Published in final edited form as:

Second Lang Res. 2019 April ; 35(2): 253–283. doi:10.1177/0267658317750220.

Reference tracking in early stages of different modality L2 acquisition: Limited over-explicitness in novice ASL signers' referring expressions

Anne Therese Frederiksen, Rachel I. Mayberry

University of California San Diego, CA, USA

Abstract

Previous research on reference tracking has revealed a tendency towards over-explicitness in second language (L2) learners. Only limited evidence exists that this trend extends to situations where the learner's first and second languages do not share a sensory-motor modality. Using a story-telling paradigm, this study examined how hearing novice L2 learners accomplish reference tracking in American Sign Language (ASL), and whether they transfer strategies from gesture. Our results revealed limited evidence of over-explicitness. Instead there was an overall similarity in the L2 learners' reference tracking to that of a native signer control group, even in the use of lexical nominals, pronouns and zero anaphora – areas where research on spoken L2 reference tracking predicts differences. Our data also revealed, however, that L2 learners have problems with the referential value of ASL classifiers, and with target-like use of zero anaphora from different verb types, as well as spatial modification. This suggests that over-explicitness occurs in the early stages of different modality L2 acquisition to a limited extent. We found no evidence of gestural transfer. Finally, we found that L2 learners reintroduce more than native signers, which could indicate that they, unlike native signers are not yet capable of utilizing the affordances of the visual modality to reference multiple entities simultaneously

Keywords

American Sign Language; classifiers; gesture; M2–L2 learning; null subjects; over-explicit reference; reference; referent tracking

I Introduction

A well-known phenomenon in adult second language acquisition is that learners tend to approach reference tracking differently than native language users. Although second language referential cohesion looks different than the norm in the target language, it also does not look like the pattern exhibited by children acquiring their first language, possibly reflecting the pragmatic sophistication of older second language (L2) learners. Because

Corresponding author: Anne Therese Frederiksen, University of California San Diego, 9500 Gilman Drive, 92093 MC 0108, La Jolla, CA 92093, USA, a.t.frederiksen@gmail.com.

Declaration of Conflicting Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

similar patterns have been observed across typologically different first-language–second-language (L1–L2) pairs, researchers have assumed that the characteristics of L2 reference tracking might have a universal explanation, but studies of the phenomenon have focused on the spoken modality (Hendriks, 2005; Ryan, 2015). To date there is only limited evidence that the same characteristics apply to second language reference tracking when the L2 is produced and perceived in a different sensory modality from L1, e.g. if one language is signed and the other is spoken. On the one hand, signed languages are natural languages and, as such, the L2 acquisition of a signed language is expected to replicate the L2 acquisition of a spoken language in the case of reference tracking and elsewhere. On the other hand, an ongoing research question is the extent to which learning an L2 in a different modality is impacted by factors that play little or no role in same-modality L2 acquisition. Signed languages make use of referring expressions that recruit properties specific to the visual modality, and such unfamiliar affordances may interact with the general challenges that L2 learners encounter in acquiring the ability to track reference in a target-like manner. Additionally, learners may encounter transfer not only of the linguistic principles from their spoken L1, but also of the accompanying gestures.

The present study examines reference tracking in American Sign Language (ASL) by hearing second language learners and compares the results with the patterns of native ASL discourse. We ask whether assumed (universal) cross-linguistic patterns hold for different-modality L2 acquisition, and whether there is a role in reference tracking for the gestural repertoires obtained from the learners' L1. This is a first step towards understanding how reference tracking in ASL is acquired by learners exposed to the language after childhood. In the following sections, we first discuss native language user patterns of referential cohesion, including the specific linguistic devices available to signers, and what characterizes referent tracking in a second language. We then describe the methods and results of the current study. We find that novice to low-intermediate L2 learners of ASL are over-explicit in their referent tracking, but less so than would be expected. We discuss some possible reasons that can account for this difference.

II Creating narrative cohesion

A crucial part of constructing a narrative is letting the addressee know which entities are involved in which actions as the story progresses. This involves introducing referents appropriately as needed and referring back to them. Referring anaphorically must be done in such a way that the addressee understands that a given referent was introduced previously and continues to be of importance for the story. Senders foreground and background entities by referring to them with different linguistic forms. A number of studies have investigated how language users are able to felicitously produce and interpret referential expressions. There is a clear systematicity to this across languages (Ariel, 1988; Chafe, 1976; Givón, 1983; Gundel et al., 1993; Hickmann, 2003; Hickmann and Hendriks, 1999). As a broad generalization, speakers use fuller referential forms if the referent in question is new or otherwise less accessible to the addressee, and they use reduced forms of reference when the referent is known to the addressee, or easily retrievable. Often, a tripartite categorization into introduced, maintained and reintroduced contexts is used to distinguish between different levels of referent accessibility (Gullberg, 2006; Hickman and Hendriks, 1999). The

introduction of a referent, that is, the first time that referent is mentioned, is likely to be accomplished by a lexical noun phrase. In English, a male referent might be introduced with an indefinite noun phrase like ‘a man’, but other languages might use a bare noun phrase, or a noun phrase marked as topic. However for subsequent mentions of a previously introduced referent, what constitutes more or less marking appears to be relative within the language in question. Maintained reference, that is, continued reference to the same referent across two or more clauses, tends to be marked with little or no linguistic material. English is a subject prominent language and typically uses pronouns to maintain reference, but in topic or discourse oriented, pro-drop languages, speakers and signers tend to maintain reference by null marking instead of overt marking material (see Gundel et al., 1993). For referent reintroductions, that is, when a sender brings a referent back into focus after one or more sentences, the preferred referring expressions can be nouns, pronouns, or null references, depending on the language, and on how the other statuses are marked within that language (e.g. Clancy, 1980; Debreslioska et al., 2013; Frederiksen and Mayberry, 2016; Perniss and Özyürek, 2015; Yoshioka, 2008).

Most studies of the principles of reference tracking have investigated spoken language systems. Consequently, our knowledge of reference tracking in ASL as well as other sign languages is based on a small number of studies. However, just as for spoken language, reference maintenance in sign language requires keeping referents activated in working memory (Emmorey et al., 1991). Below, we discuss studies of reference tracking in different sign languages. These studies have uncovered a lot about the means available to signers for making reference, although our knowledge of how signers vary these in discourse is limited. For example, we know that most sign languages have lexical nouns, verbs that recruit space for agreement (or indication) purposes, (pronominal) pointing signs, and classifiers (see Pfau et al., 2012). The following sections discuss the forms of reference available to signers in ASL.

