One hand or two?

Nativisation of fingerspelling in ASL and BANZSL

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In this paper, we focus on the nativisation process as a fully fingerspelled word
or fingerspelled letters become a fingerspelled loan or initialised sign. Previ-
ous models of nativisation (e.g., Brentari & Padden 2001) have described forms
derived from one-handed fingerspelling systems; however, fingerspelling can be
either one- or two-handed. Thus we propose an extension of Brentari & Pad-
den's model that accounts for varying degrees of nativisation based on the extent
to which native parameters (i.e., native handshapes, movements, locations and
native combinations of the three) exist within a given sign. According to the
extended model, there are five main criteria for delineating nativisation — the
extent to which: (1) forms adhere to phonological constraints of the native lexi-
con, (2) parameters of the forms occur in the native lexicon, (3) native elements
are added, (4) non-native elements are reduced (e.g., letters lost), and (5) native
elements are integrated with non-native elements.

Keywords: fingerspelling, native, lexicon, ASL, BSL, Auslan, phonology

1. Introduction

The non-native lexicon in a sign language is that part of the lexicon that is derived
from "foreign" elements, for example, elements from a spoken language like Eng-
lish, or from a foreign sign language (Brentari & Padden 2001). Padden (1998)
noted that whether such foreign elements should be considered a part of the sign
language lexicon at all has posed some problems for sign language linguists:

> ...there appears to be ideological anxiety about the presence of Foreign elements
> in a natural sign language. Sign linguists have labored long and hard to demon-
> strate that sign languages are not codes for spoken languages; the inclusion of

> Foreign vocabulary [e.g., from English] would seem to detract from the strength of this position (Padden 1998:39).

Padden (1998) claimed however that the presence of elements from a spoken language need not take away from the status of sign languages as true languages (see also Johnston 1991). As Padden correctly notes, diverse lexicons (with both native and foreign vocabulary) are normal consequences of language use in diverse communities. All languages borrow from each other (Wardhaugh 1992), and because of the large amount of contact between sign language communities and the surrounding spoken language communities, it is inevitable that this would lead to the inclusion of "foreign" elements from the surrounding spoken language in sign languages.

The foreign elements that get borrowed from spoken languages into sign languages take various forms but largely take the form of fingerspelling and/or mouthing.[1] Fingerspelling[2] is the use of a particular set of "signs" where each corresponds to a different letter of the written alphabet of the surrounding spoken language. Sign languages that have foreign vocabulary based on alphabetic fingerspelled elements include American Sign Language (ASL) (Brentari & Padden 2001; Padden 1991, 1998) and the British Sign Language (BSL) family, BANZSL[3] (Brennan 2001; Johnston 1989; Schembri 1996; Sutton-Spence 1994); these are the two language systems that we will focus on for the purposes of this paper.

Japanese Sign Language (JSL) has fingerspelled vocabulary but the foreign elements represent a syllabic fingerspelling system (Brentari & Padden 2001). JSL together with Chinese, Taiwanese, and Hong Kong Sign Languages (Ann 1998) also

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1. Mouthings are lip patterns used by signers which correspond to spoken words (Boyes Braem & Sutton-Spence 2001; Vogt-Svendsen 1983). While mouthings are an important part of the non-native lexicon, they will not be discussed further in this paper.

2. In this paper, individual fingerspelled letters are glossed in small caps with hyphens on either side (e.g., -T-). Fully fingerspelled words are glossed with hyphens between each letter, e.g., B-A-L-L. Signs consisting of only one or two letters (e.g., initialised signs) are glossed with underscores under the letters represented in the sign, e.g., ASL WATER. Signs based on entirely fingerspelled words but with restructuring that leads to reduction of some letters (e.g., fingerspelled loan signs) are represented with a hash mark before the glossed word, e.g., BANZSL #CLUB. Fingerspelled loan signs with varying degrees of nativisation are numbered (e.g., BSL #ABOUT$_2$); the higher the number, the more nativised the form.

3. We adopt here Johnston's (2003) term 'BANZSL' to refer to languages in the British Sign Language (BSL) family, which includes BSL as well as Australian Sign Language (Auslan) and New Zealand Sign Language (NZSL). Although the label BANZSL is not in wide use either by sign language linguists or by the Deaf communities who use these languages, it is a convenient way of referring to this family of languages without giving preference to one language over the others.

have character signs which are based on the written characters of these languages (e.g., NORTH, MIDDLE, and PERSON in Hong Kong Sign Language).

Another type of foreign element representing the writing system of a spoken language is the aerial fingerspelling used by some signers in New Zealand. With aerial fingerspelling, signers trace written letters in the air with their index finger (Dugdale, Kennedy, McKee & McKee 2003; Forman 2003). Aerial fingerspelling is used by some older deaf NZSL signers, in addition to or instead of the more traditional two-handed fingerspelling system used by other NZSL signers.

Danish Sign Language (DSL) has incorporated elements from the Mouth-Hand System in which a set of fifteen handshapes are used to disambiguate mouth patterns of spoken language lexical items which may appear identical when speechreading (e.g., different hand configurations may be used to distinguish the fricatives /f/ and /v/). DSL has signs, such as the sign OF-COURSE, which have developed from a sequence of hand-mouth hand configurations (Engberg-Pedersen 1993).

Fingerspelled elements within ASL are considered to be non-native by Brentari & Padden (2001) but still part of the ASL lexicon because they are still subject to many of the constraints that the native vocabulary is subject to. The extent to which these elements adhere to constraints on native signs differs depending on the form. Varying degrees of restructuring occur with these different foreign elements within a sign language to make them more like the signs in the native lexicon. The primary questions we pose in this paper are: (1) To what extent does the restructuring of one-handed fingerspelling in ASL resemble or differ from the restructuring of two-handed fingerspelling in BANZSL? (2) What can we learn about the phonological systems of ASL and BANZSL by studying the nativisation of these respective fingerspelling systems?

2.   One-handed vs. two-handed fingerspelling systems

The vast majority of the world's sign languages that we know about, including ASL, have one-handed fingerspelling systems. Many of these are descended from a system adopted in the first schools for deaf children in France founded in the eighteenth century (Carmel 1982). One-handed fingerspelling in ASL is articulated in one particular area within neutral space (i.e., the area just in front of the dominant shoulder). The hand takes on different configurations (i.e., particular handshapes and orientations) in this location. The fingerspelling system used by ASL signers is shown in Figure 1a.

The two-handed fingerspelling system used in BANZSL (shown in Figure 1b) is articulated in neutral space in the central area just in front of the signer's chest
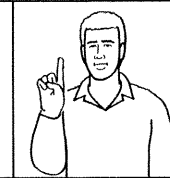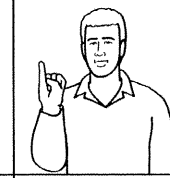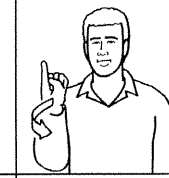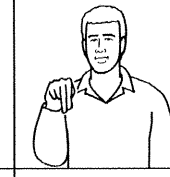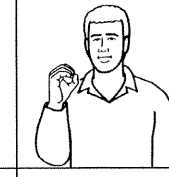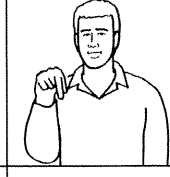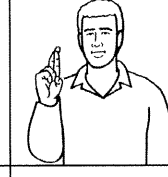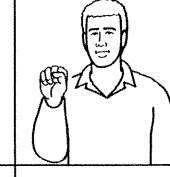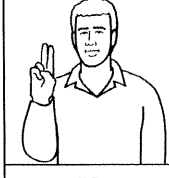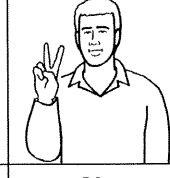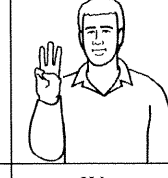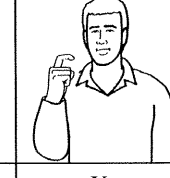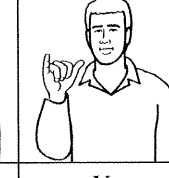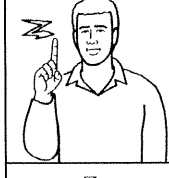
Figure 1a. ASL fingerspelling system (Reprinted with permission from Johnston, Trevor & Adam Schembri. 2007. *Australian Sign Language: An Introduction to Sign Language Linguistics.* Cambridge: Cambridge University Press.)

(i.e., the same space where two-handed lexical signs are produced).[4] For most fingerspelled letters, the dominant hand takes on a particular handshape and orientation and contacts a particular location on the non-dominant hand.

One key difference between the one-handed system of ASL versus the two-handed system of BANZSL is that BANZSL letters are fully specified for handshape, orientation, and location (and in two cases for movement), while ASL letters are specified only for handshape and orientation (and in two cases for movement). This difference has major implications for the structure of the non-native lexicon in these languages. We explore this more fully below in §3.3 and thereafter.

3.   Fingerspelled elements

Fingerspelled elements in ASL and BANZSL have traditionally been considered by some researchers (and by some sign language users themselves, as noted by Sutton-Spence (1994)) to exist only in the periphery of the sign language lexicon. Signs using elements from the fingerspelling system (as well as entire fingerspelled words), however, often have much more of a role in the everyday lexicon of signers than simply a peripheral one (Brennan 2001; Johnston & Schembri 2007). One major use of fingerspelling (i.e., fingerspelling of whole words) is to identify names of people and places and other concepts for which there may not exist a lexical sign in the language (i.e., lexical gaps). However, fingerspelling is not reserved only for lexical gaps in the language; indeed it is common for some signers to fingerspell a word for which there already exists a perfectly acceptable sign in the language. For example, while lexical signs for 'ball' exist in ASL and in BANZSL, signers of these languages sometimes fingerspell the word b-a-l-l instead (Johnston & Schembri 2007; Kelly 1991). This section looks at how fingerspelled elements fit into (and also affect) the structure of the ASL and BANZSL lexicons.

3.1 Fingerspelled words

In the one-handed fingerspelling system of ASL, the hand may remain in the fingerspelling space in front of the dominant shoulder during the sequence of fingerspelled letters, or the hand may drift outwards slightly (toward the right for right-handed signers and toward the left for left-handed signers) during fingerspelling.

