Phonological Transcription of the *Canadian Dictionary of ASL* as a Language Resource

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Abstract

This paper introduces the ongoing project of digitizing and phonologically transcribing the *The Canadian Dictionary of ASL* (Bailey and Dolby, 2002) to be used as a language resource. We describe the contents of the dictionary and the procedure used for creating the transcribed version, using the Sign Language Phonetic Annotator-Analyzer software (Hall et al., 2022). We also outline the benefits of creating a resource with such a detailed representation of the formational structure of signs.

Keywords: dictionary, phonological transcription, American Sign Language, Canada

1. Introduction

In this paper, we introduce an ongoing project to digitize and phonologically transcribe *The Canadian Dictionary of ASL*[1] (Bailey and Dolby 2002; henceforth *CD-ASL*), currently available in print only, as a language resource for phonological analysis. As Morgan (2022) says, "a digitized record of the formational content of signs that is easy to query on demand" is necessary for doing fine-grained, careful phonological analysis of sign languages (p. 99). Such a record facilitates, for example, the finding of minimal pairs, the understanding of the lexical frequency of different phonological parameters, the ability to analyse phonotactic restrictions, and more generally, the synthesis of phonetic and phonological information in a practical way. Digital records of the form of signs are also helpful for non-researchers, e.g., teachers or learners of a sign language who want to be able to look up a sign based on its formational characteristics rather than its gloss into a relevant spoken language. It is in this context that we have undertaken a detailed transcription of the *CD-ASL*.

1.1. Motivations

The widespread availability of digital tools allows for the creation of sign-language resources on a scale and with functionality that was impossible in previous years. However, much research effort has been invested in creating analog sign-language resources such as the dictionary we are using, and one of our aims is to help preserve the valuable information in such documents for future use. Future use, however, requires that resources be readily available and easy to interact with. The *CD-ASL* is similar to most paper-based sign-language dictionaries in that it is organized by its English glosses rather than by any sign-language-specific feature such as phonological parameters. Thus, the user interested in signs that share a specific phonological trait (e.g., a specific handshape) is faced with a daunting task of manually sifting through the entire dictionary in search of such signs. Part of our motivation, then, is to create a freely available digital resource that will allow for phonologically based searching.

Most lexical databases of a sign language do provide some phonological information. As technology and research have progressed, however, more and more such information can be added, and we also see ourselves as contributing to the next stage of this endeavour. For example, the ASL-LEX database (Sehyr et al. 2021, Casselli et al. 2021), while extraordinarily useful in the breadth of information it covers, collapses certain phonological categories in ways that make answering some basic questions difficult. For instance, there is no way to easily search for a sign based on the number of syllables it contains. While signs are coded for repetition, which may be repetition of either a major or a minor movement in a sign, only the former would be thought to license multiple syllables. As another example, 'contact' in ASL-LEX is given only binary status, with no ability to search for what elements are in contact, when the contact happens, or what type of contact it is (e.g. continuous or holding, cf. Friedman 1976). ISL-LEX (Morgan et al., 2022b), on the other hand, which was built after the initial version of ASL-LEX, does include explicit information about syllables and con-

[1] ASL here is American Sign Language, the name of the sign language used in most parts of English-speaking Canada; see §2.

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tact types. However, it still combines other categories, such as having a generic 'combination' category for orientation movement types instead of a compositional option to search by different specific combinations. We applaud all of these efforts to document phonological information and aim to build on the knowledge and experience of these projects, adding more detail as it becomes clear which information would be useful. The more languages that have documentation of phonological structure, the better our descriptions and theories of sign language phonology can be.

To these ends, we describe our ongoing project to provide a detailed phonological transcription of the signs from the *CD-ASL*, using software designed to facilitate such transcription of any sign language, Sign Language Phonetic Annotator-Analyzer software (Hall et al., 2022). The following sections describe the general contents of the dictionary (§2), the software and transcription procedures (§3), and the current state of the project and our initial examples of uses for the end product (§4). Before we do that, however, we believe it is important to be explicit about our own positionality with respect to this project.