1 Nominal reference

In ASL, nouns are either nominal signs (e.g. BOY, GIRL, POPSICLE, etc.) or they are fingerspelled (e.g. P-A-R-K). Nouns sometimes occur in combination with points in signing space, which under some analyses of ASL have been treated as definite noun phrases or noun phrases with locative adverbials (MacLaughlin, 1997; Neidle et al., 2000; Zimmer and Patschke, 1990; but for a counterargument, see Koulidobrova and Lillo-Martin, 2016). Others have treated ASL as lacking determiners (Koulidobrova, 2012), and it seems that bare nouns are preferred in ASL narratives (Swabey, 2002), such that signers simply use context to determine where a referent belongs on the hierarchy of givenness or accessibility (Ariel, 1988; Gundel et al., 1993).

ASL uses pointing signs to refer to people and objects (Friedman, 1975; McBurney, 2002). These pointing signs have traditionally been considered pronouns (Sandler and Lillo-Martin, 2006), although recent work has highlighted problems with this (Schlenker, 2013, 2017) and proposed that they are in fact not pronouns proper, but rather demonstratives (Koulidobrova and Lillo-Martin, 2016). Regardless of their theoretical status, pointing signs can be used with many of the same discourse functions as pronouns so, for the purposes of this article,

we will refer to them as pronouns or pronominal points. The meaning of a pronominal point is obtained from the area, or locus, in signing space indicated by the pointing sign. It is one of the characteristic properties of the visual modality that areas in space can be associated with referents (Friedman, 1975; Lillo-Martin and Klima, 1990). There are a number of ways to associate a referent with a locus. For example a signer can move the articulation of a nominal sign or fingerspelled word into a particular space, or point to the space before or after articulating the nominal sign in neutral position (for an overview, see Winston, 1991). Once a spatial locus has been established, it remains associated with the referent anchored there until the signer changes the spatial setup, or the discourse ends.

2 Reference associated with verbs, role-shift and constructed action

Predicates have received a lot of attention in sign languages, because they constitute a rich and complex system. We will start by discussing the ASL agreement system. We limit ourselves to a very general discussion of the topic, but note that many aspects of sign language verb agreement and verb classes are still being researched and debated (for an overview of some of the issues at stake, see Rathmann and Mathur, 2012), and the boundaries of different verb classes are likely not as clear as we draw them up in this overview.

Most sign languages studied to date include different kinds of verbs, including verbs that can be modified in space to indicate person agreement, and verbs that do not agree at all. For ASL, these two types have been called agreement verbs and plain verbs, respectively (Padden, 1988; but, for a slightly different characterization of verbs, see Quer, 2011). Plain verbs generally agree with neither subject nor object (Figure 1); however, as Padden (1990) points out, some plain verbs can be displaced in sign space, which is articulatorily similar to the agreement process. Unlike the general case for plain verbs, the articulation of agreement verbs can be modified to begin and end at spatial loci (Figure 2). These loci are the same as discussed in the section above. This process has been analysed by some researchers as subject and object agreement (Padden, 1988), although this analysis is not uncontroversial (for an alternative analysis, see Liddell, 2000; for discussion, see also Quadros and Quer, 2008). It should also be noted that even verbs that are classified as agreeing do not always agree, either with subject or at all (de Beuzeville et al., 2009; Fenlon et al., in press).

ASL allows null arguments (Klima and Bellugi, 1979; Lillo-Martin, 1986), and consequently overt arguments can be omitted as in (1).

Because of the different verb types in ASL, it has been argued that there are different kinds of null arguments in the language (Lillo-Martin, 1986; however, see critiques by Bahan et al., 2000; Koulidobrova, 2016a). When a plain verb is used without overt arguments, signers use context to recover the verb arguments. In the case of an agreement verb, the addressee can recover the intended arguments with the help of the verb's spatial modification. However, as has been argued both for ASL and other sign languages, agreement verbs are not always used with spatial modification (de Beuzeville et al., 2009; Engberg-Pedersen, 1993; Janzen, 2004; Lam, 2003, cited in Tang et al., 2008). The signer may choose to use his or her own locus as either starting or ending point of the verb. This can happen in the context of role-shifting or of mentally rotated space (in the sense of Janzen, 2004).

Role-shifting is when the signer, by subtle shifts in body posture (that is by turning the head, shoulders and/or torso), indicates a previously established locus. Role-shifting has sometimes been used to label the phenomenon that we will refer to as constructed action. In this article, we consider role-shift an optional marker on constructed action and/or agreeing verbs (for a brief overview of the history of these phenomena, see Lillo-Martin, 2012). An example of role-shifting with an agreement verb is given in Figure 3, where the verb GIVE begins at a locus at the signer's right shoulder and travels diagonally towards a point in front of the signer's torso. At the same time, the signer leans towards the right at the beginning of the sign, and towards his left at the end. This use of the body and the sign trajectory signals that the verb is not used with a first-to-second person meaning, but rather with a third-to-third person meaning (Friedman, 1975).

Mentally rotated space as discussed by Janzen refers to a situation where the signer maps a third person referent onto the body and portrays the verb from that referent's point of view, without any spatial indication of which referent they are acting as (Janzen, 2004: 149).¹ Role-shifting and mentally rotating the space can also be done with constructed action. Very generally, constructed action is when the signer maps a referent from the narrative onto him or herself and signs or performs the dialogue or the action attributed to that referent (Bellugi and Fischer, 1972; Lillo-Martin, 1995; Metzger, 1995). This is often marked by changes in facial expression and eyegaze (Engberg-Pedersen, 1993; Herrmann and Steinbach, 2012; Loew, 1984; Meurant, 2008; Padden, 1986). Constructed action is extremely prominent in signed languages (Cormier et al., 2013; Dudis, 2004; Ferrara and Johnston, 2014; Mandel, 1977; Quinto-Pozos, 2007). Studies have pointed out various areas in different sign languages where constructed action seems to have many of the same properties as verbs. Ferrara and Johnston (2014) show that constructed action can function as the core element of a clause, and others have noted for ASL and BSL (British Sign Language) that if a referent has been introduced into the discourse at an earlier point, the signer needs not overtly label constructed action as being associated with that referent (Cormier et al., 2013; Emmorey, 2002; McKee et al., 2011; Morgan, 2005; Wulf et al., 2002). Instead, as is also the case for agreement verbs, constructed action can be signaled by a role-shift indicating that it is the referent associated with that particular locus whose actions or speech are now being described by the signer (Winston, 1991), or by mentally rotating the conceptualized space (Janzen, 2004).

