

CHAPTER

14

Acquisition of Sign Language
as a Second LanguageDeborah Chen Pichler *and* Helen Koulidobrova**Abstract**

Research interest in sign language L2¹ acquisition is growing, fueled by dramatic increases in sign language learning (Welles, 2004). Researchers ask to what extent typical L2 patterns apply to hearing students learning an L2 in a new modality, or M2 (second modality)-L2 learners. M2 acquisition may pose unique challenges not observed in typical (unimodal) L2 acquisition. At the same time, co-speech gestures and emblems could potentially be exploited to facilitate M2-L2 acquisition of sign language. Additionally, acquisition of a second signed language by individuals with a signed L1, or M1 (first modality)-L2 learners, provide further opportunity to test “typical” patterns of L2 acquisition that have been established almost exclusively on the basis of hearing spoken second-language acquisition. This chapter summarizes the small but growing literature on L2 sign acquisition for both M1 and M2 learners, exploring some of the intriguing research questions offered by L2 sign research.

Key Words: L2, second language acquisition; modality; transfer; critical period

Second-language (L2) learning has long been a major issue in the signing community, generating prolific discussion and groundbreaking research. Traditionally, the term “L2 acquisition” uttered in the context of the signing community has been synonymous with the development by deaf students of literacy in the (written) language of the surrounding hearing population. This automatic association is understandable, given the urgent need for research on optimizing deaf literacy development. Research in this area has repeatedly demonstrated that while those who lack early language exposure demonstrate significant delays and deficiencies in both their signed (late) L1 and their written L2 competencies, deaf students with early exposure² to a natural sign language have the best chances for developing reading skills and grammatical competence in a written L2 (Cormier, Schembri, Vinson, & Orfanidou, 2012; Mayberry & Lock, 2003). By identifying age of L1 exposure as a major predictor of L2 literacy, work in this

area has also made groundbreaking contributions to our understanding of critical period effects in language learning.

Recently, researchers have become increasingly interested in other instances of L2 acquisition in the signing community, particularly the development of sign language as a second language. Interesting areas of inquiry that have been raised include the extent to which modality affects L2 acquisition, whether L2 sign acquisition proceeds in the same way for both deaf and hearing learners, and the degree to which proficiency in a previous sign language affects L2 outcomes. With respect to critical period proposals generated from research on deaf literacy, these issues are also highly relevant, as they force us to articulate predictions for other types of L2 development for deaf learners beyond just written language. This chapter summarizes the small but growing literature on L2 sign acquisition for both hearing and deaf learners, exploring some of the intriguing research questions noted earlier and

the potential insights they offer to linguistics and cognitive science.

Placing Signed L2 Learners in the Context of L2 Inquiry

In the past 30 or so years, L2 acquisition research has made great strides, in part thanks to the wide variety of theoretical perspectives that contribute to the endeavor of understanding how the human mind acquires a second language. Compared to first-language (L1) acquisition, L2 acquisition is subject to a vexingly complex set of variables. Learners come to the task of L2 learning from different native language backgrounds, possibly also with previously acquired second languages, which can influence their development in different ways. They begin the L2 learning process at different stages of life (childhood L2 vs. adult L2; we will focus primarily on adult learners in this chapter), under a variety of conditions (e.g., formal vs. informal), and for a variety of reasons (e.g., for pleasure vs. for work). Nonlinguistic factors such as aptitude, motivation, and learning styles exert nonnegligible influence on the degree of L2 success, yet these factors are highly individual and difficult to quantify. Discovering systematic patterns in the face of such overwhelming variation calls for tools from multiple theoretical perspectives, so L2 research has developed into an uncommonly interdisciplinary endeavor, drawing heavily from linguistics and psychology but also from sociology, anthropology, and pedagogy.

Extending L2 investigations to sign language introduces yet another important variable, that of modality. Over a half century of dedicated work by sign language researchers has made the case for most people that natural sign languages like American Sign Language (ASL) are languages in the fullest sense of the term, equivalent to spoken languages in complexity and expressiveness. However, equivalence does not entail being identical, and today's sign language (and cognitive) research has uncovered a fascinating array of potential modality effects that may only pertain to language in one modality (spoken or signed) but not the other (see Chapter 29, this volume). Researchers of L1 sign acquisition have already noted potential candidates for modality effects, with respect to three areas in particular: phonology, due to obvious differences between how spoken versus signed languages are articulated, with one small articulator versus two large paired articulators;

space, which sign language grammars encode more explicitly than do most spoken language; and iconicity, the effects of which are noticeably more pervasive in sign languages than in most spoken languages.