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4. Though in the minority, BSL, Auslan and NZSL are not the only sign languages which use a two-handed fingerspelling system. For example, Indo-Pakistani Sign Language (IPSL) appears to have fingerspelled elements derived from the two-handed alphabetic representations of English words (e.g., AMERICA, TUESDAY, YEAR) as well as one-handed fingerspelled items from Hindi (e.g., CHEAT) (Vasishta, Woodward & de Santis 1981).

Figure 1b. BANZSL fingerspelling system (Reprinted with permission from Johnston, Trevor & Adam Schembri. 2007. *Australian Sign Language: An Introduction to Sign Language Linguistics.* Cambridge: Cambridge University Press.)

Even when the hand does not drift outwards, it rarely stays in exactly the same position for the duration of the fingerspelled word. In the two-handed fingerspelling system of BANZSL, the two hands move and change shape to facilitate contact between the hands and fingers. Furthermore, in both of these one-handed and two-handed systems, a fingerspelled word is not simply the production of static handshapes or handshape combinations. Transitions between fingerspelled letters are smoothed so that the letters flow easily from one letter to the next (Brennan 2001), often resulting in an overall "shape" or "movement envelope" of a fingerspelled word (Akamatsu 1985; Wilcox 1992).

These smooth transitions are one way in which fingerspelled words conform to the formational constraints of the sign language (i.e., fingerspelled words get restructured so that they are more than just a sequence of static, separate hand configurations) (Battison 1978). The extent of such smoothing and restructuring is one motivation behind the different categories proposed by Brentari & Padden (2001) for the non-native lexicon of ASL and also the extended crosslinguistic version of their model of nativisation of fingerspelling that we propose in this paper.

3.2 Initialisation (ASL)

In addition to entire fingerspelled words, sign languages also combine elements of fingerspelling with formational elements from lexical signs. One example of such a combination is the process known as *initialisation* (e.g., Brentari 2001). Initialised signs in languages with a one-handed fingerspelling system use the handshape corresponding to a letter (usually the first) of an English word equivalent in meaning. Initialisation in some sign languages (particularly those with one-handed fingerspelling systems such as ASL and Irish Sign Language (ISL)) is quite common. Some examples in ASL include PERSON, WATER, and TRY. These examples involve slightly different types of initialisation.

Some initialised signs are based on a sign from the native lexicon which takes on different handshapes to indicate different but related meanings. For example, the ASL sign PERSON (with a B-handshape as in Figure 2a) is a sign from the native lexicon; related initialised signs are the equivalent initialised sign PERSON (see Figure 2b) and INDIVIDUAL.

Other initialised signs are not as related to non-initialised signs in the native lexicon. Some are established signs in the language with no non-initialised equivalent, such as ASL WATER, which uses a W-handshape with a repeated movement to contact at the mouth; see Figure 3. Other initialised signs have no non-initialised equivalent but instead have particular movement, location and orientation specifications which combine with different handshapes to produce several (usually semantically-related) signs. Examples include certain family signs in ISL: the signs
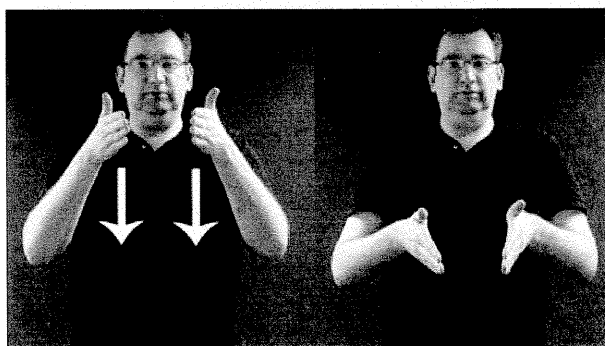
Figure 2a. ASL PERSON
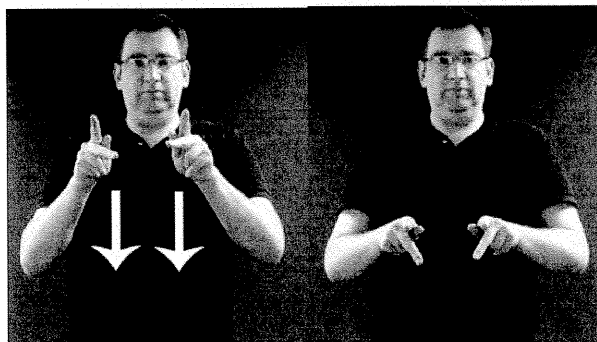
Figure 2b. ASL PERSON

AUNT, UNCLE, COUSIN, and RELATIVE all contact one side of the chin and then the other. Similarly, some colour signs in ASL all share a common movement and location. For example, the ASL signs BLUE, YELLOW, GREEN, and PURPLE all have repeated rotation of the radio-ulnar and radio-humeral joints (i.e., components of the elbow) in neutral space.
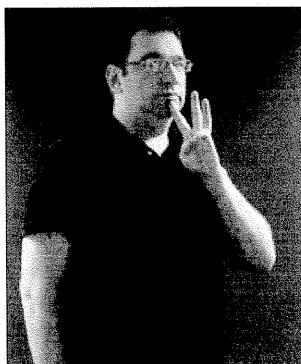
Figure 3. ASL WATER
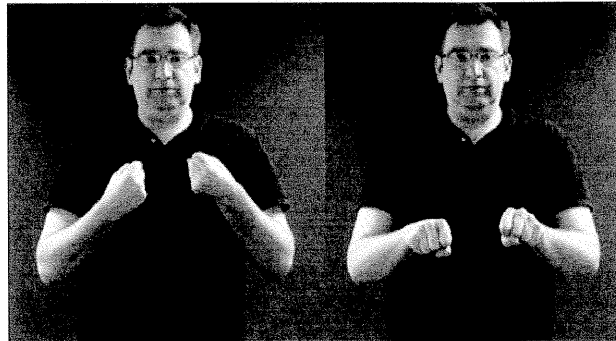
Figure 4a. ASL TRY
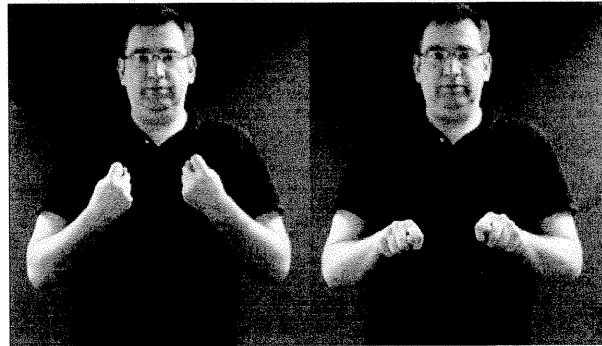
Figure 4b. ASL T̲RY

There are also some initialised signs which have semantically identical signs in the native lexicon such as TRY/T̲RY (i.e. the native sign with two s-handshapes as in Figure 4a, which can be initialised with two T-handshapes as in Figure 4b).

Additionally, there are some initialised signs which can have multiple meanings. The ASL signs D̲ICTIONARY and D̲ISSERTATION are manually the same, as are
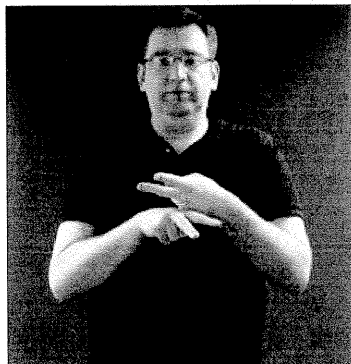
Figure 5a. ASL FIGURE-OUT
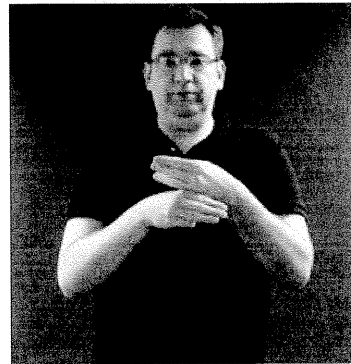
Figure 5b. ASL M̲ATHEMATICS

the signs ᴅᴀᴛᴇ and ᴅᴇssᴇʀᴛ. Pairs such as these are distinguished primarily by context and/or by English mouth pattern (Emmorey 2002).

Initialisation is one way that new signs can enter into the language. The process of initialisation in ASL in particular can be quite productive and can be used to express many different semantically-related concepts. For example, there is a set of signs having to do with different subfields of mathematics which is based on the native ASL sign ғɪɢᴜʀᴇ-ᴏᴜᴛ (which uses two v-handshapes as in Figure 5a), such as ᴍᴀᴛʜᴇᴍᴀᴛɪᴄs (shown in Figure 5b), sᴛᴀᴛɪsᴛɪᴄs, ᴀʟɢᴇʙʀᴀ, ᴛʀɪɢᴏɴᴏᴍᴇᴛʀʏ, etc.

3.3 Initialisation (BANZSL)

Initialisation in the two-handed fingerspelling system of BANZSL appears to occur less frequently overall. This may be because in ASL, the letter is identified (in most cases) purely by handshape, so various values for the other parameters of movement and location can be freely added (e.g., the one-handed letter -ᴛ- occurs with different movement and location values in ASL ᴛʀʏ, ᴛʀɪɢᴏɴᴏᴍᴇᴛʀʏ, ᴛʜᴇᴏʀʏ etc). In BANZSL, however, the letter is identified by a combination of handshape and location (and in some cases, movement), so that variation of each parameter is more limited (e.g., the two-handed letter -ɢ- must be produced with both hands in a closed fist handshape contacting each other in neutral space). This is one reason why single manual letter signs are more common in BANZSL than the types of initialisation we see in languages like ASL. Single manual letter signs (SMLS) are signs in BANZSL which are based on a letter (usually the first) of an English word equivalent or similar in meaning (Sutton-Spence 1994; Sutton-Spence & Woll 1999). These are distinct from initialised signs in ASL in that there are generally very limited types of movement of the dominant hand against the non-dominant hand (e.g., no movement or repeated movement). Furthermore, because they are two-handed, these signs tend to only occur in neutral space. BANZSL examples include many signs for family relations (e.g., ᴍᴏᴛʜᴇʀ, ғᴀᴛʜᴇʀ, ᴅᴀᴜɢʜᴛᴇʀ; see Figure 6) and time measurement (e.g., ᴍɪɴᴜᴛᴇ, ᴅᴀʏ, ᴡᴇᴇᴋ, ʏᴇᴀʀ, also days of the week). SMLS that are produced with the same letter (e.g., ᴍᴏᴛʜᴇʀ and ᴍɪɴᴜᴛᴇ; ᴅᴀʏ and ᴅᴀᴜɢʜᴛᴇʀ) are distinguished from each other by the number of movement repetitions of the letter (e.g., ᴅᴀʏ with one inward movement and ᴅᴀᴜɢʜᴛᴇʀ with repeated contacting movement), by English mouth pattern (e.g., different lip patterns for ᴍᴏᴛʜᴇʀ and ᴍɪɴᴜᴛᴇ), and/or by context (Sutton-Spence 1994). As noted above, ASL also has some pairs/sets of initialised signs that are produced with the same letter/handshape and are distinguished from each other by English mouth pattern and/or by context.