3 Referring with classifiers and classifier predicates

Other means of creating reference that have received attention in sign language research are classifiers and classifier predicates. Classifiers are the handshapes used in verbs of motion and location, as well as handling (Frishberg, 1975). In the present article, we do not consider handling classifiers or some instances of SASSes as constituting constructed action, as some research has done (Cormier et al., 2012, 2013, 2015; Dudis, 2004). Sometimes size and shape specifiers are categorized as classifiers as well, which makes for a distinction between three types of classifiers: Semantic classifiers (sometimes called entity classifiers), handling

¹Note that this use of 'mental rotation' is slightly different from the standard use of the term, which describes the imagined rotation of an object (for a discussion of this phenomenon in Deaf signers, see Emmorey et al., 1993). In Janzen's use, it is the scene as a whole that is rotated, rather than an object or a shape.

classifiers, and size and shape specifiers. Semantic classifiers constitute a relatively restricted type, with somewhat opaque iconic properties, as the handshape used for a given referent is predetermined (Supalla, 1982). For example, ASL canonically represents a human with an upright extended index finger, but this could not be used as the form for an animal. An example of a semantic classifier used in a verb of motion to represent a human walking is given in Figure 4. Morgan (1998: 159) suggests that semantic classifiers are more referentially explicit than pronominal points, because of their clear link to the entity they represent.

Handling classifiers show how an agent handles an object, and are used primarily to designate the object referent in agreement and locative verbs. Finally, size and shape specifiers (SASSes) show the extent or outline of an entity. They come in two types: static SASSes, which depict the shape of a referent by molding the hands, and tracing SASSes which depict properties of a referent by the movement of the hands (Supalla, 1982).

We show examples of L2 signers producing a static SASS (Figure 5) and a tracing SASS (Figure 6). In this article, we group both types of SASSes together, but other researchers have used different categorizations (see Zwitserlood, 2012 for a discussion of different approaches to classifiers).

4 How signers employ referential forms to create coherence

Despite the relative wealth of knowledge we have regarding the linguistics of referential expressions in ASL and other sign languages, only a handful of studies have investigated how these referential expressions are used in the context of a narrative, that is, which expressions signers choose for referring to the same referent at different points in their narrative. Comparisons of signed and spoken reference tracking patterns are complicated by the fact that signed referential forms are more varied than those often described for spoken languages (Morgan, 1998: 194). However, it has been tentatively suggested that while signed referring expressions differ from spoken ones, they appear to serve similar functions (Swabey, 2002, 2011). Findings from the modest number of studies of reference tracking in different sign languages (for British Sign Language, BSL, see Morgan, 1998, 2005; for ASL, see Swabey, 2002, 2011; Wulf et al, 2002; for Australian and New Zealand Sign Languages, Auslan and NZSL, see McKee et al, 2011; for German Sign Language, DGS, see Perniss and Özyürek, 2015) let us outline some (albeit oversimplified) patterns in sign language reference tracking with the caveat that the sign languages discussed here are all established, national sign languages in the western world (as opposed to for example village sign languages) and thus do not necessarily represent the full spectrum of possibilities that exists in the world of sign languages. Signers predominantly use nouns to refer to discourse new referents, and they are likely to use null subject reference when the referent is easily accessible. To maintain reference, signers use zero anaphora and classifiers. Note also that although it has been assumed that in languages that have null marking as an option, this should be preferred over overt marking like pronouns wherever possible (Ariel, 1988, 1990), empirical data from ASL has shown that overt pronouns are sometimes used in these contexts nonetheless (Wulf et al., 2002). Reintroductions are achieved with nouns, zero anaphora, and (only attested in BSL) classifiers.

In our previous study of reference tracking in simple ASL narratives (Frederiksen and Mayberry, 2016), a number of the patterns attested in earlier studies were replicated. For example, we found that native Deaf adult ASL signers rely on nouns to introduce referents (although they also use a small proportion of SASSes for this function). Maintained reference was generally accomplished with zero anaphora, although classifiers were also used for referent maintenance more than for any other function. Our findings further showed that native ASL signers used relatively few reintroductions in their stories. When they occurred, they were accomplished by zero anaphora and to a lesser extent, bare nouns (although compare this result with Morgan, 1998, who found the BSL signers in his study to use nouns primarily and verbal elements secondarily for reintroductions). The ASL native signers never used classifiers to reintroduce referents. A somewhat unexpected result was that signers used very few pronouns as a means of referring. Contrary to the pattern we found for ASL, other sign languages appear to make more extensive use of pronouns for reference tracking (Morgan, 1998; Perniss and Özyürek, 2015).

The last group of studies to consider here is comprised of those looking at bimodal bilingual acquisition of reference tracking. Morgan (2002) analyzed picture retellings by two children (aged 7;1, i.e. 7 years and 1 month, and 9;10) who were acquiring BSL and English from birth. He found that the youngest child repeatedly produced lexical NPs where a pronoun or a null reference would have sufficed. Additionally, both children produced strings of lexical items where Deaf signers generally choose depicting verbs. A study by Reynolds (2016) showed what happens in the ASL of bilingual hearing children compared to the ASL of monolingual Deaf children. Reynolds studied longitudinal development of narrative coherence by six hearing children learning ASL and English, between ages 5;2 and 8;2. Her findings show a preference for overt reference in ASL, similar to Morgan (2002). She found that although bilingual and monolingual children both preferred null forms in maintained contexts in ASL, they did so to different degrees, namely 45.1% for the bilingual children and 63.3% for the Deaf children, at the first time of testing. Around one year later, the bilingual children had increased their preference for nominal forms, resulting in equal use of nominal and null forms. Moreover, they also produced more pronominal forms (more than 20%) than Deaf children (5.4%), suggesting an influence from spoken English on their ASL. On the other hand, a study by Koulidobrova (2016b) found a different result. The study examined the English and ASL of two hearing bilinguals, aged 1;11–4;11 and 3;03–5;04. Data on argument omission for monolingual ASL signing peers do not yet exist, so we are left with a comparison with the norm provided by adult native signers. Although the bilinguals' rate of subject omissions was somewhat lower than that of native signers, the overall results of this study did not provide evidence of young bimodal bilinguals over-supplying arguments in ASL, nor did it find qualitative differences in how the children used null arguments compared to the adult norm. While it is possible that age plays a role in the difference between these two sets of results, as well as increasing English proficiency, it is also likely that the different contexts of language use, that is spontaneous speech vs. creation of a narrative, may have influenced the different patterns. We discuss how these findings inform our hypotheses below.