1.2. Positionality

First, it is important to be transparent about the fact that all of the co-authors on this paper are hearing, and none of us is a fluent ASL signer. Most of us have taken a number of ASL courses, all of which have been taught by Deaf signers who also emphasize awareness of Deaf culture and communities.

We recognize that the lack of Deaf signers as primary researchers on the project is a significant shortcoming for both practical and social reasons. At the same time, we think that it is important for researchers at spoken-language-biased institutions, such as the University of British Columbia, where we are based, not to ignore sign languages simply because our systems are not yet designed to fully support d/Deaf students and colleagues (and we are independently involved in trying to change that). We have made efforts to collaborate at every stage of this project with Deaf signers to ensure that the project is one that is generally supported by the Deaf community and that we are transcribing signs accurately.

This overall situation is indeed one of the reasons we chose to transcribe the *CD-ASL* as a resource: it is seen as a valuable tool for Canadian signers, and much of the work that needs to be done to make it phonologically searchable is the 'grunt work' of simply taking the pre-existing textual descriptions and translating them into phonological transcriptions, a task that can be done by anyone who is trained, and for which we do not have to overly burden community members with laborious tasks.

At the same time, there are many cases in which the dictionary text is underspecified and/or mismatches the image provided (e.g. as in Figure 1 for ADDRESS, discussed in §2). In these cases, we consult with a Deaf signer to clarify the correct baseline transcription to be used.

Here, we would like to directly acknowledge in the text of this paper the contributions of Deaf scholars and community members who have been directly consulted on this project, listed here in alphabetical order: Vincent Chauvet, Joanne Cripps, Leanne Gallant, Julie Hochgesang, Nigel Howard, Jonathan MacDonald, Gary Malkowski, and Erin Wilkinson. We owe them a debt of gratitude for helping us in our endeavours. Having said this, we also take full responsibility for any errors in our representations.

2. *The Canadian Dictionary of ASL*

The *CD-ASL* (Bailey and Dolby, 2002) was published in 2002 by the Canadian Cultural Society of the Deaf and University of Alberta Press to document the signs of American Sign Language (ASL) as they are used in Canada. Work started on the dictionary in 1982, and the form of signs in the dictionary therefore reflects ASL as it would have been most commonly used in the last two decades of the 20th century. As explained in the preface, "the *Dictionary* pays special attention to subjects of particular interest to Deaf Canadians—bilingual and bicultural education, residential schools, ice hockey and other winter sports, parliamentary government, weather and geographic features, historical events and geographic place names" (p. XI). The *CD-ASL* also has a special focus on the regional variation of signs across Canada, with variants from the Pacific (British Columbia), Prairie (Alberta, Saskatchewan, and Manitoba), Central (Ontario and Québec), and Atlantic (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador) regions each being tagged in individual regional-specific entries.[2] Hence, this dictionary is unique in its documentation of *Canadian* ASL and allows research to be done looking at lexical form variation (cf. Stamp et al. 2014; Bayley et al. 2015; Palfreyman 2015; and Siu 2016, among others, for studies on variation in sign languages).

The *CD-ASL* contains over 8700 entries (see e.g., Figures 1 and 3), each typically given a definition in English, an English sample sentence, an English prose explanation of the formational structure of the sign, and a line drawing depicting the

[2]The three northern territories of Canada are noticeably absent from this tagging.

ASL sign. Some of these entries, however, are homophones rather than unique forms (e.g. ACCESS and ADMISSION are separate entries in the dictionary, but each is accompanied with the same description and image). Additionally, some of the entries are represented simply as fingerspelled words with no separate ASL form (e.g. AGENDA).