Some of the types of initialisation discussed above for ASL also occur in BANZSL (although typically much less frequently). For example, the two-handed native
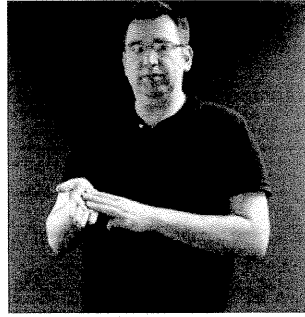
Figure 6. BANZSL ᴍᴏᴛʜᴇʀ

BSL sign ᴏꜰꜰᴇʀ has two related initialised forms: ʀᴇᴄᴏᴍᴍᴇɴᴅ and ᴘʀᴏᴘᴏꜱᴇ (see Figures 7a and 7b). Some signs such as BSL ǫᴜᴀʟɪꜰʏ (the letter -ǫ- produced with a downward movement) or BANZSL ᴇɴɢʟᴀɴᴅ (the letter -ᴇ- with repeated movement of the dominant index finger along the side of the non-dominant index finger) have no related native form. Also, some initialised signs combine a manual letter with a slightly altered version of movement/location of a related native sign, such as BSL ɢᴏʟᴅ and ꜱɪʟᴠᴇʀ (which begin with the hands in configuration of the initial letter then moving away from each other while both opening to 5-handshapes; the related native sign ꜱʜɪɴᴇ uses two twisting 5-handshapes moving upwards). As noted above, this type of initialisation is less likely to occur in BANZSL than in ASL, because BANZSL letters already share some of the same phonological characteristics of BANZSL lexical signs.

Some BANZSL initialised signs have no related non-initialised forms (similar to ASL ᴡᴀᴛᴇʀ). In BANZSL, the letter -ᴄ- is the only letter produced with only one hand and thus is used in combination with many different locations and movements. Examples include BSL ᴄᴏꜰꜰᴇᴇ, ᴄᴏᴜʀꜱᴇ (as in Figure 8) and ᴄᴏɴꜰɪᴅᴇɴᴄᴇ; many of these signs have no corresponding non-initialised forms.

Initialised signs with related non-initialised variants (like ʀᴇᴅ and ʀᴇᴅ in ASL) do not seem to occur often in BANZSL. One example is the native BSL sign

Figure 7a. BSL ᴏꜰꜰᴇʀ

Figure 7b. BSL RECOMMEND

Figure 8. BSL COURSE

FAMILY and the related SMLS FAMILY. BANZSL does have a number of concepts for which both native and non-native signs exist (e.g., the native sign DAY in addition to the SMLS DAY), but in most cases the signs are phonologically unrelated. (The native sign DAY and the SMLS DAY differ in all phonological parameters, as opposed to ASL TRY and TRY which differ only in handshape). One type of "initialisation" that occurs in two-handed systems but has not been documented in one-handed systems is single manual letter+sign compounds, which combine an initial letter with a lexical sign to create a compound (e.g., -P- + MOUTH for "Portsmouth", -C- + TAKE-CARE for "crèche" in BSL) (Sutton-Spence 1994).[5]

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5. Examples such as -P- + MOUTH for "Portsmouth" seem similar to sign+fingerspelled compounds such as ASL PICK-U-P or S-T-O-C-K-MARKET (Brentari & Padden 2001) — see below §5, Category 1.3. In all of these, each part of the compound represents one morpheme or possibly one syllable of an equivalent English word/compound. But others like BSL -C- + TAKE-CARE for "crèche" are quite different. Here the equivalent English word is monomorphemic and monosyllabic; the letter represents the first letter of the equivalent English word and the sign represents the meaning of the entire word. Also, many of the letter+sign compounds in BANZSL appear to be nonce combinations, while a small number may be lexicalised, as opposed to ASL where reports suggest that many sign+fingerspelled compounds are lexicalised.

Thus BANZSL does use fingerspelled elements in signs but somewhat differently from ASL. SMLS in BANZSL (especially combined with particular mouth patterns) can be quite productive. ASL more productively uses other types of initialisation (e.g., those that combine handshapes with a wide range of locations and movements).

3.4 Fingerspelled loan signs

According to Battison (1978), fingerspelled loan signs in ASL are based on fully fingerspelled words but have been restructured to more closely fit the phonology of signs in the native lexicon. The handshapes and transitional movements between letters undergo reduction, to varying degrees.

Fingerspelled loan signs are common in languages with one-handed fingerspelling systems such as ASL and ISL. Examples of fingerspelled loans in ASL include #NO and #EASY (Battison 1978; Brentari & Padden 2001); examples in ISL include #WHY and #RACE (O'Baoill & Matthews 2000). Fingerspelled loan signs also occur in two-handed fingerspelling systems (e.g., BANZSL #CLUB and Auslan #NO, #HOW), as noted by Sutton-Spence, Woll & Allsop (1990). Examples from BANZSL and ASL will be discussed further below.

4.   Structure of the sign language lexicon

4.1 Overview

It has been suggested that the ASL lexicon may be divided into a subcomponent that contains all the native sign vocabulary (called the *native lexicon*), and a non-native component (the *non-native lexicon*) that is borrowed from English by means of fingerspelling (Brentari & Padden 2001; Padden 1998). The native subcomponent of the lexicon may be subdivided into *core* and *non-core* components. This is illustrated in Figure 9 (adapted from Brentari & Padden 2001). This illustration shows that the lexicon can be represented as having three main components, shown as areas 1, 2 and 3. Area 1 represents signs derived from fingerspelling. Area 2 represents classifier constructions, as well as some spatial verbs, and pointing signs used

Non-native lexicon   **Native lexicon**
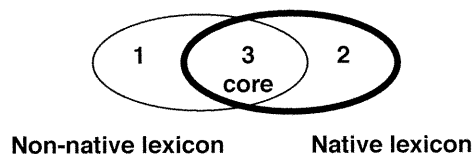
Figure 9. Model of the ASL lexicon (adapted from Brentari & Padden 2001)

as pronouns, determiners, predicates and adverbs. The central area (3) is the core native vocabulary. Signs may also move between the non-native (1) and the native core (3) lexicon, and between the non-core (2) and the core (3) native lexicon, which is why both areas 1 and 2 overlap with area 3. Our primary interest lies in areas 1 and 3, and particularly the overlap between them.

4.2 Phonological characteristics of the native lexicon

Before examining the relationship between the native and non-native lexicons, we first review the phonological structure of the native lexicon and various constraints that hold within it.

4.2.1   *Overview of phonological parameters*

Traditionally, researchers have proposed that there are four primary phonological parameters that can differentiate one sign from another: handshape, movement, location, and orientation (Battison 1978; Stokoe 1960). Of these, handshape has been explored in the most detail (e.g., Sandler & Lillo-Martin 2006). Handshape describes the configuration of the hand(s) during the production of a sign. Several researchers have proposed that handshapes can be broken down into three features: selected fingers, finger position, and aperture (Brentari 1998; Hulst 1995; Sandler 1989). Brentari & Padden (2001:97) define the selected fingers as: "Those fingers that are able to move or contact the body during the course of executing a sign." Finger position describes the configuration of the selected fingers (but not the unselected fingers) in a given handshape, specifying which joints of the selected fingers are flexed: the base knuckle (or metacarpophalangeal joint), and/or the mid-finger joint (or interphalangeal joint). Aperture indicates the degree to which the finger joints are flexed (Brentari 1998).

Location describes the location of the hand(s) on or in relation to the body during the production of a sign. The hands may make contact with the body at a specific location, but do not do so necessarily, and the location may be articulated at any point during the sign's movement. The phonological parameter of movement describes the movements of the arm(s) and/or hand(s), in terms of trajectory, repetition, cyclicity, and tenseness/laxity. Orientation, which describes how the palm(s) of the hand(s) and the direction of the fingers are oriented during the production of a sign, is the least explored of the phonological parameters. Orientation alone does not differentiate many signs in BANZSL or ASL and indeed is treated by some researchers as a subcomponent of handshape (cf. Sandler & Lillo-Martin 2006).

Sign languages have inventories of possible distinctive values for each of the phonological parameters, which may vary from language to language. Brentari

& Padden (2001) have suggested that these inventories can be used as criteria to determine the degree of nativeness of an element that is borrowed into a sign language. While there are some phonological forms that occur across many languages (e.g., a 5-handshape, chest location, or a rotational movement from the shoulder), there are also particular forms that occur in some sign languages but not others (the Taiwanese Sign Language hand configuration that involves extending the ring finger from the fist is not found in BANZSL or ASL, for example). Moreover, there are parameter values that may be contrastive in one sign language but not another. For instance, in Turkish Sign Language, the ғ-handshape is an allophone of the o-handshape (Kubus 2007, cited in Hohenberger 2007), whereas these two handshapes are contrastive in BANZSL and ASL.

4.2.2   *Phonological constraints*

One of the central goals of sign language phonology is to determine how the use of the phonological parameters is constrained. Most models of phonological constraints in sign language have focused on ASL; however, research thus far suggests that many of these phonological constraints hold true for other sign languages as well (Hohenberger 2007).

In sign languages, signs may be produced either with one hand or with both hands. One set of constraints proposed by Battison (1978) deals specifically with signs that are two-handed. Two-handed signs can take one of two forms: either the two hands are both active, or the dominant hand acts upon the non-dominant hand. Battison's Symmetry Condition states that, for the former case, "both hands must be specified for the same location, the same handshape, the same movement (whether performed simultaneously or in alternation), and the specifications for orientation must be either symmetrical or identical" (Battison 1978:33). In this context, the same location can refer to two points that are aligned along the body horizontally (e.g., the left and right sides of the forehead) or vertically (e.g., the chin and medial torso).

For the remainder of two-handed signs, Battison's Dominance Condition states that "(a) [i]f the hands of a two-handed sign do not share the same specification for handshape…, then (b) one must be passive while the active hand articulates the movement, and (c) the specification of the passive hand is restricted to be one of a small set: A, S, B, 5, G, C, O" (Battison 1978:35).