In view of these potential modality effects, it is quite plausible that learning a second language in a different modality from one's first language may present possibilities, difficulties, and therefore developmental patterns that do not occur for L2 learning in the same modality as one's L1. For this reason, we distinguish here between *M1-L2 (first modality-second language)* learners and *M2-L2 (second modality-second language)* learners. The former are typically represented by deaf individuals already proficient in one sign language who then learn a second sign language. The latter are typically hearing individuals for whom a signed L2 is the first language they have ever learned in the signed modality. This initial categorization is practical for our current purposes, although we acknowledge that it is in some ways overly simplistic. For instance, it is unclear how to categorize Coda learners who acquired both a spoken L1 and a signed L1 from childhood (see Chapter 12, this volume) or hearing learners who previously acquired a signed L2 (let us suppose with considerable proficiency) and are now learning a second sign language. Do these learners essentially pattern like M2-L2 learners because of their early mastery of a spoken language, or do they pattern more like M1-L2 learners because of their mastery of a previous sign language? Conversely, how should we categorize deaf learners who acquired their first sign language very late and are now learning their second sign language? Do they fall into the category of M1-L2 signers, or do they belong in a different category altogether because they are less proficient in their first sign language than signers who were exposed from birth? If proficiency in one's previous sign language determines whether learners warrant the M1 versus M2 label, what are the appropriate cutoff points? These are fascinating questions, but ones that we are unfortunately not able to fully address at this time. For now, we will limit our discussion to the cases for which we have access to published reports: deaf adults learning a second sign language (M1-L2 signers) and hearing adults learning their first sign language (M2-L2 signers). The current literature is focused predominantly on M2-L2 signers, but wherever possible, this chapter will discuss M1-L2 signers, whom we argue are the appropriate comparison

group for the early-exposed deaf signers in the critical period research.

Framework and Notions Borrowed From the Spoken L2 Tradition

Potential modality effects notwithstanding, most of the research that we discuss in this chapter adopts the basic position that certain L2 phenomena central to spoken language acquisition also apply to L2 sign acquisition. Foremost among these phenomena are language *transfer* and language *universals*, which we discuss in turn.

Transfer

A great deal of the literature on spoken L2 acquisition is concerned with linguistic transfer. While the precise mechanism behind transfer effects remain unclear or downright contentious (see Koulidobrova, 2012, for arguments against the notion of transfer, demonstrating that many instances claimed to be transfer in fact cannot be), examples of this linguistic phenomenon have been robustly documented for L2 learners, at all levels of the grammar. For instance, L2 learners may adopt exhibit word order patterns in their L2 that reflect the word order in their first language—arguably an influence of L1 syntax on the L2. In the realm of phonology, L2 learners commonly substitute phonemes from their L1 phonological repertoire for L2 phonemes that they perceive to be similar. They may also “overlay” rhythmic templates and other prosodic patterns of their L1 onto their L2; prosodic and phonological transfer together are largely responsible for creating the effect of a “non-native accent.” Lexically, learners are often fooled by false cognates (words that appear similar across two languages, such as French *actuel* “current” and English *actual*) into thinking that these have the same semantic scope as similar words in their L1, leading to inappropriate word choices. Discourse and pragmatic characteristics are vulnerable to transfer as well (e.g., transferring L1-specific conventions for formulating apologies or request, or L1 patterns for introducing and maintaining referents in L2 conversations and narratives). Even gestures have been noted to transfer from one language to another, spawning the recent establishment of a whole new subfield of second-language gesture research (see Gullberg, 2006, for an excellent introduction). Irrespective of the theoretical account, transfer has long been a prominent feature of L2 acquisition research as a rich source of hypothesized L2 errors.

A priori, we assume that nothing prevents most of these types of grammatical “incorporation” in spoken L2 acquisition—instances in which grammatical properties of L1 are observable in L2, for example, and vice versa—from occurring between a spoken L1 and a signed L2, or between two signed languages. Linguistic features, be they morphosyntactic, pragmatic, or so on, are abstract entities that can be realized in either speech or sign, and the problem of partially overlapping semantic fields exists just as it does for any language pair. Indeed, observers have often pointed to the “dinner conversation paradox” (Sandler, 2006, p. 335) as an example of just how much linguistic knowledge can be quickly transferred from one sign language to another by skilled users: “A long dinner among Deaf users of different sign languages will, after a while, permit surprisingly complex interchanges” (Newport & Supalla, 2000, p. 109). While this characterization may not be entirely accurate (Jordan & Battison, 1987), it emphasizes the considerable extent of potentially “transferable” features among natural sign languages, even for those that are genetically unrelated to each other.