III Learning to track reference

1 Reference patterns in spoken L2 acquisition

Spoken language research shows that it is a challenge for second language learners to acquire the skill of tracking referents in the target language in a native-like manner. Many studies have asked wherein the specific difficulties lie. The proposed explanations include source language transfer and/or markedness (Jin, 1994; Muñoz, 1995; Polio, 1995), communicative pressures (Williams, 1988; Yanagimachi, 1997), the desire to be clear (Tomlin, 1990), vulnerability at the syntax–discourse interface (Sorace, 2011; Sorace and Filiaci, 2006; Sorace and Serratrice, 2009), and process-oriented learner strategies, specifically focusing on sentence level planning in an effort to reduce the cognitive load involved in carrying out global, discourse level planning (Carroll and Lambert, 2003; Gullberg, 2003, 2006). Early work tended to pursue one of three avenues (Yanagimachi, 1997). One set of studies argued that L2 reference was characterized by an overuse of null reference compared to the target language norm (Fuller and Gundel, 1987; Gundel and Tarone, 1983; Huebner, 1983; Williams, 1988). Another set of studies found that attenuated forms are difficult for learners to acquire, resulting in their overuse of lexical noun phrases instead of pronouns, and pronouns instead of null references (Jin, 1994; Kumpf, 1992; Polio, 1995; Tarone and Yule, 1987; Tomlin, 1990). Finally, a third set argued against the idea of learner references being only over or underspecific, and instead suggested that learners produce both ‘error’ types in different contexts, and even sometimes produce unique referential patterns (Klein, 1986; Klein and Perdue, 1992; Schmidt, 1980; Yanagimachi, 1996). More recent findings, however, seem to primarily support the so-called ‘over-explicitness’ strategy (Tarone and Yule, 1987). This is the idea that second language learners tend to use overly explicit forms of reference when narrating compared to the native norm. Particularly compelling is the fact that overspecificity is found in the L2 varieties of many languages including Mandarin (Polio, 1995), Swedish (Gullberg, 2003), French (Gullberg, 2003, 2006), Korean (Jung, 2004), English (Muñoz, 1995; Williams, 1988), Spanish (Saunders, 1999), Italian (Chini, 2005; Sorace and Filiaci, 2006), and Japanese (Blais et al., 2010; Yoshioka, 2008). This is due to the finding that being overly explicit does not only happen for speakers of non pro-drop languages learning a pro-drop language. If this were the case, the tendency could be accounted for by transfer effects, that is incorporation of grammatical elements from one language to the other (Paradis and Genesee, 1996), alone (i.e. transferring the use of pronouns from a subject prominent language to a topic or discourse oriented language in contexts where native language users tend to use null arguments). Instead, because the pattern is observed in the reverse direction as well (see Bini, 1993, discussed in Sorace, 2005; see also Sorace et al., 2009), the data suggest that the observed pattern is not due to transfer in specific L1–L2 constellations; rather, this pattern appears to arise as consequence of bilingualism in general (Hendriks, 2003).

It is not entirely clear which stage(s) of learner language are expected to exhibit over-explicit referent tracking. For example, Ahrenholz (2005) and Hendriks (2003) suggest that over-explicitness only appears at the intermediate stage of second language acquisition, and Kim (2012) finds that the L2 acquisition of zero anaphora follows a u-shaped learning curve. However, studies like Jin (1994) and Polio (1995) find that increasing proficiency

corresponds to an increase in the appropriate use of attenuated reference forms. Furthermore, although the general property of being overly explicit seems to hold cross-linguistically, there is variation in how over-explicitness surfaces, ranging from use of nouns phrases with non target-like additional description (Ryan, 2012, 2015), to overuse of lexical noun phrases compared to pronouns (Gullberg, 2003, 2006; Jung, 2004; Polio, 1995), to over-reliance on pronouns compared to null elements (Muñoz, 1995; Sorace and Filiaci, 2006), and to overuse of both nouns and pronouns compared to native speakers (Saunders, 1999; Yoshioka, 2008). At least some of this variation depends upon whether or not the learners have received formal instruction or have learned naturalistically – the former are more likely to be over-explicit (for a discussion, see Yanagimachi, 1997).

2 Signed L2, spoken L1 as a specific case of different-modality L2 acquisition

If the pattern of L2 reference tracking is truly cross-linguistic, we expect to find it even if the L1 is in the spoken and the L2 in the signed modality. The studies by Morgan (2002) and Reynolds (2016), although examining simultaneous bilingual acquisition in children, rather than late L2 learning, suggest that the phenomenon can indeed cross modalities. However, it is possible that adult cross-modal L2 learning involves factors that do not play a role in same-modality L2 acquisition. Research into the topic of cross-modal second language acquisition, referred to by Chen Pichler and Koulidobrova (2016) as second-modality–second-language (M2–L2) acquisition, is still in the beginning stages. Given the existence of phenomena that play little role in spoken languages, but are theorized by some to be essential parts of signed languages such as space and iconicity (Marschark et al., 2016), it seems plausible that different-modality L2 learning might face other challenges than same-modality L2 learning. In addition, the case of a spoken L1 and a signed L2 also requires considering possible influences from co-speech gesture. Some aspects of non-signers' gestural knowledge can be recruited for the processing of sign, for example utterance boundaries (Fenlon et al., 2008). Studies have suggested that parts of gesture competence can be transferred from the (spoken) L1 to the signed L2 (Chen Pichler, 2011; Taub et al., 2008), even in cases where transfer from the L1 gesture repertoire results in a less target-like production (Ortega, 2013; Ortega and Özyürek, 2013). This is relevant for the present study because we are investigating the phenomenon of reference tracking that makes use of devices like pointing both in spoken languages, where co-speech gestures accompany speech, as well as in sign languages. Because pointing is familiar from gesture, we might expect parallels to the situation for iconic signs described above, that is, we might expect to see transfer from gesture to sign.