A broader set of constraints has been proposed which apply to both one-handed and two-handed signs, delimiting the possible values and value changes in the phonological parameters. Regarding changes in parameter values, a two-type constraint has been proposed for all major parameters (Perlmutter 1992) — specifically, monomorphemic signs allow a maximum of two different movements (Brentari 1998; Sandler 1993), a maximum of two different locations (Sandler 1989), and a

maximum of two different handshapes — i.e., one handshape change (Battison 1978; Sandler 1989). Although it is possible for hand configuration to change within a single sign, those two handshapes must have the same set of selected fingers (Mandel 1981; Sandler 1989). For example, a sign can include a transition from a G-handshape to an x-handshape, but not a transition from a G-handshape to a Y-handshape. In addition, in a sign with a handshape change, the selected fingers' configuration must be either open or closed (Sandler 1989). Finally, Corina and Sagey (1989) observed that if the selected fingers are closed, the unselected fingers must be open, otherwise, the unselected fingers are closed.[6]

In terms of how these parameter changes are related to each other, a handshape change can occur during a sign movement (Brentari 1998). For example, in the BSL sign LOVELY, the handshape changes from an o-handshape to a 5-handshape, while the arm simultaneously moves away from the lips. However, in BANZSL and ASL, it does not seem that a handshape change can co-occur with a transition between two different places of articulation on the body in a monomorphemic native sign. Thus, the kind of handshape and location change that occurs in some versions of the ASL sign BROTHER (considered to be a compound: BOY^SAME), with a closed-B-handshape at the forehead moving to a G-handshape contacting the non-dominant hand, would not be expected in a monomorphemic sign. Likewise, the kind of handshape and location change that occurs in the ASL two-letter loan USHER-SYNDROME (where a U-handshape at the temple moves to an s-handshape at the side of the chin) would not be expected in a native sign.

These characteristics of and constraints on the structure of the native lexicon should provide a useful framework for categorising borrowed forms as more or less nativised. With respect to borrowed forms in particular, Sandler (1996), Brentari & Padden (2001), Brentari (2005), and Eccarius (2008) have observed that handshapes in ASL initialised signs do not undergo assimilation or exhibit internal movement, i.e. these handshapes are resistant to change because they must preserve the form of the fingerspelled letter.[7] Handshapes that do not represent fingerspelled letters, however, can undergo either of these phonological processes. In ASL, for example, the sign QUOTATION has a transition from a v-handshape to a clawed-v-handshape, but the initialised sign VEGETARIAN does not allow a handshape change, because its handshape represents the letter -v-. However, there

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6. While it is generally true that unselected fingers must be either distinctively open or closed, there are some exceptions. For example, the ASL signs PERFECT (F-handshape with unselected fingers open) and REVENGE (baby-o-handshape with unselected fingers closed) are a near minimal pair. Thanks to an anonymous reviewer for pointing this out.

7. Although this does generally appear to be true for ASL signs, there may be exceptions — cf. ASL WEIRD which has hand-internal movement.

are initialised signs in BANZSL, such as ᴅɪɢɪᴛᴀʟ or ɢᴏʟᴅ, which add a handshape change to a fingerspelled letter, thereby reducing any identifying features of the fingerspelled letter at the end of the sign.

5. Non-native lexicon analysis for ASL (Brentari & Padden 2001)

Brentari & Padden (2001) propose that the non-native vocabulary of ASL (area 1 from Figure 9) is composed of four subcategories, based on constraints proposed above, among others. Figure 9 is expanded below as Figure 10 to reflect these four categories.
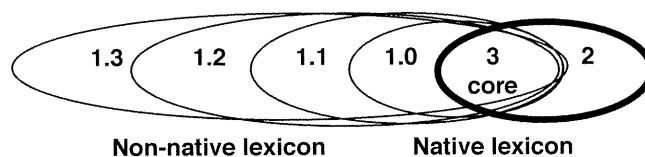
Figure 10. Model of the ASL lexicon, revised (adapted from Brentari & Padden 2001)

Category 1.0 ∩ 3.0
According to Brentari & Padden (2001), this category consists of those fingerspelled loan signs which violate no native constraints — that is, they consist of handshapes, movements and locations that are found in lexical signs. These signs may be best thought of as originating from the non-native lexicon but now forming part of the native lexicon (which is why this category straddles area 1 and area 3). They essentially look and behave very much like core native signs. For signs which represent more than one letter in this category, the handshapes and transitional movements between letters have undergone considerable modification and/or reduction, so much so that these signs are often not readily recognised by signers as based on fingerspelling at all. Examples include the ASL fingerspelled loan sign #ɴᴏ.

Category 1.0
This category for Brentari & Padden (2001) consists of signs which violate no constraints of the native lexicon — that is, they consist of movements and locations found in lexical signs — but they use handshapes taken from the fingerspelling system which are not found in the core lexicon. These signs typically do not involve a change in handshape. This category includes initialised signs such as ASL ᴡᴀᴛᴇʀ (shown above in Figure 3), some ASL name signs which consist of only one handshape with a particular movement and location, and some two letter loans

Figure 11. ASL RESTROOM

which involve no change in handshape (e.g., ASL HARD-OF-HEARING, or REST-ROOM, as shown in Figure 11).

The main difference between this category and Category 1.0 ∩ 3.0 is that the handshapes are clearly identifiable as originating from the fingerspelling system. These handshapes are marked to some degree and would not be expected to occur in the native core lexicon. For example, the w-handshape as found in ASL WATER occurs in signs initialised with the letter -w-, but no native core signs.

Category 1.1
For Brentari & Padden (2001), these are signs that violate the constraint that each sign must have only one set of selected fingers (i.e., these signs involve a non-native handshape change). Thus this category includes signs such as ASL VIDEO-TAPE, WITHDRAW, and PROJECT as in Figure 12, some ASL name signs (i.e., those that involve a handshape change), and two letter loans such as ASL TELEVISION and THURSDAY.

Figure 12. ASL PROJECT

Category 1.2
According to Brentari & Padden (2001), these are signs which violate the constraint that each sign must have only one set of selected fingers (same as Category 1.1),

Figure 13. ASL #BACK

and also violate the requirement that each sign must have at most two handshapes and that handshape changes should maximise aperture (i.e. the degree to which the handshape is open or closed). They give as examples signs that have more than two handshapes, such as partially assimilated loan signs (e.g., ASL #BACK as in Figure 13) and three-letter loans (e.g., ASL #EASY). These signs involve more than one handshape change and the handshape changes that do occur involve varying degrees of openness and closeness.

Category 1.3
For Brentari & Padden (2001), signs in this category violate the same constraints that signs in Category 1.2 violate, and also violate the rule that each sign must have at most two different movements. Thus they give as examples commonly finger-spelled words (e.g., ASL F-R-E-E) as well as sign+fingerspelled compounds (e.g., ASL S-T-O-C-K-MARKET, BREAK-U-P).

6. Crosslinguistic model of nativisation of fingerspelling

For ASL, handshape alone is usually enough to differentiate one letter from another (e.g., ASL BLUE vs. YELLOW). Therefore Brentari & Padden (2001) use hand-shape as an indicator of a sign's nativeness. However, their model as originally proposed does not account for patterns found in two-handed fingerspelling systems, where handshape is not the only parameter involved. Another issue with Brentari & Padden's model is that it assumes that forms using fewer manual letters are more nativised than those that represent more letters. Although it is true that there appears to be a constraint on the maximum number of hand configurations per sign in BANZSL (e.g., Johnston & Schembri 2007), fewer handshapes are used to distinguish manual letters in two-handed forms (Sutton-Spence, Woll & Allsop 1990). Thus, fingerspelled sequences in BANZSL may have relatively more letters with fewer handshape changes than is possible in ASL, for example.

Native

Fully nativised single-letter signs	Fully nativised 2-letter signs	Fully nativised fingerspelled loans
BANZSL GARAGE, ENGLISH, MOTHER$_2$ ASL SOCIETY, THURSDAY$_3$	ASL HIGH-SCHOOL, THURSDAY$_2$ BANZSL ROMAN-CATHOLIC, EXCUSE	ASL #NO, #BREAD BSL #ABOUT$_3$ Auslan #NO$_2$
Partially nativised single-letter signs	Partially nativised 2-letter signs	Partially nativised fingerspelled loans
BANZSL MOTHER$_1$, BSL UNCLE ASL WATER, PURPLE, EMERGENCY	BSL GLASGOW$_2$ BANZSL THURSDAY$_2$ ASL WITHDRAW, PROJECT	ASL #EASY, #SURE BANZSL #CLUB BSL #BIRMINGHAM Auslan #ABOUT$_1$, #NO$_1$
		Commonly fingerspelled words ASL F-R-E-E, BANZSL S-O-N Sign + fingerspelled compounds ASL S-T-O-C-K-MARKET BANZSL S-T-E-P-SISTER
Individual fingerspelled letters	Non-nativised 2-letter signs	Non-nativised fingerspelling
ASL/BANZSL -A-, -B-, -C-, -D-, etc	Auslan AIR-CONDITIONING BSL GLASGOW$_1$, BANZSL THURSDAY$_1$ ASL THURSDAY$_1$	Fully fingerspelled words, names, etc.

Non-native

1 letter	2 letters	Entire word

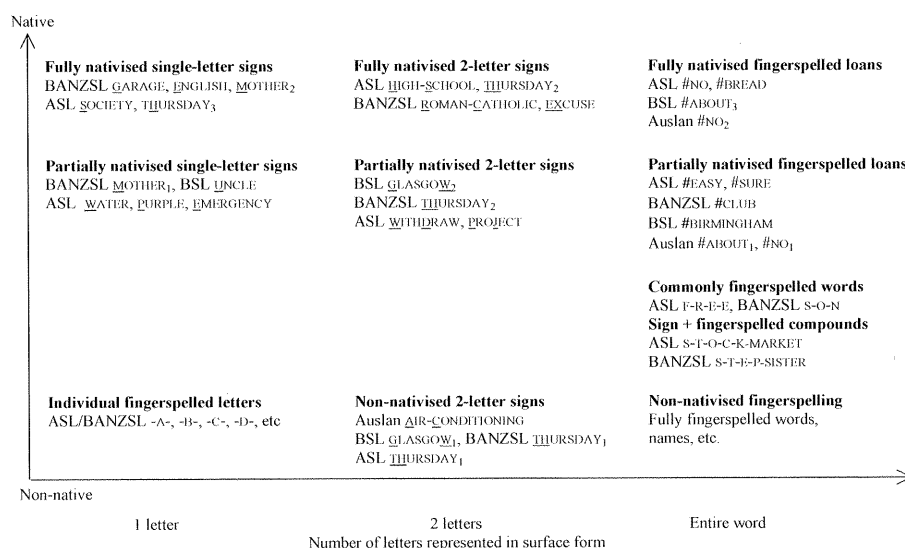Number of letters represented in surface form

Figure 14. Proposed working model of nativisation of fingerspelling in ASL and BANZSL

We propose instead a model of nativisation of fingerspelling (based on Brentari & Padden's (2001) model of the non-native lexicon for ASL) which accounts for both the one-handed fingerspelling system of ASL and the two-handed system of BANZSL; see Figure 14. Within this model, forms can vary by degree of nativisation and also (separately) by the number of letters represented. The degree of nativisation is based on the addition of native elements and the reduction of non-native elements. The more nativised a form is, the more it adheres to the phonological constraints of signs in the native lexicon. The less nativised a form is, the more it may violate phonological constraints of signs in the native lexicon.