Within the description of the form, each handshape is given an absolute categorical label, aligned with the set of 114 handshapes identified by the editors of the dictionary as occurring in Canadian ASL. All other phonological information is described in prose and varies in terms of the consistency of information given with respect to palm orientation, location, movement, and non-manual characteristics. Occasionally, there is a mismatch between the prose description and the line drawing provided. An example entry with such a mismatch is shown in Figure 1, for the sign ADDRESS. Note that the text suggests a repeated straight upward movement, while the arrows in the image suggest that the movement is instead a circular action. While our internal convention is to prioritize the text over the image in such cases with our initial coding, we are also subsequently checking all such cases with a Deaf signer to resolve the conflict.

The 840-page *CD-ASL* is currently published only in a hardcover format (https://ualbertapress.ca/9780888643001/the-canadian-dictionary-of-asl/). As with all such paper-based resources, then, searching is difficult and entirely dependent on the organization of the written text. In this case, the entries are organized alphabetically by English gloss, such that searching by any phonological parameter (handshape, location, etc.) is entirely impossible. One of our goals in this work was to create a digitally accessible, phonologically organized resource that can be searched in this way. Details of our procedure for creating this resource are described in the next section.

address: *n.* postal designation or place of residence. *She put her new **address** on the envelope.*

SIGN #1: Horizontal **'EXTENDED A'** hands, palms toward the body, are simultaneously brushed upward twice against the chest.

Figure 1: An example of an entry in the *CD-ASL*, for the sign ADDRESS.

3. Transcription Procedure

To create the digital version of the form-based entries, we are using the Sign Language Phonetic Annotator/Analyzer software (SLP-AA; Hall et al. 2022). This software is a free and open-source tool (https://github.com/PhonologicalCorpusTools/SLPAA/) designed to facilitate detailed form-based transcription of signs. Transcriptions are done through menus of pre-defined options. Approaching transcription this way has several advantages. First, text-based descriptions are more human-readable than many notation systems (see discussion in Hochgesang 2014), allowing transcribers to be trained more quickly and allowing non-trained users of the resource to more readily understand the transcriptions. Second, providing the options as pre-existing menu items preserves the utility of standardization of transcription and ease of computer-based searches for particular characteristics. An example of some of the options for coding path movements in SLP-AA is shown in Figure 2. Note that there are still places for users to enter their own text if needed—for example, if the shape of the movement is something other than one of the pre-specified ones. Currently, the software only presents these menu choices in English; this is a potential drawback for more widespread usage.

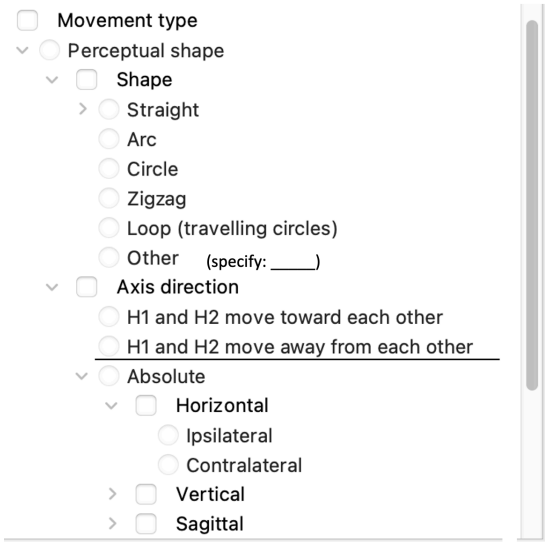

Figure 2: A screenshot of part of the movement selection options in the SLP-AA software.

This software is still under simultaneous development with the transcription of the *CD-ASL*, by an overlapping but not identical set of researchers, and the two endeavours are mutually beneficial. Using the software to transcribe actual forms allows us to improve the coverage and user interface of the software, and the existence of the software allows us to create standardized, searchable transcriptions of the entries in the *CD-ASL*.