There are reasons to expect that different-modality L2 acquisition should function just like same-modality L2 acquisition, but there are also reasons to think that it might be different. Supporting the idea that different-modality L2 acquisition is like any other L2 acquisition is the fact that, as sign languages are natural languages just like spoken languages, we expect that patterns identified in L2 learning of universal nature should also hold when the L2 is in a different modality from the L1. However, the arguments in favor of the alternative have to do with potential modality effects. Evidence suggests that, although all bilinguals experience an increased cognitive load due to the constant need to suppress one of their languages, the load may be smaller for bimodal bilinguals (in this case hearing native signers), who have

the option to code-blend rather than code-switch (Emmorey et al., 2008), because their two languages are produced in different channels. Although the option to code-blend does not necessarily mean that linguistically wellformed discourse can be produced simultaneously in two languages (because word order, morphology, etc. tends to suffer in one of the languages (Emmorey et al., 2005), it is possible that the reduced suppression effort in a different-modality L2 situation frees up more cognitive resources (Emmorey et al., 2012; Petroj et al., 2014; but see also Emmorey et al., 2008, 2016), and that this might positively affect the production of referent tracking. If previous proposals that overspecification tendencies in L2 discourse are the result of an attempt to reduce the global planning load (Carroll and Lambert, 2003) are correct, we might expect different-modality L2 learners to do better at reference tracking than same-modality L2 learners.

3 What should we expect reference tracking in a second-modality L2 to look like?

As we have seen above, the two previous studies of ASL–English bimodal bilinguals (Koulidobrova, 2016b; Reynolds, 2016) showed different results with respect to oversuppliance of overt arguments in ASL. Assuming that the communicative task plays a role in the observed patterns, we note that the story-telling task performed by the participants in the present study is more comparable to the task used by Reynolds than the spontaneous speech examined by Koulidobrova. This might suggest that our data should look similar to those of Reynolds, with the L2 learners exhibiting an overuse of pronouns and an underuse of zero anaphora compared to native signers. It is difficult, however, to extrapolate from child native learners to adult L2 learners before we have detailed investigations of the latter group. Predicting how the L2 signers will pattern is also complicated by the fact that, as explained above, over-explicitness can take different forms. It is possible that this variation could result from the properties of the different source-target language pairs. For example there is some evidence from Japanese that if the native pattern makes limited use of pronouns, L2 learners also tend to avoid them in their productions, even if pronouns are the dominant means of making continued reference in their first language (Nakahama, 2009). Instead, learners might overuse noun phrases and underuse zero anaphora (Yanagimachi, 1997). In the case of an adult with spoken L1–signed L2, however, we also need to consider that not only can speech be transferred, gesture can as well. As discussed above, gestural repertoires may play a role when hearing individuals acquire a signed second language in adulthood. The similarities between the pointing gestures used by hearing people and the pronominal points used by signers (Meier and Lillo-Martin, 2013) might make the possibility of transferring pronouns from the L1 an attractive strategy for creating referential coherence.

In the first study to investigate cross-modal adult L2 reference tracking to date, Bel et al. (2015) looked at reference control in proficient L2 signers of Catalan Sign Language, whose first languages were Catalan and Spanish. They found some evidence of referential over-specificity in the L2 signers' overall use of pronouns: compared to the native signers, the L2 signers used a greater proportion of pronominal reference and a lower proportion of null reference. However, when analysing how the two groups associated the reference forms with each discourse status, no statistically significant difference was found between native and L2 signers. Further, the participants studied by Bel et al. were proficient (interpreter students in

their final year of training), rather than novices. Given the various results of studies examining the effect of proficiency on reference forms, it is clear that we need to replicate the findings of Bel et al. for less proficient learner groups. Finally, the study by Bel et al. did not investigate the forms of zero anaphora from different verb types, and constructed action phenomena were wholly excluded from the study.

In the present study, we investigate the patterns of reference tracking in novice learners of American Sign Language, as compared with a native signer baseline. Our expectation is that patterns of reference tracking observed cross-linguistically in the learner language hold true for the English L1 –ASL L2 learning situation as well. Based on considerations of language typology and possible gestural transfer, we expect that L2 learners will be over-explicit, i.e. they will use more nouns than native signers when maintaining reference to already introduced discourse entities, and more pronouns when zero anaphora would be appropriate. In addition, we speculate that the L2 learners will be challenged by ASL classifiers, because these are language specific referential expressions, the referential value of which may be difficult for the learners to discern. Finally, also due to modality specificity, we expect to see differences in the way L2 ASL signers use verbal morphology, constructed action and spatial modification for referent tracking purposes, as compared to the native signers.

IV Methods

1 Participants

Nine hearing second language learners of American Sign Language participated in the experiment. The L2 learners were recruited from among undergraduate students at the University of California, San Diego and ranged in age from 19–22 years. Although there was variation in their language experiences, all participants learned English in childhood and reported that English was their dominant language. At the time of testing, the participants were novice to low-intermediate signers, based on hours of instruction. They had taken between 2.5–4.5 academic quarters of college-level ASL instruction, which corresponds to 150–270 hours of instruction (excluding time spent on homework assignments). In terms of hours of instruction, this puts the participants between an A2–B1 proficiency levels on the scale used by the Common European Framework of Reference for Languages. There was some variation in proficiency among the learners, given that some had taken up to two quarters more of ASL than others, and they varied in the amount of ASL they used outside of the classroom. Data from one participant had to be discarded due to technical difficulties, making eight the total number of L2 participants whose data were analysed. Table 1 summarizes the L2 participants' background and language proficiency.

The results for the L2 learners are compared with those of a native signer control group, which serves as a baseline for ASL referent tracking. These data have been reported in detail elsewhere (Frederiksen and Mayberry, 2016). In the present study we discuss these data only as a means of comparison where it is relevant to interpreting the learners' results. To summarize the native signers' background: (1) they ranged in age from 20–55 years; (2) they began learning ASL from birth from parents and/or older deaf siblings; (3) they experienced variation in the amount of ASL input they received from birth, due to the fact that some had hearing parents; (4) they varied in their use and knowledge of English.

2 Stimuli

The eight L2 signers performed the same task as the native signers in our previous reference tracking study (Frederiksen and Mayberry, 2016). The task was to retell four simple wordless stimulus stories. Each story consisted of six causally related events involving a protagonist walking somewhere, encountering a secondary character, obtaining a featured object (balloon, popsicle, etc.) from the secondary character, walking away with the object, losing or damaging the object, and then reacting to what happened. We deliberately designed our stimulus materials to be simple because the goal was to investigate the basic question about how characters and objects are referred to throughout narratives in ASL. Our stories allowed participants to create narratives that introduced, maintained and reintroduced entities, while ensuring similar patterns across stories. This enabled us to examine basic narrative structure in L2 ASL and to compare it with the basic patterns used by native ASL signers.