6.1 Signs/forms representing a single letter

These categories represent a single letter (usually but not always the first)[8] of an English word roughly equivalent in meaning. These categories include both ASL initialised signs and BANZSL single manual letter signs (SMLS).

6.1.1   Individual fingerspelled letters

It seems obvious that the least nativised single-letter forms within a given sign language should be the individual letters themselves. This is indeed the case; however, due to the existence of both marked and unmarked parameters within the finger-

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8. Examples of signs in these categories which represent a single letter which is not the first letter of the equivalent English word include the fully nativised version of ASL THURSDAY described here, and also ASL TEXAS and BSL HOW (see §7.1.5).

spelling systems of both ASL and BANZSL, some individual letters are more na-tive-like than others (as noted by Brentari & Padden 2001 for ASL). Furthermore, an individual ASL letter alone (whether with a marked handshape or not) cannot constitute a lexical sign; some native parameter must be added (e.g., movement and/or location) in order for a lexical sign to be formed (Perlmutter 1992; Wilbur 1987). This would explain why single-letter signs produced in this fingerspelling location always have some added movement (e.g., ASL FURNITURE, EMERGENCY, INSURANCE, etc).

Individual BANZSL letters on the other hand, can be homophonous with lexi-calised signs. The spatial location that is used for BANZSL fingerspelling is the same as the location used for many BANZSL signs from the native lexicon (i.e., two-handed native signs that are produced in neutral space). The letter -H- is man-ually homophonous with the BSL lexical sign PLAIN, for example.[9] Interestingly, the only BANZSL letter which is one-handed (-C-) adheres to the same constraint noted above for ASL letters — i.e., the letter -C- seems not to act as a lexical sign on its own within the fingerspelling space without added native parameters (e.g., movement and/or location).

6.1.2 *Partially nativised single-letter signs*

This category consists of signs representing a single letter, the parameter(s) of which do not occur in the native lexicon. In this category, signs may have some addition of native parameters or reduction of non-native parameters, and they may violate constraints of the native lexicon. Examples include BANZSL MOTHER (see Figure 6 above), BSL UNCLE and ASL WATER (see Figure 3 above), PURPLE, and EMERGENCY. The dominant handshape of the BANZSL letter -M- does not occur in the BANZSL core native lexicon (except in the sign SCOUT, borrowed from the saluting gesture produced by scouts), but the BANZSL sign MOTHER involves addition of a native parameter (i.e., repeated movement to contact). Likewise, the handshapes used to represent the ASL letters -W-, -P- and -E- do not occur in the ASL native lexicon, but each of these letters has added native parameters in WATER, PURPLE, and EMERGENCY, respectively. The BSL sign UNCLE is only partially nativised because the pinky finger of the non-dominant 5-handshape may move to facilitate contact with the dominant hand, which violates the Dominance Condition whereby the non-dominant hand must remain passive (Battison 1978). This type of violation does not appear to oc-cur in the native, core BSL lexicon and thus this may be allowed only in non-native, non-core vocabulary.

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9. BANZSL letters and lexical signs which are manually homophonous with each other are gen-erally disambiguated the same way that manually homophonous SMLS are disambiguated — i.e. by English mouth pattern and/or by context (see §3.3 above).

6.1.3   Fully nativised single-letter signs

Signs in this category represent a single letter, the parameter(s) of which do occur in the native lexicon. These signs may also have some addition of native parameters which make these signs indistinguishable from signs in the native lexicon; thus these signs adhere to constraints within the native lexicon. Examples include BANZSL ̲GARAGE, ̲ENGLISH, and ̲MOTHER$_2$ (with -M- occurring as a more nativised B-handshape as shown in Figure 15b; cf. the non-nativised -M- in 15a) and ASL T̲HURSDAY$_3$ and ̲SOCIETY.[10] The parameter combinations of the BANZSL letters -G-, -E- and the variant of -M- that is produced with a dominant B-handshape all occur in the BANZSL native lexicon (in signs such as BSL CHURCH, Auslan ELDEST-CHILD and BANZSL APPLAUD, respectively), and the handshapes used for the ASL letters -S- and -H- occur in the ASL native lexicon (in signs such as WORK and CHAIR, respectively). These examples all have added native parameters as well. Specifically there is added repeated movement in BANZSL ̲GARAGE, ̲ENGLISH, and ̲MOTHER. ASL ̲SOCIETY has a doubled hand arrangement and additional arcing movement of both hands to contact, and ASL T̲HURSDAY$_3$ has an added circular movement.[11]
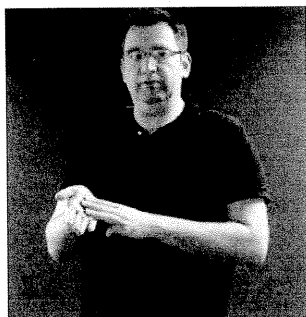

Figure 15a. BANZSL ̲MOTHER$_1$ **Figure 15b.** BANZSL ̲MOTHER$_2$
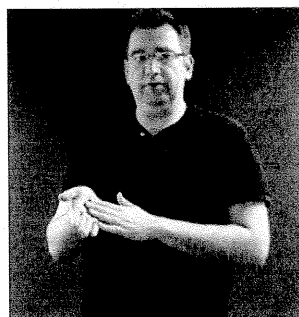
10. Note this version of ASL THURSDAY (i.e., T̲HURSDAY$_3$ with an H-handshape) is used by some but not all ASL signers. See §7.1.4 for the more typical two-letter versions of T̲HURSDAY.

11. Addition and reduction of elements should be considered here to be synchronic as well as diachronic. In many cases the addition or reduction of these elements are likely to have followed historical patterns — e.g., SMLS in BANZSL that have repeated movement most likely originated with the letter itself with repetition added later, and ASL initialised signs such as ̲PURPLE likely originated as the letter -P- with an added radio-ulnar movement added later. However, in some cases of initialisation it seems that a native version of a sign (i.e., with native parameters) may have existed first, which a non-native letter was then mapped on to. This seems especially likely with so-called lexical families in ASL — e.g., ASL ̲SOCIETY likely originated as a native non-initialised sign meaning something like GROUP, which then was initialised with different handshapes representing different letters to get initialised ̲SOCIETY, ̲TEAM, ̲CLASS, etc.

6.2 Signs representing two letters

Signs in these categories represent two letters from an English word roughly equivalent in meaning. The signs traditionally referred to as "abbreviation signs" in ASL (Battison 1978) are included in these categories.

6.2.1 *Non-nativised 2-letter signs*

Signs in this category represent two letters with no added native parameters or reduced non-native parameters. These signs are simply a sequence of two letters and in some cases violate constraint(s) of the native lexicon. Examples include Auslan AIR-CONDITIONING (sequence of -A- and -C-), BSL GLASGOW$_1$ (sequence of -G- and -W- as in Figure 16), BANZSL THURSDAY$_1$ (sequence of -T- and -H-), ASL THURSDAY$_1$ (sequence of -T- and -H-, as shown in Figure 26a below).

Most of these examples violate some constraints of the native lexicon, such as the selected finger constraint. However the BSL sign GLASGOW$_1$ does not appear to violate any constraints of core native signs. Indeed, because so many BANZSL letters could themselves be well-formed native signs (as noted above in the section on individual fingerspelled letters), there are likely many two-letter non-nativised forms which do not violate any native constraints (cf. Brennan 2001).

On the other hand, it is difficult to find examples of two-letter sequences in ASL with no added parameters or reduced non-native parameters, which violate no native constraints at all, since many violate the selected fingers constraint. One example may be ASL HIGH-SCHOOL shown below in Figure 19 which has the same (though opposite) handshape change as that found in the native sign THROW. However this sign is very often produced with perseveration of the palm orientation of -H- into the letter -S- which constitutes reduction of a non-native parameter. In this case, the sign belongs more appropriately in a more nativised category as described below.

Figure 16. BSL GLASGOW$_1$

6.2.2   *Partially-nativised 2-letter signs*

These signs represent a sequence of two letters with added native parameters and/ or reduced non-native parameters so they are more than just a simple sequence of letters. Examples include BSL nativised GLASGOW$_2$ (with a nativised version of -w-), BANZSL nativised THURSDAY$_2$ (with a nativised version of -T-) and ASL PROJECT and WITHDRAW. In BSL GLASGOW$_2$, shown in Figure 17, the non-dominant hand retains the fist handshape of the -G- throughout the sign, resulting in a form that looks less like fingerspelled -w-. In BANZSL THURSDAY$_2$ the dominant G-handshape of the letter -T- is replaced with an open-8-handshape such that contact with the non-dominant palm is made with the dominant extended middle finger. This different handshape results in a handshape change between -T- and -H- which is less non-native than the form with the canonical -T-. Thus both BSL GLASGOW$_2$ and BANZSL THURSDAY$_2$ involve a reduction of fingerspelled forms (which might be argued to make them more native-like). Additionally, GLASGOW$_2$ has changed from the non-nativised GLASGOW$_1$ so that it adheres to the non-dominant hand constraint proposed by Brentari (1998) whereby there may be a maximum of one distinctive value for the non-dominant hand for a prosodic word.

The ASL signs PROJECT (see Figure 12 above) and WITHDRAW are produced with a sequence of -P- and -J-, and -w- and -D- respectively, but in both cases native parameters are added (an additional non-dominant hand and arcing movement in PROJECT and additional movement in WITHDRAW).