TRANSFER FROM GESTURAL EXPERIENCE TO M2-L2 SIGN

The one possible exception to the generalization of linguistic features transferring in L2 sign acquisition, at least for M2-L2 acquisition, is phonology, which some researchers have claimed cannot transfer across modalities (Bochner, Christie, Hauser, & Searls, 2011; Rosen 2004; see Chapter 26, this volume).

In terms of second language acquisition, fundamental differences between signed and spoken languages associated with the channel of information transmission (i.e., differences in sensorimotor and phonological processing) create a situation in which the construct of language transfer has little or no discernable impact with respect to the domain of phonology. (Bochner et al., 2011, p. 1307)

However, phonology is abstract and, therefore, at least in principle modality independent. Additionally, other researchers have pointed out that for M2-L2 signers, previous experience with gestures common in hearing communities (e.g., emblems and co-speech gestures but also facial gestures and other nonmanual cues) might serve as a rich source for cross-linguistic incorporation into L2 signing (Brentari, Coppola, Mazzoni, & Goldin-Meadow, 2012; Chen Pichler, 2009, 2011;

Ortega, 2013; Ortega & Morgan, 2015; Taub, Galvan, Piñar, & Mather, 2008).

L2 speech perception models such as Flege's (1995) Speech Learning model and Best's (1995) Perceptual Assimilation model predict that transfer is highly likely in cases where an L1 form is very similar *but not identical* to an L2 form. In these cases, learners may fail to perceive small but linguistically significant features that distinguish the L1 and L2 forms, and assimilate the L2 form into the pre-existing L1 phonetic category. Such phonetic assimilation could lead to M2-L2 signers substituting handshapes from their gestural inventory that are similar but not identical to formal handshapes in their signed L2, resulting in inaccurate handshape production. Ortega (2013) and Ortega & Morgan (2015) documented just this type of error among beginner M2-L2 learners of British Sign Language (BSL) who took part in a sign repetition task before starting their first 11-week BSL course. In this task, participants were instructed to reproduce individual BSL signs with varying degrees of iconicity (as previously determined by Vinson et al., 2008) as accurately as possible. Subjects were less accurate in their articulation of the major sign parameters (handshape, movement, location, and orientation) for iconic signs than for arbitrary signs. Ortega surmised that the decreased accuracy for iconic signs could result from M2-L2 signers recognizing them as similar to iconic gestures, leading them to produce their own iconic gesture for those items rather than faithfully copying the specific phonological features of the BSL signs presented to them, as they did for arbitrary signs.

Chen Pichler (2009, 2011) made a similar proposal for ASL, but as an explanation for why handshape transfer occurs from some "false cognate" gesture-sign pairs, yet not others. She observed that some hearing, nonsigning participants in her study appeared to transfer handshapes from their conventional gestures to unfamiliar ASL signs, but only for highly unmarked handshapes. For instance, in Figures 14.1b and 14.2b, a hearing nonsigner participant produced the same modified A-handshape (fist with unopposed thumb) for the gesture "Yes!" (fists raised in victory) and target signs SENATE



Figure 14.1a Target form for gesture "Yes!"



Figure 14.1b Hearing nonsigner form for gesture "Yes!"

and SYMBOL that required the S-handshape (fist with opposed thumb). Figures 14.1a and 14.2a show that for all three cases, the target model involved the S-handshape, a highly unmarked handshape that was predicted to be accurately reproduced by hearing nonsigners. However, it is also highly similar but not identical to this particular participant's "fist" handshape and appears to have been perceptually assimilated to that handshape for these items.

Such transfer did not occur in cases where a participant's gesture handshape looked superficially similar to a *marked* handshape of an elicited sign, for example, the handshape used in the conventional gesture *call me* (Fig. 14.3a) and the Y handshape in the ASL sign WRONG (Fig. 14.4a). In these cases, as illustrated in Figures 14.3b and 14.4b, nonsigner subjects faithfully reproduced minor differences in the degree of splay between the thumb and pinky in the target forms.

Chen Pichler suggested that handshape information is more difficult to quickly extract from unfamiliar signs when the handshapes are marked, because such handshapes block M2-L2 signers' association with similar handshapes from their gestural inventory. She proposed that "in such cases subjects approach the target sign as an unfamiliar bundle of handshape, movement and location features that they must do their best to replicate in a short period of time" (Chen Pichler, 2011, p.118).