3.1. Selection of Entries

Due to the simultaneous development of the SLP-AA software, we are approaching the transcription of the *CD-ASL* in stages. As a first pass, we are coding a representative sample of signs from the dictionary rather than immediately working on coding all of the entries. To provide us a concrete guideline for selection, we chose to select all entries from the *CD-ASL* that share a gloss with the entries in the ASL-LEX database (Caselli et al., 2021). This also allows for direct comparisons both between the actual signs (e.g., American vs. Canadian dialect differences) and between the phonological transcriptions of signs that happen to have similar forms. Note that we just use the glosses in ASL-LEX to select glosses from the *CD-ASL*; we do not filter signs by whether the actual forms are similar across the two sources. For example, if there are two separate entries in the *CD-ASL* for related but not-identical concepts (e.g., ADULT vs. ADULTS), we select for inclusion only the one for which there is an exact *gloss* match in ASL-LEX (in this case, ADULT). This is despite the fact that the form for ADULT in ASL-LEX happens to be more similar to the form for ADULTS in the *CD-ASL*.

Once a gloss has been selected, all of the various entries for that gloss from the *CD-ASL* are transcribed, such that in many cases, a single gloss from ASL-LEX results in multiple entries in our resource (e.g., PASS has five unique forms in the *CD-ASL*, representing six different semantic senses of the English word 'pass'). At the same time, not every gloss that occurs in ASL-LEX occurs in the *CD-ASL*; such glosses are skipped (e.g., ACCENT occurs in ASL-LEX but there is no entry with this gloss in the *CD-ASL*). Occasionally, a gloss from ASL-LEX occurs under a different gloss in the *CD-ASL*, and such entries are also transcribed (e.g., the ASL-LEX gloss ACCOUNTANT is listed as the 'same sign' under the *CD-ASL* entry ACCOUNTING, and so ACCOUNTANT is included in our transcriptions).

3.2. Parameters and Other Phonological Content

When we began transcribing entries from the *CD-ASL* in January of 2023, the SLP-AA software supported coding the *sign type* of signs along with *handshape*, *movement*, and *location* specifications. All of our signs are coded for these parameters. In the fall of 2023, with developments in the SLP-AA software, we were able to start adding in what we refer to as *relation* elements, such as contact specifications and relative orientation; about half of our signs currently are coded for relation. Absolute orientation and non-manual parameters are still being implemented in the software and have not been coded for any signs. Further explanation of how these parameters are coded follows immediately below; more complete descriptions are provided in Hall et al. (2022), and full documentation of the software and its choices for transcription is also under development.

3.2.1. Sign Type

The sign type choices in SLP-AA roughly follow those laid out by Battison (1978). Rather than assigning explicit numbers to each type, however, the elements that determine a sign's type are coded separately, again to allow for easier searching of specific characteristics. For example, the options in the sign type module allow a user to specify that a sign is one- or two-handed, and if it is two-handed, whether both hands move or only one, and if both hands move, whether they move similarly, etc. Transcribers base their selections on the text of the dictionary entry.

3.2.2. Timing

One of the ways in which the SLP-AA transcriptions are more detailed than most other such notations is that they support full detail for indicating the relative timing of each parameter, even in a static resource such as a dictionary (as compared to a real-time resource like a corpus). For example, as mentioned above, ASL-LEX codes whether or not there is contact in a sign, but does not indicate when such a contact occurs during the sign or which elements make contact. In ISL-LEX (Morgan et al. 2022a, Morgan et al. 2022b), signs are explicitly allowed to have two path movements or two locations, each individually specified. To make timing even more flexible, in SLP-AA, each sign is assigned an abstract 'x-slot' structure, such that specific elements like contact, location, or movement, can be associated with points or intervals at any relevant time during the sign. For the *CD-ASL* coding, we define x-slots essentially as syllables, with each iteration of the largest movement within a sign defining a syllable and hence an x-slot (see e.g. Stack 1988; Wilbur 2011). A simple monosyllabic sign, then, will have a handshape and location defined at the beginning of an x-slot, then have a movement that lasts the entire x-slot, and a new handshape and/or location defined at the end of the x-slot, depending on what has changed. If the movement changes only the handshape, the location is assigned to have the same duration as the whole x-slot, and vice versa. For example, Figure 3 shows the dictionary entry for the monosyllabic sign RED, and Figure 4 shows the resulting summary of the transcription in SLP-AA. The sign type is shown across the top, spanning one x-slot,

and modules for movement, location, relation, and hand configuration are assigned to their relative timing. In this case, the movement and location each last for the entire x-slot duration, the hand configuration is different at the beginning and end, and a relation module is used only at the beginning.