Even though native parameters have been added and/or non-native parameters reduced, these forms still violate some constraints of the native lexicon. Some of the forms (e.g., BANZSL THURSDAY$_2$ and ASL PROJECT and WITHDRAW) violate the selected fingers constraint, and some have two different places of articulation (e.g., BSL GLASGOW$_2$).

Figure 17.   BSL GLASGOW$_2$

6.2.3   *Fully nativised 2-letter signs*

This category consists of signs which represent two letters, where native parameters have been added and/or non-native parameters reduced, and the resulting form adheres to the constraints of the native lexicon. Like the fully nativised single letter signs, these signs look like signs from the native lexicon. Examples include BANZSL ROMAN-CATHOLIC and EXCUSE and ASL RESTROOM, HIGH-SCHOOL and THURSDAY₂. BANZSL ROMAN-CATHOLIC as shown in Figure 18 uses the handshape representing the letter -C- all the way through the sign. BANZSL EXCUSE has an additional up and down movement such that the resulting version of -E- has the dominant hand beginning under the non-dominant hand, moving upwards and then coming back down to land in place on the non-dominant hand for -X-. ASL RESTROOM has the handshape for the letter -R- with an added movement (see Figure 11 above). All three of these signs include no handshape change and thus no violation of the selected fingers constraint. The ASL example HIGH-SCHOOL as in Figure 19 is a sequence of the letters -H- and -S- which are both letters which also occur in the ASL native lexicon. This sign does involve a handshape change but is very similar (in fact, the same change but in reverse order) to the one found in the native ASL sign THROW. The ASL nativised two-letter sign THURSDAY₂ is a very quick sequence of the letters -T- and -H- where the orientation of the -H- hand is anticipated during the production of the -T- so that the palm remains facing the body during the sign. The speed of the handshape change between -T- and -H- makes this form look very similar to native signs which include rubbing of the thumb tip and fingertip(s) (e.g., ASL FEW or FLUENT); see Figure 26b below.

Figure 18. BANZSL ROMAN-CATHOLIC

6.3 Fingerspelled forms representing the entire word

Signs in these categories represent the equivalent English word in its entirety, or the restructuring that has taken place from the fully fingerspelled form has been so substantial that it is not clear which/how many letters are represented.
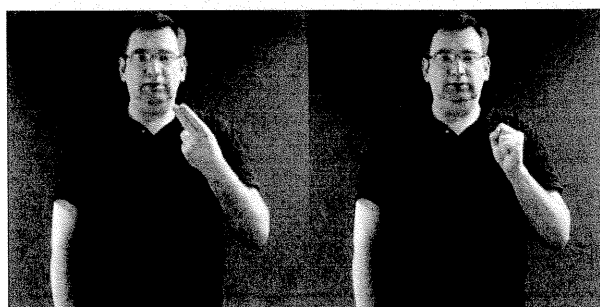
Figure 19. ASL ᴴɪɢʜ-ꜱᴄʜᴏᴏʟ

6.3.1   *Non-nativised fingerspelled words*

This category consists of fully fingerspelled words which have undergone no noticeable restructuring or change from a simple sequence of fingerspelled letters. This would include words (names, etc.) which are not commonly fingerspelled, or which would not be expected to be familiar to the addressee. Because in most cases so many letters are represented, this category violates many constraints including the selected fingers constraint as well as the two-type constraint (the constraint on the maximum number of movements and locations). The organisation of the letters (and the parameters used to create them) is largely sequential.

6.3.2   *Commonly fingerspelled words and sign + fingerspelled compounds*

Signs in this category include commonly fingerspelled words and signed + fingerspelled compounds. Examples include BANZSL s-o-n and s-t-e-p-ꜱɪꜱᴛᴇʀ and ASL ꜰ-ʀ-ᴇ-ᴇ and s-t-o-c-k-ᴍᴀʀᴋᴇᴛ. In these examples the fingerspelled sequence is fluent and the transitions between the letters smoothed. These examples violate the same native constraints that non-nativised fingerspelled words violate, and as with non-nativised fingerspelled words, the organisation is primarily sequential.

6.3.3   *Partially nativised fingerspelled loan signs*

Like partially nativised single-letter and 2-letter signs, signs in this category have had addition of native parameters and/or reduction of non-native parameters. Examples include BANZSL #ᴄʟᴜʙ (shown in Figure 20), BSL #ʙɪʀᴍɪɴɢʜᴀᴍ and ASL #ᴇᴀꜱʏ and #ꜱᴜʀᴇ (shown in Figure 21). The most salient letters remaining in BANZSL #ᴄʟᴜʙ are c-l-b; the most salient letters in BSL #ʙɪʀᴍɪɴɢʜᴀᴍ are ʙ-ʜ-ᴍ or just ʙ-ᴍ. The most salient letters in ASL #ᴇᴀꜱʏ are ᴇ-ꜱ-ʏ (this form also has an added native palm orientation change), while the most salient letters in ASL #ꜱᴜʀᴇ are ꜱ-ʀ-ᴇ (this form also has an added native downward movement with palm orientation inward toward the body; Battison 1978). However, these signs have undergone substantial restructuring and a reduction of the transitional
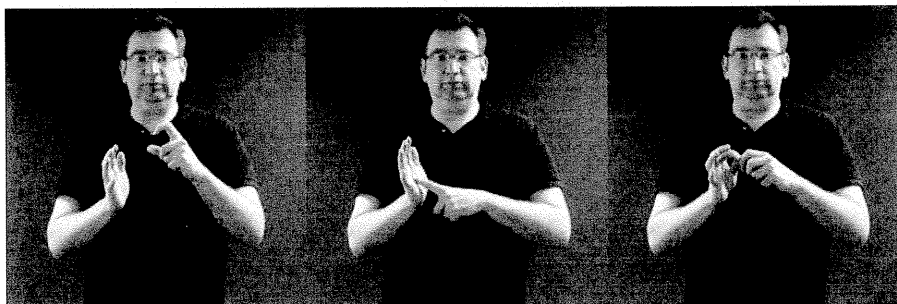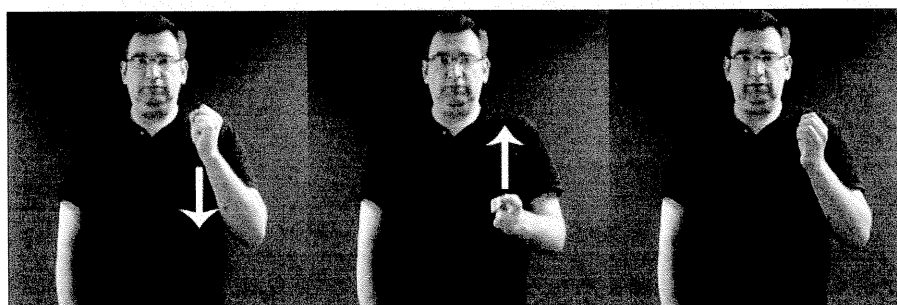
Figure 20. BANZSL #CLUB

Figure 21. ASL #SURE

movements between the manual letters to the extent that it can be difficult to determine which or how many letters are still present. Such restructuring results in a move towards more simultaneous organisation than with non-nativised and partially-nativised forms. And, it is at this level (no less nativised than this) that forms may take on grammatical marking such as agreement or directionality: one example in this category is the ASL partially nativised loan sign #BACK which may be moved between locations associated with source and goal referents (like native directional verbs; see Figure 13). Despite the restructuring, however, these signs still violate some rules from the native lexicon. The above examples all violate the selected fingers constraint.

6.3.4   *Fully nativised fingerspelled loan signs*

As with partially nativised fingerspelled loan signs, native parameters have been added (and non-native parameters reduced) in fully nativised fingerspelled loans. However, in this category so much restructuring has occurred that these signs do not violate any constraints of native signs; that is, these signs look just like native signs. As with native signs, organisation is primarily simultaneous, such that these loan signs also fit the prosodic structure of native signs. Examples include BSL #ABOUT (see Figure 25d below) and Auslan #NO (see Figure 23c below). ASL
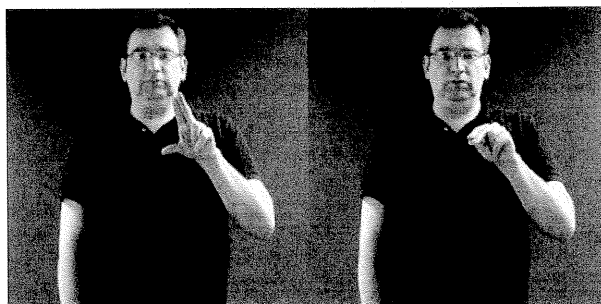
Figure 22. ASL #NO

examples include #NO (see Figure 22) and #BREAD.[12] Both Auslan and ASL loan signs #NO are directional verbs.

7.   Discussion

Whether with single-letter signs, two-letter signs, or forms based on an entire word, the degree of nativisation of a form is best considered to exist along a continuum (represented in Figure 14 along the Y-axis). In each case, where there are partially nativised forms, there may be multiple versions that are partially nativised, each one more or less nativised than the others. In this section, we look at some examples of nativisation paths in BANZSL and ASL.

7.1   Nativisation paths: Some examples

There are some examples of synchronically co-occurring forms within BANZSL and ASL in which clear nativisation paths can be identified. Here we offer examples from BSL, Auslan and ASL.

7.1.1   *Auslan #NO*

Fully fingerspelled word → Partially nativised fingerspelled loan → Fully nativised fingerspelled loan

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12. In many cases with fully nativised forms it is difficult to know whether these forms have non-native origins or not. The ASL examples of #NO and #BREAD are fairly well documented in the literature (Battison 1978; Brentari & Padden 2001; Padden 1998). It is not clear whether BSL #ABOUT or Auslan #NO have non-native origins; however, the various degrees of nativisation clearly present in forms of Auslan #ABOUT provide strong evidence to support the analysis that BSL #ABOUT and Auslan #NO are indeed fingerspelled loans.