New signers' previous gestural experience can be a source for more than just handshape substitutions into the target L2 sign. A number of researchers have recently explored the ability of hearing nonsigners to detect utterance boundaries in sign language narratives. Such boundaries are marked by a variety of nonmanual cues, including changes in head and body position, eye blinks, pauses, and lengthening of signs at the end of intonational phrases (Brentari & Crossley, 2002; Nespor & Sandler, 1999; Wilbur & Zelaznick, 1997, among others). For instance, Fenlon, Denmark, Campbell, and Woll (2007) reported that British nonsigners performed as well as M1-L2 signers in identifying prosodic boundaries while watching a narrative signed in an unfamiliar



Figure 14.2a Target forms for SENATE, SYMBOL

sign language. Mesh (2012) noted similarly successful identification of prosodic breaks by American nonsigners. While number of reasons for this recurring result are possible, the most relevant one for this discussion is the nontrivial role of paying special



Figure 14.2b Hearing nonsigner reproductions of SENATE, SYMBOL

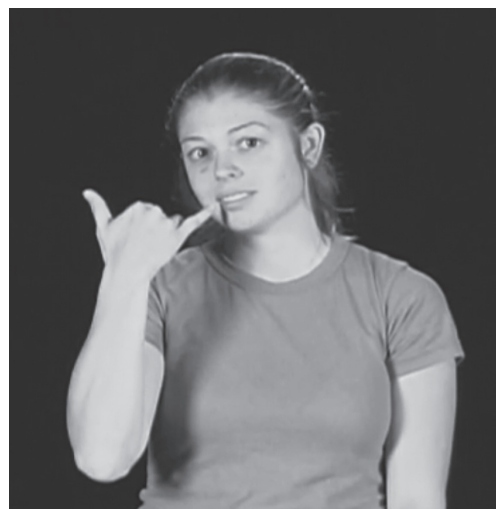


Figure 14.3a Target form for gesture “*Call me*”

attention to prosodic cues contributed by co-speech gesture,³ rather than the meaning invoked by the signs that gesture may support. Fenlon et al. concluded from their findings that nonsigners “are not gesturally naïve and are able to use experience from spoken languages when determining sentence boundaries in a signed language” (Fenlon et al., 2007, p. 196). Furthermore, the degree of spoken language (and gesture) experience necessary to develop sensitivity to visual prosodic cues may be surprisingly minimal. For instance, Balog and Brentari (2008) reported that 9-month-old hearing babies with no sign language successfully detected differences between signed utterances with different intonational phrase structure, suggesting that the



Figure 14.3b Hearing nonsigner form for gesture “*Call me*”



Figure 14.4a Target form for WRONG.

relevant sensitivity to visual prosodic cues may be in place even before infants produce running speech and co-speech gesture themselves.

OTHER INFLUENCES OF ICONICITY ON TRANSFER FOR M2-L2 SIGN

The previous discussion of gestural influences on M2-L2 signing is related to the broader issue of how iconicity affects acquisition. An increasing number of researchers have recently demonstrated that M2-L2 signers are sensitive to iconic signs, although that sensitivity manifests in different ways. Previous studies on the influence of iconicity on L2 acquisition are mixed. Several studies have reported that for M2-L2 signers in the very early stages of acquisition (including sign-naïve subjects who simulate sign learners in the initial state in some experimental studies), iconic signs are easier to recall and recognize than noniconic signs (Baus, Carreira, & Emmorey, 2013; Campbell, Martin, & White, 1992; Lieberth & Gamble, 1991). However, at least one study (Morett, 2012) concluded that iconic signs are not learned

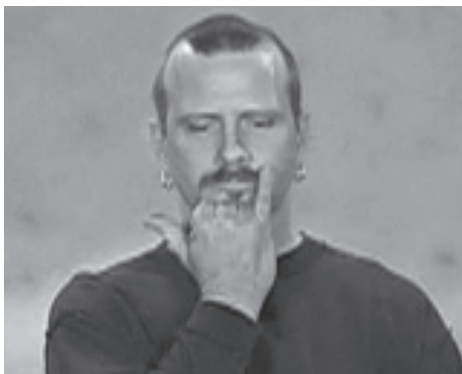


Figure 14.4b Nonsigner reproduction of WRONG.

more easily than noniconic signs, but rather that physical enactment of signs (iconic or otherwise) enhances sign learning. According to the report in Baus et al. (2013), for sign M2-L2 learners with high proficiency, such as trained ASL interpreters, iconic signs had an inhibitory effect for translation from ASL to English and no effect on translation from English to ASL. One explanation for the inhibitory effect is that in contrast to novice signers, highly skilled M2-L2 signers form direct lexical mappings between ASL signs and their corresponding English equivalents, but iconic signs can “force” these signers to route their translation process through conceptual mediation. The latter is a slower process than direct translation. Such an account is consistent with findings from Thompson, Vinson, and Vigliocco (2009, 2010), who demonstrated slower reaction times for native signers on heavily iconic signs when performing a phonological processing task that normally does not activate meaning.