3 Procedure

Participants were given instructions in English and ASL. Before the experiment, each participant either conversed with a native signer, and/or watched a video of the instructions for the experiment in ASL. This was done to ensure that the L2 signers were comfortable signing, and ready to use ASL. After instructions and consent, the participants first watched a stimulus story and then narrated its content while being video recorded. The stories were told to a native signer, (2 participants) or to the camera with the instruction that the recording would be shown to a signer who would then be asked to pick out the correct story based on their description (6 participants).² When participants indicated that their narrative was complete, they were shown the next stimulus story and the procedure was repeated. We presented the stimuli on a laptop screen, and the presentation was varied across participants using a Latin squares design.

4 Transcription, coding and annotation

We transcribed participants' narratives in ELAN (Crasborn and Sloetjes, 2008), following standard sign glossing conventions (Baker-Shenk and Cokely, 1980) with minor modifications (see Frederiksen and Mayberry, 2016). All narratives were divided into clauses and sentences using Berman and Slobin's (1994) principle of using the presence of predicates to determine clause boundaries. Clauses were then grouped into sentences. Generally, clause boundaries corresponded to sentence boundaries, except in cases of overlapping signs or constructed action sequences across multiple predicates, without prosodic markers, pauses or lengthened signs to indicate a boundary.

After transcription and annotation of clause and sentence boundaries, we determined the referent for each referring expression in the narratives, and used this information to code the reference status for overt and covert references. Following Gullberg (2006), we coded every first mention of a referent as 'introduced', and sentence subjects as 'maintained' if they had been mentioned in any position in the previous clause. Referents were coded as

²-An analysis of native signers' narratives revealed no differences that could be attributed to varying the addressee (Frederiksen and Mayberry, 2016). For this reason, we collapsed all L2 narratives in the present study.

‘reintroduced’ if they appeared as subject in a clause, following a clause where the referent in question had not been mentioned, in any position. Thus, while expressions introducing referents could have any grammatical role, only subjects were included for maintained and reintroduced referents. The final step in the coding procedure was to identify the linguistic form of the referring expression. Table 2 shows the reference types that occurred in the data. The table also shows how we grouped these types as nominal, pronominal, zero anaphor and classifiers. Figure 7 shows an excerpt from an L2 signer’s narrative.³

V Results

Our coding procedure of including only first mentions and subsequent mentions functioning as subjects yielded a total of 504 references produced by the eight L2 signers. These were distributed across the statuses as follows: 125 referring expressions introduced entities, 307 referring expressions maintained reference, and 72 referring expressions reintroduced entities. By comparison, the eight native signers produced 449 references retelling the same narratives (Introduced: 109 references, maintained: 310 references, reintroduced: 30 references). Looking at the mean proportions by group (Table 3), the native and L2 signers use the same amount of introduced reference (both 0.25), but the native signers use a greater proportion of maintained reference (0.69) than the L2 signers (0.62) and the L2 signers use a greater proportion of reintroduced reference (0.14) than the native signers (0.06). This suggests that the distribution of referential expressions across statuses varies as a function of ASL proficiency. We confirmed this by fitting two Poisson generalized linear mixed models on the count data and comparing them. One model included group as a variable and the other model did not. A likelihood ratio test revealed that significantly more variation was accounted for by the model that included group as a fixed effect ($\chi^2(3) = 16.761, p < 0.001$).

To discover whether L2 signers overuse nominal and pronominal forms and underuse zero anaphora compared with the native signers, we first asked whether the native and L2 signers use similar proportions of the four reference categories when collapsing across discourse statuses. Comparison of the mean proportions in Table 4 reveals a greater proportion of nouns and pronouns for the L2 signers (0.43 and 0.03) compared with the native signers (0.39 and 0.00), but a smaller proportion of zero anaphora for L2 signers (0.43) than for native signers (0.47). However, a likelihood ratio test examining the variation accounted for when including/excluding group as a variable in the model found no evidence of an overall difference in how the groups use ASL referring expressions ($\chi^2(4) = 2.628, p = 0.622$).

We next asked whether the groups use the four reference categories the same across discourse statuses (Table 5). Comparing the numbers from the native signers with the L2 signers’ shows that the L2 signers used proportionally more nouns in maintained and reintroduced statuses, as well as more pronouns and less zero anaphora in reintroduced contexts compared with the native signers. We performed a three-way analysis of variance (Discourse Status by Reference Category by Group) with subject as a random variable, using arcsine transformed proportions. This analysis revealed no main effects for reference

³Because the focus of the present study is on sequential reference throughout narratives, we have not considered the different possibilities that exist in ASL of simultaneous production of more than one referring expression. Thus, if a lexical (plain or agreeing) or classifier predicate that was not considered quotational co-occurred with constructed action, we counted only the predicate.

category and group, $F(3,42) = 0.78$, $p = 0.512$, but showed a three-way interaction between discourse status, reference category and group, $F(6, 84) = 2.62$, $p < 0.05$. Planned comparisons revealed that this interaction was driven by the difference in the two groups' use of classifiers in reintroduction contexts. Given the similarity between handle classifiers and handshapes from co-speech gesture one might hypothesize that this difference could be caused by overuse of handle classifiers by the L2 learners.⁵ An examination of the data, however, revealed that the L2 learners produced no handle classifiers referring to subject referents in either introduced, maintained or reintroduced contexts. No other comparisons were significant, indicating that the L2 learners do not reliably overuse nouns and pronouns, nor underuse zero anaphora compared to the native signers in retelling these stories.

Recall our prediction that the L2 signers would differ from native signers according to the pattern observed for learners' spoken language reference tracking, specifically in their use of nouns and zero marking. These predictions were not borne out. The learners used a higher mean proportion of nouns in maintained and reintroduced contexts, a higher mean proportion of pronouns in reintroduced contexts, and a smaller proportion of zero anaphora in reintroduced contexts than did native signers, but these differences were not statistically significant.

We next examined the use of zero anaphora to ascertain whether the L2 signers vary their use depending on type, and whether they have mastered the different spatial frameworks, that is whether their use of verbal expressions with spatial marking vs. mentally rotated space is similar to or different from that of the native signers. For these analyses, we focused on maintained and reintroduced contexts, as these are where zero anaphora play a dominant role. We performed analyses of variance on the data, and found no significant difference between the L2 and the native signers, except where noted below. As before, the lack of significant effects could be due to the variance and limited size of the data set. We report the numerical differences to supplement the insights from the statistical analyses, but the results should be interpreted with caution.