Figure 23a. Auslan N-O
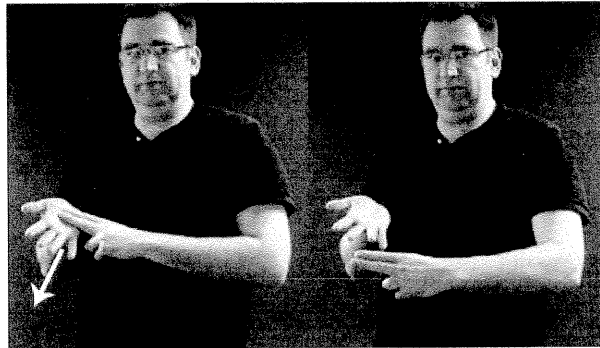
Figure 23b. Auslan #NO_1

Figure 23c. Auslan #NO_2

Figures 23a–c show the progression of Auslan #NO from a fully fingerspelled word N-O, where the dominant hand for the -O- changes handshape and the non-dominant finger moves to facilitate contact, to a partially fingerspelled loan where the handshape of the dominant hand from the letter -N- perseverates into the letter -O- and the dominant hand moves in one fluid movement from the location on the

palm from -N- off the tip of the ring finger for -O-, to a fully nativised fingerspelled loan where the handshape of the dominant hand again perseverates from the letter -N- but this time simply flicks outward. The latter looks similar to the ASL and BANZSL sign BUTTER, albeit with a single, forward movement.

7.1.2 Auslan #ABOUT

Fully fingerspelled word → Partially nativised fingerspelled loan → More nativised fingerspelled loan in Auslan

Figures 24a-c show various forms of Auslan #ABOUT. The first is the BANZSL fully fingerspelled form. The second is one variant of a partially nativised form in which the -B- and the vowels are reduced (only the subordinate hand forms the F-handshape of -B- and the dominant fingers move towards the locations of -O- and -U- but do not make contact). The third is a more partially nativised form in which the dominant G-handshape moves in an arc from -A- to -T-.
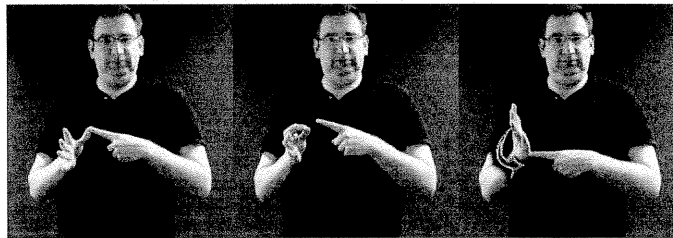

Figure 24a. BANZSL A-B-O-U-T

Figure 24b. Auslan #ABOUT₁

Figure 24c. Auslan #ABOUT₂

7.1.3   BSL #ABOUT

> *Fully fingerspelled word → Partially nativised fingerspelled loan → More nativised fingerspelled loan → Fully nativised fingerspelled loan in BSL*

The nativisation path for BSL #ABOUT is similar to that of Auslan. The least nativised form is the BANZSL fully fingerspelled word (Figures 24a and 25a are the same). Next is #ABOUT$_1$ in which the most salient letters are A-B-T (note that the -B- of this form is fully formed, unlike the -B- of the equivalent form in Auslan; cf. Figures 24b and 25b). Next is #ABOUT$_2$ in which the dominant G-handshape moves in an arc from -A- to -T-, just as in Auslan (i.e. Figures 24c and 25c are the same).

The primary difference between the nativisation paths for BSL and Auslan #ABOUT is that BSL takes the path one step further: the fully nativised fingerspelled loan #ABOUT$_3$ shown in Figure 25d involves the dominant G-handshape moving in a circular manner before making final contact on the palm. The fingertip of the handshape no longer makes contact with the thumb or palm, so that

Figure 25a. BANZSL A-B-O-U-T

Figure 25b. BSL #ABOUT$_1$

Figure 25c. BSL #ABOUT$_2$

Figure 25d. BSL #ABOUT$_3$

the -A- and -T- have been lost. This nativisation path demonstrates well that the Y-axis in Figure 14 is best thought of as a continuum rather than a set of discrete categories. This nativisation path has two partially nativised variants between the fully fingerspelled form and the fully nativised loan. Figures 25a-d (compared to Figures 24a-c in §7.1.2) show how nativisation paths can occur differently in different languages even with the same initial input (i.e., even with the same fully fingerspelled form).

7.1.4   *ASL THURSDAY*

Non-nativised two-letter sign → Partially nativised two-letter sign → Fully nativised single-letter sign in ASL

Nativisation paths generally stay within either the single-letter, two-letter or entire word scales, but there are some forms which may move from one number-of-letter category to another. Figures 26a-c show the various forms of ASL THURSDAY, starting with the non-nativised form (simply a sequence of -T- then -H-) followed by a partially nativised form in which the inward palm orientation of the -H- is antici-
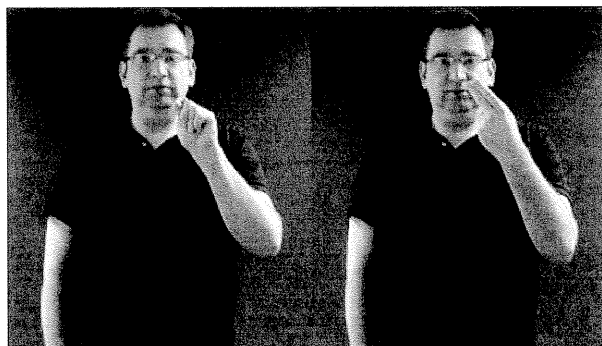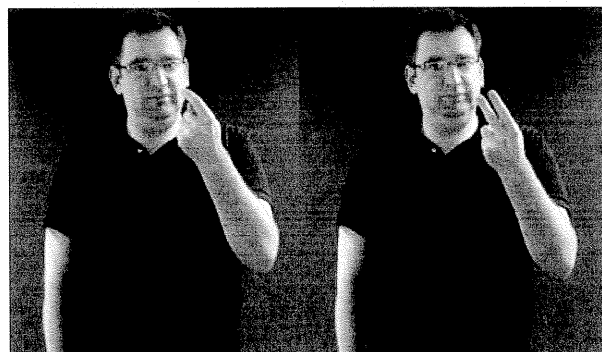

Figure 26a. ASL THURSDAY$_1$
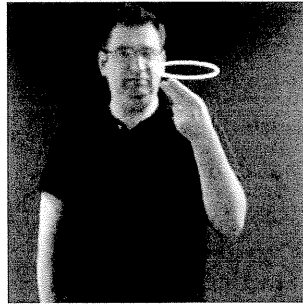

Figure 26b. ASL THURSDAY$_2$

Figure 26c. ASL T<u>H</u>URSDAY₃

pated in the production of the initial -T- (and repetition of this sequence may also be added as well). The fully nativised form drops the -T- altogether leaving just an -H- with an added circular movement.

7.1.5   BSL HO<u>W</u>

> *Non-nativised single-letter → Partially nativised single-letter sign → Fully nativised single-letter sign in BSL*

In this path, shown in Figures 27a-c, the least nativised form is homophonous with the single letter -W-. The partially nativised form is the letter -W- with the fingers interlocking so that the backs of the hands are facing each other rather than the palms, while the fully nativised form has the same form but with clawed 5-handshapes such that the palms are facing each other (or toward the signer) again. (Note: Auslan has a different nativisation path for #HOW in which the least nativised form is the fully fingerspelled word H-O-W. In all versions of Auslan #HOW, there are elements of both the -H- and the -W-, as opposed to BSL in which only elements of the -W- are clearly present.)
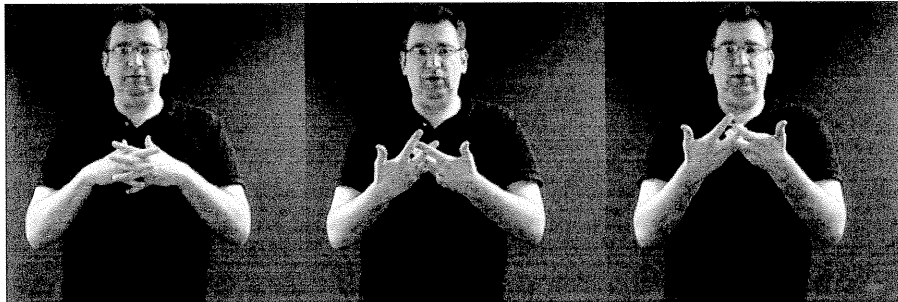

Figure 27a. BSL HO<u>W</u>₁   **Figure 27b.** BSL HO<u>W</u>₂   **Figure 27c.** BSL HO<u>W</u>₃

7.1.6   ASL NO-GOOD (from BANZSL N-G)

Non-nativised two-letter sign → Partially nativised two-letter sign

As we have already seen, one of the key differences between one-handed and two-handed fingerspelling systems is the degree to which individual BANZSL letters resemble signs in the native lexicon, while ASL letters do not. This is something that has been observed as far back as the 1970s. Battison (1978) suggested a fingerspelled loan sign within ASL that has been borrowed from the BANZSL two-handed system directly into ASL — a sign meaning NO-GOOD, which is produced with a BANZSL -N- followed by a BANZSL -G-, as shown in Figure 28a.

> It must be noted that this British-American fingerspelling loan has not undergone any restructuring. The reason is evident — there is no phonological conflict involved with making the British letters N and G, since they already have the structure of ASL signs (Battison 1978:140, original emphasis).

Battison is correct that these two letters each individually fit the structure of native ASL signs, and in fact this sequence of letters also fits the structure of native BANZSL signs.[13] However, Battison slightly contradicts himself in the following paragraph when he notes a form of this borrowing which has undergone restructuring, demonstrated in Figure 28b:

> One informant related that he and his friends (none of whom know the British fingerspelling origin) commonly assimilate the first active handshape to the second, by changing the two-handed N to a form in which the active hand is also a fist (A or S) (Battison 1978:140).

Perhaps Battison does not see this as a contradiction since both N-G and the more nativised form exist as borrowings in ASL, and the more nativised example is only reported by one of his informants. However, these examples of NO-GOOD and indeed all the nativisation paths in this section nicely illustrate that restructuring does occur in two-handed systems (even when borrowed into a one-handed system), and that nativisation paths with varying degrees of restructuring can be found in both the one-handed system of ASL and the two-handed system of BANZSL.

7.2   Observations about the crosslinguistic model

7.2.1   Added movement vs. no added movement in BANZSL single-letter signs
With single-letter signs in BANZSL, it is unclear whether signs which are homophonous with individual letters (i.e., those which have no additional movement

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13. The origin of this borrowing into ASL (either the non-nativised or the more nativised form) is unclear, as there is no evidence to our knowledge that either form ever existed as a lexicalised form meaning NO-GOOD in BSL, Auslan or NZSL.