With respect to transfer then, novice M2-L2 learners recognize signs that resemble iconic gestures that they themselves use, as noted earlier by Ortega (2013) and Ortega & Morgan (2015). This recognition often leads to substitution of the learner’s gestural form for the elicited target form, resulting in lower formational accuracy (Ortega & Özyürek, 2013).

TRANSFER FROM L1 SIGN TO L2 SIGN

The notion that linguistic transfer should occur from L1 sign to L2 sign is an uncontroversial, oft-repeated claim, particularly in forums aimed at disabusing the general public of the myth that sign languages are universal. An example appeared in Hickok, Bellugi, and Klima (2002), a popular and highly accessible introduction to sign language and the brain published in the journal *Scientific American*: “Deaf people in different countries use very different sign languages. In fact, a deaf signer who acquires a second sign language as an adult will actually sign with a foreign accent!” (Hickok, Bellugi, & Klima, 2002, p. 48; see also Budding, Hoopes, Mueller, & Scarcello, 1995). Despite substantial anecdotal evidence for “foreign signer accents,” there is still very little published research on the topic of M1-L2 language influence, phonological or otherwise. A notable exception is a study by Quinto-Pozos (2008) that investigated potential areas for “language interference”/transfer due to the geographic proximity between

Mexican Sign Language (LSM) and ASL for Deaf Mexican M1-L2 signers of ASL. For instance, LSM employs an F-handshape involving contact between the pad of the thumb and the radial side of the index finger at the proximal interphalangeal joint, with the extended fingers very slightly splayed. This handshape contrasts with the typical ASL F-handshape, which involves contact between the pads of the index fingertip and thumbtip, with the three extended fingers splayed more widely apart. Such phonetic details are noticeable to experienced viewers and substitution of one for the other could contribute to the perception of a nonnative accent. ASL and LSM also differ with respect to the nonmanual markings on *wh*-elements: In ASL, *wh*-words are accompanied by brow furrowing, while in LSM they are accompanied by a backward head tilt. Finally, ASL or LSM signs are often accompanied by mouthing patterns of English or Spanish equivalents, and these mouthing patterns could conceivably transfer across sign languages. Quinto-Pozos (2008) reported that while he observed these types of “interferences” in casual conversations between LSM and ASL users in his data, they did not trigger any difficulty for comprehension and may have been too subtle to be noticed. Alternatively, because LSM and ASL exist in a long-term language contact situation, signers themselves sometimes alternate between LSM and ASL forms, and they may be influenced by a variety of sociolinguistic factors that are still poorly understood. This path, however, points away from the notions of “transfer” and toward productive code switching, a phenomenon that is currently being investigated for a number of spoken-only, sign-only, and spoken-sign language pairs. This path of inquiry also introduces particular predictions with respect to both phonology and morpho-syntax (see Koulidobrova, 2012, for an overview; Koulidobrova & Palmer, 2015).

Universals

Another major theme in the spoken L2 literature is that of universals, or factors that exert an influence on acquisition regardless of the particular L1 or L2 of the learner. The notion of markedness is a common example of this kind of universal. L2 learners acquire marked structures more slowly and with more errors than they do unmarked structures. Some researchers have developed markedness hierarchies related to specific aspects of grammar, such as the Accessibility Hierarchy of

Keenan and Comrie (1977), proposed to predict the occurrence of different types of relative clause structures crosslinguistically, as well as the order in which they are acquired by language learners. And finally, for researchers who support the idea that Universal Grammar (UG) is active for L2 acquisition, the constraints and biases encoded in UG are further examples of universals guiding the types of hypotheses that L2 learners entertain (see Chapter 16, this volume). Of course, all of these universals may be contravened in certain cases, such as in the case of language-specific markedness patterns. Jaquez, Anible, and Occhino-Kehoe (2014) reported one such case from their research comparing the response speed of native Deaf signers of Italian Sign Language (LIS) and ASL asked to identify signs in an array that utilized the F- and B-handshapes. Universally, the F-handshape is more marked than the B-handshape (e.g., Boyes Braem, 1990), but Jaquez et al. argued that the F-handshape is so common in LIS that it must have a much less marked status than in ASL. Correspondingly, native deaf signers of LIS took longer to identify signs with the F-handshape than did deaf signers of ASL, a difference that Jaquez et al. predicted on the assumption that unmarked handshapes are less phonologically salient than marked handshapes. In contrast, response times to the B-handshape, unmarked in both languages, were the same for both ASL and LIS signers. The authors concluded that language-internal markedness patterns can trump an otherwise universal markedness hierarchy.