red: *adj.* the colour of blood. *He wore a* ***red*** *shirt and white shorts for Canada Day.*

SIGN: Vertical right **'ONE'** hand is held with palm facing the body and tip of forefinger touching the lower lip. As the hand is then drawn very firmly forward at a downward angle, the forefinger crooks to form an **'X'** shape.

Figure 3: An example of an entry in the *CD-ASL*, for the sign RED.

3.2.3. Handshape

As mentioned in §2, the *CD-ASL* provides a categorical label for each handshape used in the dictionary, along with images of each canonical version of the handshape and descriptions of their conventionalized labels such as 'clawed' or 'spread.' Each of the handshapes that is included in the *CD-ASL* has been pre-transcribed as a 'pre-defined' handshape within the SLP-AA software, using the Johnson and Liddell (2011a,b, 2012) transcription system, modified as described in Tkachman et al. (2016). Thus, for each sign being transcribed, the transcriber only has to select the relevant handshape name and associate it to the appropriate timepoints in the sign. For example, for the sign RED, shown in Figure 3, the transcriber would select "ONE" and associate this with the beginning of the x-slot. This associates both the phonological handshape label and the detailed phonetic transcription of this hand configuration with this sign; both are shown in the tooltip obtained by hovering over the first hand configuration element, as shown in Figure 4. A similar process is used to transcribe the "X" handshape at the end of the sign.

3.2.4. Movement

Movements in the text of the *CD-ASL* are described in prose. While there are some terms that are used repeatedly (such as "move alternately," or "brought together," or "circle"), there is much variability in the specific wording. One of the advantages of using the SLP-AA software to transcribe the dictionary is to standardize these descriptions, such that users can easily search for or calculate the frequency of particular types of movement. Transcribers 'translate' the prose descriptions into the pre-set parameter values within the software. These parameter values are largely derived from classic phonological descriptions of movement, focusing on shapes / path movements, joint-specific internal movements, and what is often referred to as 'manner' of movement, e.g. directionality, repetition, and other specific characteristics like increased force or speed (e.g. discussion in Brentari 1998; van der Kooij 2002; Sandler and Lillo-Martin 2006; Sandler 2011; Morgan 2022).

For example, in RED, there are two simultaneous movements, one that would typically be described as a 'path' movement, where the hand moves "very firmly" in a straight line forward and away from the signer, and one that involves the index finger "crook"-ing (called 'hooking' in SLP-AA). Each of these movements is fully transcribed with a separate instance of a movement module in SLP-AA, and associated with the entire x-slot (these are shown as H1.Mov1 and H1.Mov2 in Figure 4). One convention we use here is that if the text entry does not specify whether the movement is a path movement or a joint-specific / local movement, we default to the path interpretation, and this is another type of information that we consult with a Deaf signer about.

Sometimes, instead of using explanatory notes, the dictionary provides a special symbol to mark a key aspect of a sign's production. One example is directional verbs, i.e., verbs that may move in different positions in signing space, depending on where the positions of people in the communicative context are. Such signs are marked with a special symbol that indicates their nature as directional. Our internal convention is that our basic transcription follows the baseline information in the text about the direction of the sign's movement, but we also mark such signs as directional verbs in the coding, such that they could all be found in a subsequent search if desired.

3.2.5. Location

As with movements, locations are described in prose in the dictionary and are translated into standardized SLP-AA terminology. In the software, there are two basic choices for location types: signing space locations, designated by locations on the horizontal, vertical, and sagittal axes, and body locations. The choices for body locations are essentially a super-set of the locations in Brentari (1998); Hanke (2004); Johnson and Liddell (2021) and Morgan (2022).