Figure 28a. ASL with BANZSL letters ṉo-ɢood₁

Figure 28b. ASL with BANZSL letters ṉo-ɢood₂

like ʏEAR, ɢAME and ᴡEEK) should be considered less nativised than single-letter signs which do have additional native parameters added (e.g., ṃOTHER₁ or ɢA-RAGE which both have repeated movement to contact). Because both types could occur as native signs in BANZSL (i.e., they break no rules of the native lexicon), both types have been considered fully nativised in this model.

7.2.2   Partially nativised single-letter signs in BANZSL vs. ASL

Partially nativised single-letter signs in BANZSL are quite different from those in ASL (cf. Brennan 2001). In BANZSL, most individual letters are phonologically possible signs within the native lexicon, so as soon as a single manual letter has been lexicalised into a sign, it can be treated as a fully nativised one-letter sign. (Note this is also recognised by Battison (1978), as quoted in §7.1.6.) There are only a few exceptions. In some BANZSL signs which involve lexicalised vowel letters, the non-dominant hand is a 5-hand with one of the non-dominant fingers protruding forwards toward the dominant hand (this also happens in full finger-spelling where the non-dominant fingers move to facilitate contact between the dominant and non-dominant hand). BANZSL ɪNSURANCE is an example, where the dominant ɢ-handshape brushes the middle finger of an open-8-handshape. The open-8-handshape is not an allowable handshape for a non-dominant hand

in an asymmetrical sign according to Battison's Dominance Condition (which appears to hold for BANZSL as well as ASL — see Johnston & Schembri 2007), so this sign violates a constraint of the native lexicon and in this model belongs in the partially nativised single-letter category.[14] BANZSL INSURANCE also may involve the non-dominant open-8-handshape moving to facilitate contact with the dominant G-handshape, similar to the issue with BSL UNCLE noted in §6.1.2.

The situation is different in ASL where the parameters (particularly handshape) of many fingerspelled letters do not occur in the native lexicon and thus signs with these handshapes could never be fully nativised within our model. For instance, the parameters of the letters -w-, -E- and -P- do not occur in the native ASL lexicon; therefore the signs WATER, EMERGENCY and PURPLE are partially nativised single-letter signs.

There is only one BANZSL letter which includes a parameter that does not occur in the native lexicon and that is the non-nativised letter -M-; the handshape of the dominant hand does not occur in the native lexicon. So, variants of the single-letter signs such as MOTHER and MINUTE which use this handshape (as shown in Figure 15a) are also classed as partially nativised single-letter signs. Note that this letter has a nativised version with a flat-B-handshape on the dominant hand, which does occur in the native lexicon, and variants of signs with this more nativised handshape are fully nativised signs.

7.2.3   Two-letter signs vs. fingerspelled loan signs representing short words

It can be difficult to distinguish two-letter signs from fingerspelled loans representing an entire word, particularly when there are few letters in the fully fingerspelled form. The ASL and Auslan versions of the fully nativised sign #NO could be considered fully nativised two-letter loans, representing the two letters -N- and -O-, or they could be considered fully nativised fingerspelled loans representing the entire word. The ASL partially nativised sign #JOB could be considered a partially nativised two-letter sign (J-B) or a partially nativised fingerspelled loan representing the entire word. For the #NO examples, the classification of entire word loan or two-letter loan does not make much difference, since the English word NO only contains two letters. For ASL #JOB, some researchers have considered this to be a three-letter loan (Battison 1978; Brentari & Padden 2001). However, we assume this form is a two-letter loan because the handshape changes from the letter -J- to -B- with little or no evidence of the letter -O- at all. Thus, unlike Battison (1978) and Brentari & Padden (2001), the classification for number of letters in

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14. Perhaps in order to avoid this violation, the initialised BSL sign ISLINGTON (a borough of London) is produced with one hand with the thumb and the middle finger repeatedly contacting each other. (Incidentally this sign is identical to ASL #BREAD.)

our model is based on the number of letters which appear as most salient in the surface form of the loan, not the number of letters in the English word on which the loan is based.

7.2.4 Number of letters represented as more categorical than nativisation within crosslinguistic model

Loan signs which have traditionally been considered 3-letter, 4-letter, or 5-letter loans are usually actually representations of entire English words. Where this is not the case, they are representations of entire English abbreviations (e.g., F-E-B for "February" in both ASL and BANZSL, B-D-A for "British Deaf Association" in BSL, N-T-I-D for "National Technical Institute for the Deaf" in ASL). Thus the X-axis of the crosslinguistic model (representation of letters of fingerspelled word) seems to act much more categorically than the Y-axis (degree of nativisation). This is likely due to phonological constraints such as those discussed in §4.2.2, where signs may have a maximum of two different values for any given parameter (which accounts for single-letter and two-letter signs). If an entire word is represented, as in fingerspelled loan signs, the form undergoes restructuring so that it conforms (possibly to varying degrees) to the constraints of the native lexicon.

7.2.5 Nativisation and grammatical processes

Fully nativised forms may undergo further grammatical processes such as the directional modifications associated with agreeing/indicating verbs (e.g., ASL and Auslan #NO). Partially nativised forms may also undergo grammatical processes (e.g., ASL #BACK).

7.2.6 Uncertain historical origins

It must be noted that in some cases, the origins of a sign as a fingerspelled letter or word are really not clear. This is true for both ASL and for BANZSL, although perhaps more so for BANZSL because there has been less documentation of BANZSL fingerspelled loans in the literature. We have assumed following claims in the literature (e.g., Sutton-Spence 1994) that BANZSL ENGLISH originates from the letter -E-, though it is possible that this is not the origin. We have also assumed that the fully nativised BSL #ABOUT$_3$ originated from the fully fingerspelled word as shown in the nativisation path in §7.1.3. Again it is not entirely clear that this is the origin of this sign, but given the partially nativised forms that we know do exist within BSL, and also the alternate nativisation path of #ABOUT in Auslan (see §7.1.2), it certainly seems very likely.

7.2.7   Uncertainty about phonological differences amongst the BANZSL languages

While many of the forms described throughout this paper exist in BSL, Auslan and NZSL (all three languages of the BANZSL family), there are examples that only occur in only one or two of the languages. It is unclear whether different forms are due to subtle but general phonological differences which may exist between these languages or whether they are simply due to chance.

7.2.8   Stability of non-native side of continuum

Last, but certainly not least, it is important to keep in mind there is quite a bit of stability of foreign elements in both ASL and BANZSL. While nativisation processes are constantly at work in ASL and BANZSL, the non-native side of the continuum will never disappear as long as there continues to be contact with English.

8.   Summary and conclusion

The model of nativisation of fingerspelling proposed here differs from the model proposed by Brentari & Padden (2001) in two significant ways. Firstly, the cross-linguistic model accounts for nativisation patterns occurring in both ASL which has a one-handed fingerspelling system and BANZSL which has a two-handed fingerspelling system. The criteria that we have used to determine the extent of nativisation for various forms are:

1. *Extent to which forms adhere to phonological constraints of the native lexicon*
    Signs which are fully nativised fully conform to the constraints of the native lexicon; these signs look and behave essentially like native signs, and it is only their known origin as a fingerspelled form which makes them any different from native signs. Signs which are non-nativised or partially nativised violate one or more constraints of the native lexicon as outlined above in §4.2.2. Violated constraints may involve any of the major parameters of sign formation, not only handshape.
2. *Extent to which parameters occur in the native lexicon*
    Signs consisting of parameters which do not occur in the native lexicon are especially apparent in less nativised single-letter signs. As noted by Brentari & Padden (2001), initialised signs in ASL which have non-native handshapes such as WATER and EMERGENCY can never be as fully nativised as initialised signs which have handshapes which are already part of the native lexicon, such as SOCIETY. The same is not true for BANZSL, since nearly all parameters of BANZSL letters do occur in the native lexicon. The one exception to this

is the dominant handshape of the non-nativised letter -M- but even this has a nativised variant (see §6.1.3).

3. *Extent to which native elements are replaced or added to the fingerspelled letter(s)*

   Native parameters have been added in fully nativised signs such as BANZSL GARAGE (addition of repeated movement) and EXCUSE (addition of upwards movement) and ASL THURSDAY₃ (addition of circular movement).

4. *Extent to which non-native elements are reduced*

   Non-native parameters have been reduced in partially nativised signs such as BSL nativised GLASGOW₂ (the non-dominant handshape of -W- is lost due to perseveration of the non-dominant handshape from -G- into -W-) and ASL nativised THURSDAY₂ (the outward palm orientation of -T- is lost due to anticipation of the inward palm orientation of -H-).

5. *Extent to which native and non-native elements are combined simultaneously*

   Simultaneous versus sequential organisation is especially prevalent in the forms representing an entire word. More simultaneous representation of the letters of the word results in more nativised forms, and vice versa. This is why it can be difficult to identify which and how many letters are represented in partially and fully nativised fingerspelled loans (e.g., ASL #BREAD and #EASY, BSL #ABOUT and #BIRMINGHAM), while identification of individual letters in commonly and fully fingerspelled words is much more straightforward. The most simultaneously organised forms (i.e., the fully nativised fingerspelled loan signs which represent an entire word) prosodically fit the pattern of native signs which tend to be monosyllabic.

More data/examples from ASL and BANZL would help confirm whether these criteria are sufficient to account for all the nativisation patterns in these languages, or whether these criteria need to be supplemented or adjusted based on other forms which have not been considered here.

The second way in which our model differs from Brentari & Padden's (2001) model is that the crosslinguistic model separates out the degree of nativisation from the number of letters represented into two separate but related continua. Under this analysis, initialised forms representing one letter are not necessarily any more or less nativised than forms representing an entire word. We have seen evidence of nativisation paths showing various degrees of restructuring for forms representing one letter, two letters, and the entire word. In most cases, the number of letters represented within a nativisation path does not change. In one nativisation pathway (ASL THURSDAY), the most nativised form represents only one letter compared to the less nativised forms which each represent two letters. More data from ASL and BANZSL would help confirm whether or not all fingerspelled

forms/loans can be considered to be based on either a single letter, a sequence of two letters, or the fully fingerspelled word.

Further research would need to apply this model to other sign languages with one-handed and two-handed fingerspelling systems to determine whether and how the model could be adjusted to fit other systems. Also interesting would be an attempt to apply this model to sign languages whose non-native component is based on a non-alphabetic system, such as character signs in some East Asian sign languages (Ann 1998). By separating out the number of letters represented to a separate continuum within the model, we predict that the nativisation continuum may be applicable to these non-alphabetic systems as well (though this remains to be tested).

Acknowledgements

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