Other potential universals affecting sign L2 acquisition are related to motor skill, reflecting the fact that theorizing related to markedness in phonology often relies on ease of articulation (Calabrese, 2005). Mirus, Rathmann, and Meier (2001) reported that when asked to reproduce isolated unfamiliar signs, M2-L2 adult signers frequently exhibited proximalization of movement, producing the sign movement from a joint closer to the torso than is standard (e.g., shifting the downward movement for the ASL sign RAIN from the wrist joints to the more proximal elbow joints). This type of movement error is also commonly observed for young L1 signers. Interestingly, Mirus et al. noted proximalization errors for adult Deaf M1-L2 signers as well, albeit much less frequently than for M2-L2 signers. In this sense, proximalization reflects universally challenging articulatory demands of reproducing unfamiliar signs, a “new and complex motor skill” (Mirus et al., 2001, p. 114) for all learners.

However, as Mirus et al. pointed out, proximalization does not always result in a sign error; joint selection for sign movement varies considerably across and within signers (Cull, 2014), and for a variety of potential reasons (e.g., signing is larger across long distances or when the signer is highly emotional) that require further investigation.

Some developmental universals for L2 sign appear to be imposed by human perceptual biases. “Mirror errors” occur when signers fail to mentally rotate a two-handed sign before producing it, such as producing the ASL sign SATISFIED with the nondominant hand above the dominant hand (Figure 14.5b), as the sign would appear in one’s mirror reflection, rather than with the dominant hand above the nondominant hand (Figure 14.5a).

Rosen (2004) classified these as perceptual errors and noted that they are prominent in beginning M2-L2 signing. Chen Pichler (2008) reported frequent mirror errors in M2-L2 signing as well, suggesting that asymmetrical signs are perceptually challenging for all signers, in spite of previous sign experience. With respect to sign formational parameters, some are more perceptually salient than others. Emmorey and Corina (1990) reported location as one of the first parameters (the other is orientation) that signers identify when they are shown a sign. Movement is identified last, at which point signers are able to identify the full sign. Correspondingly, in studies testing participants’ sensitivity to contrasts involving different sign formational parameters, researchers observe



Figure 14.5a Target form for SATISFIED.



Figure 14.5b Deaf M1-L2 signer reproduction of SATISFIED with mirror error.

that native deaf ASL signers are more sensitive to movement+location contrasts than to contrasts involving any single parameter (Hildebrandt & Corina, 2002). The same preference is exhibited by hearing nonsigning adults, suggesting that movement+location information is universally recognized by humans as “core structural units of syllable structure in ASL” (Hildebrandt & Corina, 2002, p. 593). With respect to sign production, Ortega (2013) and Jissink (2005) both reported location as the formational parameter most accurately reproduced by M2-L2 signers of BSL and Sign Language of the Netherlands (NGT), respectively. This pattern mirrors findings in the sign L1 literature, where location is also the earliest formational parameter controlled by young children in a number of national sign languages (e.g., Conlin, Mirus, Mauk, & Meier, 2000; Morgan, Barrett-Jones, & Stoneham, 2007).

A recent study by Hall, Ferreira, and Mayberry (2014) addressed the very fundamental perceptual biases that give language users the ability to decide which featural details are relevant for linguistic categorization. This skill in turn has an important effect on language acquisition, allowing learners to filter out and disregard patterns in the input that are not linguistically important. Hall et al. (2014) administered a phonological similarity task in which deaf native signers, deaf nonnative (late-exposed) signers, hearing proficient M2-L2 signers, and hearing nonsigners indicated on a sliding scale how similar or different presented signs were to each other. Judgments of native and M2-L2 signers reflected phonological similarities between signs rather than similarities in meaning, whereas late-exposed deaf signers and nonsigning control participants appear

to have been sensitive to other, potentially linguistically irrelevant cues that were disregarded by the other two groups. The researchers concluded that “early exposure to language helps a learner discern which aspects of a linguistic signal are most likely to matter for language learning, even if that language belongs to a different modality” (Hall et al., 2014, p. 104). At the same time, a certain degree of experience with sign language also appears to be needed for hearing learners to develop target-like perceptual biases for the signed modality, an idea that has recently been explored by Koulidobrova and Palmer (2015). Although, as previously mentioned, hearing nonsigning adults as well as native signing adults both prefer movement+location information over orientation (Hildebrandt & Corina, 2002), Bochner et al. (2011) showed that when analyzed independently, these parameters receive different degrees of attention from L1 versus M2-L2 signers. Koulidobrova and Palmer compared the linguistic behavior of M1-L2 signers to that of L1 and M2-L2 signers and discovered, in defense of Hall et al.’s findings, that previous and even concurrent exposure to a sign language, even if late in terms of natural language acquisition, resulted in an L1-like performance in discriminating the linguistically meaningful parameters in sign language phonology.

