL (Nicodemus et al. 2014). Thus the 2H form must serve another purpose—potentially to differentiate between the two signs.
Figure 31: 1H versions of **CHOOSE** and **FIND** (lifeprint.com, accessed January 29, 2020, Modern ASL)

Figure 32: 2H version of **FIND** or **PICK-UP** (lifeprint.com, accessed January 29, 2020, Modern ASL)
And BAD’s 2H form is likely formed on analogy with GOOD: 2H BAD appears only in Modern ASL, and it is only in half (3/6) of the modern day dictionaries I checked.

There are potential problems with the analysis of homonymy avoidance. Each of the signs discussed have added a hand in different ways—some becoming balanced, others unbalanced, some with alternating motion and some not. Also, there are other sets of homonyms which seem stable (e.g. GUESS and MISS). It may be that instead of directly causing phonological change, homonymy increases the likelihood that a phonological change to one of the homonyms from some other source will be lexicalized, because differentiating the homonyms is advantageous. That approach, however, does not explain where the changes to the signs in this category actually come from.

6.4 Terminus of AT Movement

There is another interpretation, however, that involves a bona fide phonological pattern, though evidence for it is not strong. GOOD, BAD, THAT, and CHOOSE_3 all involve movement along the same axis, and the weak hand in a flat-B shape added at the end of the sign’s movement. I use the terminology from Sanders and Napoli (2016) and call this the AT, or away-toward axis, which extends towards and away from where a person is facing. IMPOSSIBLE also adds the hand at the movement’s terminus, though the movement does not seem to have a large AT component.

Movement along the AT axis, also called “motion-in-depth” is the most difficult type of movement to perceive (Sanders 2018). Adding a hand at the terminus of movement could aid perception of movement along that axis. Additionally, for GOOD, BAD, and THAT, the added hand is held rather low in neutral space, requiring a more-easily-perceived movement downwards to make contact with it. However the evidence for this analysis is not as strong as it may seem at first glance. As previously stated, THAT may be originally 2H, and the desire to increase the perceptibility of AT movement does not apply to IMPOSSIBLE. As mentioned above, BAD was most likely formed analogically off of GOOD. That leaves only two signs, GOOD and CHOOSE_3, which this analysis actually explains. An explanation from homonymy avoidance accounts for both of these signs, along with others. The motion terminus explanation also fails to explain why a sign like THANK-YOU, otherwise homonymous with GOOD, cannot be articulated with a flat-B at the end of its AT movement. More work on the effects of perception on sign change is certainly called for, and AT movement is worthy of more investigation, but for this dataset, the homonymy argument seems stronger.
7 Conclusions

Frishberg’s (1975) paper was a foundational analysis for beginning to explore historical change in American Sign Language, and made many useful claims. My data, however, suggests that one claim—that signs tend to become 2H below the neck—is not entirely accurate. There may be a pressure to coin 2H signs at the chest, but all the signs that I have confirmed to have added a hand, most likely did so for reasons outside phonology. Some followed previously recognized paths, such as representing semantically plural ideas with two hands (§3.1.1), or the lexicalization of classifiers (§3.1.2). I have suggested two alternative accounts: the conventionalization of hyperbole (§6.1) and avoidance of homonymy (§6.3). I have also claimed the existence of an undocumented ASL morpheme indicating semantic emphasis. This process morpheme adds the non-dominant hand reflected across the midsagittal plane to a 1H sign. It also has a phonologically conditioned allomorph: in environments where exact reflection is dispreferred, the non-dominant hand undergoes transformation along the axis of the dominant hand. This phonological conditioning lends credence to a different claim from Frishberg (1975)—that signs on the face are preferentially one-handed.

Though I could not support Weak Add as a phonological process, I did find two other conditions where the forms of signs seemed constrained by cognitive effort: only minimally marked classifiers can be relexicalized as the non-dominant hand of a frozen lexical sign (§3.1.2) and the form of the emphatic morpheme contains as little phonological information as possible (§5.1.2). These, along with the examples of allomorphy described in §3.3.1 and §5.1.2, show that ASL phonology can cause regular changes in lexical items.

Perhaps the fact that I could not support any signs as having a purely phonological mechanism for Weak Add was a problem with my data. The historical record of ASL is sparse, particularly early on in its history. It could be that the push towards 2H signs happened mostly in LSF, before coming to the United States, or in the US in the nearly 100 years before extensive documentation of signs. One way to potentially address this concern would be to look only at newly coined signs—if the pressure to have 2H signs at the chest is in force when a sign is being coined, relatively few new signs below the neck will be 1H. If the pressure isn’t active when the sign is being lexicalized, and only afterwards, then we would expect to see more signs that are 1H very early in their history and become 2H relatively quickly—this would explain the gap in 1H to 2H changes for phonological reasons that I observe.

Conditions of language transmission are quite different in ASL from most spoken languages, so there are likely even more factors at play. Most users of the language do not
learn ASL from their parents, but rather in schools or from deaf signers outside the family, and many begin learning the language relatively late in or, often, after the critical period (Mayberry 1993). The ways these conditions affect the form of the language are still largely unclear, though it is generally agreed that ASL exhibits great variation on all linguistic levels across the United States (Lucas et al. 2001). There has been some excellent work on documenting this variation, though much of the variation exists at different levels of prestige—and unfortunately the least prestigious varieties have received the least linguistic attention (Lucas et al. 2001: 77). It remains for historical linguists to uncover the origins and spread of ASL variation, and presents an opportunity to legitimize and uplift varieties of signing of the most marginalized subsets.

Overall, I suggest, based on the data I have, that Weak Add happens only for semantic, iconic, or lexical reasons, never purely phonological ones.
Appendix: Signs with Weak Add

A  Plural

ANNOUNCE
#BACK
CHILD(REN)
FROM
GOSSIP
LOOK-AROUND
THING(S)

B  Classifiers

BLEED
CHARACTER
CHOOSE_1
CHOOSE_2
CHOOSE/FIND(1981)

CREAM
DAY
FIND
SHIP

C  Unbalanced

BAD
CHOOSE_3
EACH
GOOD
IMPOSSIBLE
USE

D Emphatic

AGGRESSIVE
ANGRY
BRAG
CARELESS_1
CARELESS_2
CELEBRATE
CHOOSE(1965)

ENJOY
HAPPY_1
HAPPY_2
HUMBLE(1923)
QUICK(ER)
SHIRT
VOMIT_1
VOMIT_2
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