In RED (Figure 3), for example, "the lower lip" is translated into the SLP-AA specification of being a body location of the 'lower lip,' which is hi-

Figure 4: The SLP-AA summary window for the sign RED. Each element in the summary can be clicked to show the complete coding; hovering over an element gives a preview. Here, the first hand configuration (for the "ONE" handshape) is selected, and a preview of the full phonetic transcription is shown.

erarchically nested under 'Head / Face / Mouth / Lips.' A user could use any of these higher-level categories instead; to code the *CD-ASL*, we use the categories that most closely align to the text description. The details of contact are specified as part of the relation module, as described in the next section.

As with other parameters, we have certain conventions that allow us to code otherwise underspecified signs. For example, most one-handed signs, especially those in neutral space, are not actively specified in the text as occurring on one side of the body or the other. We default to assuming that one-handed signs are on the ipsilateral side of the body, but if there is any reason to suspect that a particular sign is not so located (e.g., the accompanying image shows the hand in a different location), we would ask a Deaf signer consultant about the typical production.

3.2.6. Relation

The final type of information currently being included in the transcribed *CD-ASL* is what we call 'relation' information.[3] This includes all types of relations between two elements, such as the relation between the two hands or between one or both hands and a particular location or movement. This can be used to code spatial relations (e.g., Hand 1 is above and in front of Hand 2), presence or absence of contact (e.g., Hand 1 contacts Hand 2), type of contact (e.g., the contact between Hand 1 and Hand 2 is 'holding' or 'continuous,' cf. Friedman 1976), distance (e.g., the hands are close to or far from a location), and the hand part that is relevant to a movement or location (e.g., the ulnar side of Hand 1 leads a movement or makes contact with a location; cf. relative orientation as discussed in Crasborn and van der Kooij 1997).

In RED (Figure 3), the fact that it is the "tip of the forefinger" that touches the lower lip at the beginning of the sign is coded as a relation module that is specifically linked to the location module. This relation module marks that Hand 1—and specifically, the tip of the index finger—has contact with this lower lip location at the beginning of the x-slot. As with other parameters, any ambiguities or underspecifications are checked with a Deaf signer.

3.3. Updating Dictionary Entries

As noted above, we are in the process of verifying underspecified and conflicting entries with a Deaf signer to make sure our entries are as accurate as possible. Our consultant points out multiple kinds of issues with the current dictionary entries, including both entirely out-of-use signs and individual elements of the production of signs that do not match current usage. We are currently only modifying the *CD-ASL* entries where they were underspecified or self-conflicting, rather than actively changing entries to be more modern. Digitizing older sign language dictionaries at the level of phonetic and phonological detail like ours enables researchers to ask meaningful questions about language change and language evolution, e.g., how more gestural elements of sign-language communication become grammaticalized, reduced, etc. (cf. Shaffer and Janzen 2000; Janzen and Shaffer 2002). At the same time, we are keeping track of all such additional information provided by our consultant, so that we can cross-check with other Deaf signers and potentially provide modern equivalents to dictionary entries in the future.

[3] Absolute orientation, which we take to be all statements of "palm facing" directions in the dictionary, e.g. "palm facing the body" in the entry for RED in Figure 3, can also be coded with SLP-AA, but we have not yet invested resources into doing this coding, instead prioritizing relative orientation.

4. Findings and Future Studies

As of the time of submission, approximately 2000 signs from the *CD-ASL* have been transcribed, with transcribers currently working on the letters *P* and *R*. These are all unique forms; signs that have separate entries but are repeated forms from earlier entries have not yet been included, as these will eventually be single entries tagged with multiple glosses. However, the ~2000 signs do include multiple different forms for the same gloss (e.g., including both the generic and the Atlantic Canadian forms of the sign ADDRESS 'postal designation' as well as the different ASL forms used for ADDRESS 'postal designation' vs. ADDRESS 'lecture'). Transcribed signs also exclude labelled compound signs (e.g., ABNORMAL, described as "ASL concept NOT - NORMAL") but include fingerspelled signs (approx. 300 signs).