The studies summarized in this section illustrate the current preponderance of phonological research in the field of L2 sign acquisition. Many questions about universal tendencies for sign L2 morpho-syntactic, lexical, and discourse development remain unexplored, both in M1-L2 and M2-L2 domains, although interest in these areas appears to be growing. Bel, Ortells, and Morgan (2014) offered a rare L2 sign study focusing on reference control in the narratives of Catalan Sign Language (LSC) by M2-L2 learners. These learners, all advanced signers in the final stages of their interpreter training program, were generally target-like in their selection of referent forms, employing nominal forms (e.g., GIRL) for introductions and null pronouns for referent maintenance. However, the researchers also noted a consistent tendency for the L2 signers to be overly explicit, using overt pronouns more frequently than their native-signing comparison group, including in contexts of referent maintenance when a null pronoun would have sufficed. Interestingly, the native languages of these M2-L2 signers, spoken Spanish and Catalan, are both languages that employ null pronouns in a similar way to LSC. Yet learners did not transfer this competency into their L2 LSC, presumably because

of a universal tendency to “adopt a strategy to avoid ambiguities and resort to overproduction of overt forms” (Bel et al., 2014, pp. 12–13), a strategy that has been noted previously for spoken L2 narratives (Bel et al., 2010; Sorace, Serratrice, Filiaci, & Baldo, 2009). As with a number of other studies summarized in this chapter, a question arises whether the aforementioned result will hold for M1-L2 signers. Sorace et al. suggested that at least one of the reasons for the oversuppliance of arguments may be attributed to the cognitive load characteristic of bilingual language production, irrespective of whether the additional language was acquired in early childhood or much later. However, Emmorey, Bornstein, Thompson, and Gollan (2008) argued that for bimodal (sign-speech) bilinguals, this load is much reduced. This view leads to a two-fold prediction: (a) that early simultaneous bilinguals acquiring languages in different modalities will oversupply arguments less than children acquiring languages in the same modality (see e.g., Koulidobrova, 2014), and (b) that sequential M1-L2 learners of sign languages will produce higher rates of overt forms than M2-L2 learners. The preliminary findings suggest that, in line with Sorace et al.’s (2009) hypothesis, M1-L2 learners of ASL produce more overt arguments in their narratives than do native ASL users (Wulf, Dudis, Bayley, & Lucas, 2002). Here, research on L2 acquisition of sign languages promises to inform theoretical models of additional language acquisition.

“Late L1 Acquisition Is Not the Same as L2 Acquisition”: Relevance of Sign L2 Research for Deaf Literacy

Research comparing deaf signers with varying ages of exposure to sign language has repeatedly demonstrated that the age of exposure to L1, regardless of whether it is spoken or signed, has a critical effect on the degree to which subsequent acquisition of a written L2 is successful (Cormier et al., 2012; Mayberry & Eichen, 1991; Newport, 1990). Mayberry and Lock (2003) reported nearly identical performance for deaf and hearing L2 learners of English on a grammaticality judgment task targeting a variety of English syntactic constructions. Both of these participant groups benefitted from early exposure to their L1, growing up in families where that L1 was used on a daily basis. Their success in processing English syntax stands in stark contrast to the performance on the same experimental task by deaf L2 English learners who were born to hearing, non-signing families and who were first exposed to sign

language in school. Despite the fact that all three groups began their English development during the same period of childhood, Mayberry and Lock (2003) reported that the group without early exposure to an L1 scored significantly lower than their comparison groups on the English grammaticality judgment task, often only at near-chance levels. Moreover, late-exposed deaf signers also performed more poorly on ASL grammaticality judgments than both early-exposed deaf signers and L2 signers who began learning ASL only after losing their hearing in late childhood (Boudreault & Mayberry, 2006; Mayberry, 1993). Mayberry concluded that “the timing of L1 exposure in early life affects the outcome of all subsequent language learning, both the L1 and the L2, independent of sensory–motor modality” (Mayberry, 2007, p. 543). In other words, deaf individuals who received late exposure to their signed L1 look qualitatively different from hearing (or formerly hearing) individuals who received similarly late exposure to an L2 (spoken or signed). They (late-exposed deaf signers) are subsequently predicted to do poorly as L2 learners of *any* second language, yet the research reports all focus on L2 learners of written English. We submit that this is not the appropriate comparison group, as acquisition of a written form of a spoken language entails acquisition of both the language (its lexicon and grammatical features) and its written representation, arguably a more complex process than acquisition of another language alone. Characterization of late-exposed deaf signers’ L2 learning ability should be more appropriately based on observation of their performance in a second sign language, as M1-L2 learners.