The L2 signers produced a total of 277 zero anaphora in these contexts, compared to 239 in the native signer group. The L2 signers' mean proportion of zero anaphora from agreement verbs was slightly higher than the native signers' (0.29 vs. 0.25), while their mean proportion of zero anaphora from plain verbs (0.45) was lower than the native signers' (0.51). The mean proportions of zero anaphora from constructed action were similar for the L2 signers (0.26) and the native signers (0.24) (Table 6). There were no statistically significant differences in the distribution between the groups.

This distribution suggests that the L2 learners are capable of using the variety of verbs in ASL in a manner similar to native signers. However, if we look at the mean proportions within maintained and reintroduced discourses statuses (Table 7), we find that these proportions do not reflect an even pattern in the two discourse contexts. In maintained contexts, L2 signers used a total of 238 zero anaphora, compared with the native signers'

⁵.We thank an anonymous *Second Language Research* reviewer for pointing this out.

219 examples. In reintroduced contexts, L2 signers used a total of 39 instances, and the native signers used 20 instances. Proportionally, the L2 signers use more zero anaphora from agreement verbs and construction action in maintained contexts, and less from plain verbs, compared to native signers. For reintroduced contexts however, the pattern is reversed with L2 signers using a higher number of zero anaphora from plain verbs, and native signers using more from agreement verbs and constructed action. These differences between groups, however, were not statistically significant.

Keeping this fact in mind, we nonetheless want to point out what the numerical distribution could indicate, in so far as plain verbs have the least potential in providing information about the referents involved in the action, namely that the L2 signers might not yet be native-like in their use of the forms with respect to referential accessibility, although they have acquired the use of zero anaphora with all predicate types. There may not have been sufficient power in the study design to substantiate these possible trends.

Looking only at the zero anaphora from verbal elements that can be spatially modified (agreement verbs and constructed action), we next compared how L2 and native signers use the rotated and the spatial framework. Collapsing over instances of discourse statuses and zero anaphora sources, the L2 signers had numerically more use of the rotated framework (84 instances) than the spatial framework (67 instances), whereas the native signers numerically used the spatial framework more often (71 instances) than the rotated framework (46 instances). The differences were not statistically significant. In maintained contexts, the L2 signers use similar numbers of rotated (29 instances) and spatial (33 instances) agreement verbs, whereas the native signers use numerically more spatial agreement verbs (47 instances) than mentally rotated agreement verbs (3 instances). Both groups use numerically more instances of rotated (L2: 46; native: 36) than spatial constructed action (L2: 21; native: 14) in maintained contexts. In reintroduced contexts, both groups use agreement verbs more frequently in the spatial (L2: 9; native: 7) than in the rotated framework (L2: 2; native: 1), while constructed action is used more often in the rotated (L2: 7; native: 6) than the spatial framework (L2: 4; native: 3). An analysis of variance showed that the interaction between group, spatial framework and discourse context was significant, $F(2, 28) = 5.54$, $p < 0.01$. Thus, the groups use spatial frameworks differently when we take discourse context into account. This difference is driven by the distribution of agreement verbs in maintained contexts. The fact that the L2 signers used the rotated framework more for maintained but not reintroduced agreement verbs might be an indication that they are attempting to use less marking material when referents are the most accessible. This, however, is not the pattern followed by the native signers, whose choice of spatial framework seems to be driven primarily by predicate type, rather than by discourse context.

VI Discussion

In this study, we set out to examine reference tracking in a different-modality L2 situation, in which L2 learners face the challenges of switching modalities on top of the ‘usual’ challenges that comes with learning to use a second language. We hypothesized that the learners in our study would follow the pattern of over-explicitness found in studies of same-

modality L2 reference tracking, and that this would result in an overuse of nominal reference in maintained and reintroduced contexts, compared to the native signer baseline. As for modality specific challenges we expected, first, that the learners would struggle with unfamiliar referring expressions such as classifiers, and, second, that they would transfer pointing behaviors from their L1 gestural repertoire. We hypothesized that the familiarity of pointing gestures combined with their similarity to pronominal points would lead learners to produce this referring expression more frequently than the native signers, leading the L2 signers to produce pointing over and above the amount we might expect as a result of overexplicitness.

Our findings provided only limited evidence for the expected pattern of over-explicit reference. Although the L2 signers used proportionally more nouns in maintained and reintroduced contexts compared to the native signers, the difference did not reach statistical significance, which could be due to the small number of participants and simple narrative structure. A similar finding applied to the use of zero anaphora compared to other reference types where the learners' use of zero anaphora in reintroduction contexts was proportionally smaller than the native signers', but not significantly so. We found varied results with respect to the learners' use of different zero anaphora types and their distribution within the spatial/rotated frameworks. While the native signers appear to vary zero anaphor types and not spatial frameworks as a function of referent accessibility, the L2 learners' results showed the reverse pattern. Their choice of spatial frameworks appeared to reflect considerations of referent accessibility, whereas the native signers' choice reflects predicate type.

The relative overall similarity between the native signers and the L2 learners might be an indication that the different-modality L2 learners have more cognitive resources available than same-modality L2 learners (Emmorey et al., 2012) and are able to allocate them to target-like referent tracking. The findings from Morgan (2002), Reynolds (2016), and particularly from Bel et al. (2015) of some over-explicitness, however, cast doubt on this explanation and makes it more likely that our findings reflect the proficiency level of our participants. Previous L2 research has found that over-explicitness does not occur until the intermediate stage of acquisition (Ahrenholz, 2005; Hickmann, 2003). In that case, we should expect the L2 learners in this study to become more explicit in their use of reference as they properly attain the intermediate level of proficiency. Another possibility is that the nature and brevity of the stimulus materials affected the results in the current study. Our narratives short and simple by design, as our aim was to unpack the very basics of narrative reference tracking. However, shorter stories with just one main protagonist also do not require extensive shifting between referents, and it is possible that we would see more over-explicitness with more complex stimuli.