When complete, the transcribed version of the dictionary will be made publicly available as a binary .slpaa file, which is the specific file type that can be read and interpreted by the SLP-AA software. We are also actively developing the "Analysis" component of the software to allow for ease of searching and comparison of signs. We are hoping to also distribute a less software-dependent version of the transcribed signs, e.g. as a .csv, a .json, or a .sql file, depending on the complexity of the data structures involved.

This work in progress has allowed us to have useful insights into phonological description and structure, even before we have a fully complete dictionary resource. For example, we have been forced to confront the difficulty of handling circular direction terms in a way that is consistent and searchable. The *CD-ASL* assumes a right-handed signer, but we would like our resource to be usable by and relatable to all signers, regardless of hand dominance. Furthermore, the dictionary is inconsistent in how it describes circular directions even for a right-handed signer, sometimes adopting the perspective of the signer and sometimes the addressee, and sometimes not specifying the perspective. To create a consistent, inclusive, and searchable record of these signs, we have adapted the coding conventions away from terms like "clockwise" and "counter-clockwise" and instead use terms like "ipsilateral from the top of the circle" (where the "top" is conventionally defined to be the highest point for circles on the vertical and sagittal planes and the most distal point for circles on the horizontal plane). We hope that an update like this might be extended to other descriptive projects to facilitate cross-resource comparison as well.

Another future direction that this project has already suggested is the investigation of the forearm in lexical specification. There have been a number of signs in the *CD-ASL* whose descriptions make it clear that the position of the forearm was deemed important to the writers of the dictionary. The potential relevance of the forearm has been noted since at least Stokoe et al. (1965), where certain signs were said to involve a "prominent" use of the forearm of the dominant hand, e.g. in the sign DAY (https://www.handspeak.com/word/537/; Lapiak 1995). Stokoe's notation convention was to include a checkmark for such signs, and Johnson and Liddell (2012) adopt the same convention in their phonetic notation system. However, there are a wide variety of actual cases in which forearms may be relevant. Compare, for example, DAY to the sign for CASTLE as described in the dictionary, which is similar to the version marked 'regional variation' at https://www.handspeak.com/word/1723/ (Lapiak, 1995). This sign involves both forearms resting horizontally one on top of the other at the beginning of the sign and each being raised vertically at the end of the sign. Another potential use for the forearm is as in BARK (as in 'tree bark') and BRIDGE, where the forearm of the non-dominant hand is used as an iconic location for the dominant hand to act upon. Only by having a detailed phonological transcription of signs in a language—specifically, detailed enough to include information about forearm position and movement—can we hope to catalogue, classify, and eventually fully understand the phonological role of the forearm as an articulator in sign languages.

There are many such specific examples that arise as we code, even when we limit ourselves to the glosses that also occur in ASL-LEX. While we recognize that many early efforts to create databases for sign languages have focused for good reason on the most canonical types of signs, we think that the field is in a position to dive more deeply into these less prototypical types of signs and include them in our phonological research.

5. Conclusion

We see digitizing older sign-language resources such as the *CD-ASL* as a way to acknowledge past signers and past research, and as a means of beginning to address more detailed and specific questions of diachronic change and synchronic phonological structure. We believe that transcribing signs on a more detailed level than has previously been possible will provide us with much greater insight into the phonological systems in sign languages. Having a digitized and freely available resource of this nature should also be helpful to Canadian ASL users who are trying to interact directly with the formational structure of the

language and not through its English translations. We hope that our experience with digitizing the *CD-ASL* will also inspire other researchers to digitize dictionaries of other sign languages, regardless of their publication date, and to create both lexical and corpus resources that include a fine-grained level of phonological detail.

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