Unfortunately, very few studies of M1-L2 sign acquisition currently exist, as noted earlier. The most we can do in the meantime is briefly sketch out two reasons why M1-L2 sign acquisition by late-exposed deaf signers might compare favorably to the patterns documented for their L2 acquisition of written English. First, as already mentioned, learning the signed form of a (sign) language allows direct access to the grammatical features of that language, without the additional challenge of learning the secondary form that encodes that language. Even if phonological coding and awareness have a much smaller influence on English reading development than previously believed (Mayberry, del Giudice, & Lieberman, 2011), acquisition of a natural language through text alone is still unlikely to exhibit the natural stages of L2 language acquisition or, at the very least, presents unwelcome potential

confounds. Furthermore, researchers have found phonological coding in one’s L1 to be a predictor of success in later L2 speaking and writing (Sparks, Patton, Ganschow, & Humbach, 2011). Given the ample documentation that late-exposed deaf signers develop an incomplete or weak phonological foundation in their L1, poor ASL phonological coding may constitute another reason for poor subsequent English reading skills, independent of age of onset.

Second, the striking number of general linguistic features shared across sign languages (e.g., simultaneity, use of space to establish reference, high degree of iconicity) offers M1-L2 learners a wide range of possibilities for positive transfer into their L2 that could offset some of the critical period effects currently associated with late-exposed L2 development. Indeed, a major criticism of using spoken second-language acquisition as a testing ground for the critical period hypothesis is the observation that many L2 learners achieve native-like attainment, despite starting acquisition past the putative critical period. One documented source for this unexpected success is typological similarity between the L1 and L2 that allows for considerable positive transfer (Bialystock & Miller, 1999; Bongaerts, 1999). Yet there are many international deaf students at Gallaudet University and the American School for the Deaf, among others, who appear to have acquired ASL very successfully; many of these individuals were not exposed to their native sign language until later childhood. Thus, further research needs to define the variables responsible for such success in M1L2 learners and whether these variables can be manipulated for cases of M2L2 acquisition. At the same time, we would do well to remember that the studies documenting such native-like attainment by late L2 learners of ASL have not examined the nuances across syntax, semantics, and morphology, at least to the same degree as this has been done for L2 acquisition of spoken languages. Examination of successful M1-L2 acquisition cases holds potential for refining current claims about ultimate L2 attainment for late-exposed signers.

Conclusion

This chapter summarizes a selection of the growing literature on the acquisition of sign languages as second languages, both in the M1-L2 and M2-L2 contexts. A distinction along these lines seems a prudent initial step to allow us to eventually determine whether modality differences impact the second-language development process enough to warrant the M1 and M2 labels. Existing research

has already raised intriguing questions about possibilities for transfer from previous experience (both grammatical and gestural) and the nature of universals (both modality-neutral and modality-specific) on sign L2 acquisition. Much additional research is needed, particularly in the areas of sign L2 lexicon, prosody, nonmanuals, and morpho-syntax, the last having been demonstrated to be a particularly rich domain for L2 effects in the spoken second-language literature. The effect of typological distance (perceived and real) between L1 and L2, the nature of sign L2 interlanguage, particularly in cases of M2-L2 acquisition in comparison with M1-L2 acquisition, and the interaction of multiple previously acquired sign languages are also promising but largely unexplored lines of inquiry. Finally, we suggest that predictions made by the traditional paradigm of “deaf second-language acquisition” or deaf learners of L2 English (and other spoken/written languages) can be tested and refined through the establishment of “baseline” measures of deaf L2 acquisition of other sign languages.

Notes

1. We reserve the term “second language” (L2) for all instances of subsequent (vs. simultaneous) multilingualism (2L2) with an understanding that for many “L2” learners of sign languages, much as it is for “L2” learners of spoken languages, the language in question may be either L3, L4, *inter alia*.
2. These studies focus on deaf children without cochlear implants, but recent reports suggest that early exposure to a natural sign language confers the same advantages to implanted deaf children. Young deaf children with cochlear implants who are exposed to a natural sign language from birth from their deaf, signing parents perform comparably with hearing bimodal bilinguals on a variety of linguistic tests (Davidson, Lillo-Martin, & Chen Pichler, 2014; Giezen, Baker, & Escudero, 2014; Hassanzadeh, 2012; Koulidobrova, 2014; Rinaldi & Casselli, 2014). This suggests that exposure to natural sign input from birth leads to better outcomes for spoken language development, which in turn could plausibly lead to better outcomes for literacy. Currently, of course, this remains an empirical question requiring careful further examination.
3. That gesture is a part of the linguistic system of language users and, thus, may “transfer” has also been shown in second-language acquisition of spoken languages (Gulliford, 2010, and references therein).

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