As for the challenges specific to different-modality L2 learning, the results were mixed. We found no evidence of overuse of pronominal points in the learners' narratives. Similar to the baseline of the native signers, the L2 productions contained very few pronouns. Thus, there was no indication that the familiarity of pointing led the novice signers to adopt this referential form more readily than other devices. We did find, however, that the learners' use of classifiers followed a pattern that was different from that of the native signers. The native signers used classifiers to introduce and maintain referents, but never to reintroduce a

referent. By contrast, the L2 signers used similar proportions of classifiers in maintained and reintroduced contexts. This shows that the L2 learners are perfectly capable of acquiring this unfamiliar referring expression, but it also suggests that they still struggle with how to use it for reference tracking in a target-like manner at this novice stage of L2 learning.

Uncertainty about discourse structure is also echoed in the learners' distribution of references across discourse statuses. The L2 signers used a larger proportion of reintroduced reference, and a smaller proportion of maintained reference, compared to the native signers. This indicates that the learners were more likely than the native signers to shift perspective between entities in the stories. In his study of L2 Japanese speakers, Yanagimachi (1997) suggested that one reason why learners who looked almost targetlike in their reference tracking in 1st and 2nd person narratives looked rather un-targetlike in their 3rd person narratives, is that they tended not to keep one referent as the main discourse theme, but instead they switched between the four possible referents. In the present study, we purposefully designed our stimulus stories to be simple. Thus, it was possible to tell a coherent story without mentioning the secondary character, and some signers, both native and learners, chose to do so. Although our materials make the kind of switches observed by Yanagimachi less likely, we nonetheless observe a similar tendency in the present study in the learners' more frequent reintroductions. Native signers are skilled in exploiting the affordances of the visual modality in their reference tracking. As suggested by Swabey (2002), ASL signers appear to keep their referents activated in the discourse more extensively than speakers of spoken languages when narrating. Our finding that native signers maintain a lot and reintroduce very little appears in line with this result. The different pattern displayed by the learners suggests that they cannot yet fully utilize the properties of the visual modality for target-like narrative discourse. On the one hand, the learners face a problem, which is common to all L2 acquisition, namely learning how to employ native-like discourse structure. On the other hand, the possibility of keeping referents activated is particularly prominent in the visual modality, and could consequently be an area in which different-modality L2 learning differs from same-modality L2 learning.

Comparing results of the present study with those of the one other study of reference tracking in different-modality L2 learners (Bel et al., 2015), indicates that factors common to same-modality L2 research on reference tracking, such as learner proficiency, play a similar role in cross modality L2 learning. The proficient second language signers in Bel et al.'s study used more pronominal pointing signs overall than did the native signers, and they used proportionally less null references in maintained contexts. It is possible that the difference in proficiency between the L2 signers in the Bel et al. study and the present one might account for these diverging patterns. Although pronominal points in ASL can serve functions in discourse similar to the functions of pronouns in spoken English or spoken Catalan, the process by which pronominal points get their meaning differs in signed and spoken languages. As discussed above, the reference of pronouns in sign languages depends on the locus they are directed towards. This locus in turn gets its meaning from being linked to a referent by way of a number of possible processes. It is possible that the novice learners were sufficiently unfamiliar with, or unsure of, the process of producing pronouns, preferring to avoid using this referring expression, despite the fact that it is formally similar to a pointing gesture. Substituting a null pronoun circumvents this possible difficulty, and

might be preferable in the relatively formal situation of being recorded signing a story. This might explain why the novice ASL learners in the present study used almost no pronouns, even though this was one of the preferred referring expressions of the proficient Spanish Sign Language (LSC) signers in Bel et al. However, it is also clear that there was a different pattern in the baselines provided by the native ASL and LSC signers, as the LSC signers' use of pronouns was relatively frequent and the ASL signers' use was negligible. Reynolds' (2016) study similarly found sparse use of pronouns in the ASL narratives by the Deaf native signing children. Crucially, however, the bilingual children in Reynolds' study used a large proportion of pronouns, which she attributes to influence from English. Thus, the lack of pronominal over-explicitness in the current study raises questions about the impact of different stimulus materials and methods across these studies, as well as learner proficiency.

Finally, while it seems clear that some transfer of ASL happens in novice ASL learners' spoken English narratives (Casey et al., 2012), the results of the present study suggest that transfer from gesture to sign in the domain of reference tracking is less likely, at least in the context of a simple narrative structure. Future studies of cross-modal reference tracking should expand the line of inquiry to include object references as well as subject references (see Swabey, 2002), and focus on simultaneous rather than sequential reference (Barberà and Quer, to appear), as these areas could reveal additional challenges for L2 learners.

VII Conclusions

This study examined reference tracking in L2 ASL by learners whose first and second languages do not share a sensory-motor modality. We asked whether novices' different-modality L2 reference tracking follows the assumed universal patterns of over-explicitness exhibited by L2 learners across source-target language pairs. In the present study, we found that L2 learners reintroduce more than native signers. We linked this to previous suggestions that native signers utilize the affordances of the visual modality to use simultaneous reference to multiple entities, and suggested that the novice L2 signers are not yet able to incorporate this possibility into their referent tracking. As for use of different referential forms, the learners' patterns showed an overall similarity to that of the native signers, even where research on spoken L2 reference tracking predicted that we should find differences, namely in the use of lexical nominals, pronouns and zero anaphora. Contrary to our expectations, the L2 learners showed limited evidence of overexplicitness in their use of these referential expressions. Instead, our data suggests that L2 learners have problems with the referential value of classifiers, and with target-like use of different zero anaphor types and spatial modification. Overall, the results of the present study indicate that over-explicitness does occur in the early stages of different-modality L2 acquisition, although not in the areas where it is expected from same-modality L2 research, and that gestural transfer does not appear to have an impact on this area of L2 acquisition. We conclude that although the different-modality L2 learners appear to struggle with some of the same issues as same-modality L2 learners, they face additional challenges in acquiring reference tracking in a new modality.

Acknowledgements

We thank Marla Hatrak for assistance, and the audience at the 2014 Boston University Conference on Language Development for feedback on parts of this work.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research reported in this article was supported in part by the National Institute of Health, USA, grant R01DC012797 to Rachel I. Mayberry. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Figure 1.
The plain ASL verb CRY.

Figure 2.

The agreement verb GIVE with spatial agreement at two spatial loci.

(1) 1-ASK-a

(I-) ask (-her/him) (Sandler and Lillo-Martin, 2006: 15)

Figure 3.
The agreement verb GIVE with role-shift.

Figure 4.
Semantic classifier used in a verb of motion.

Figure 5.
Static size-and-shape specifier (SASS): '(shape of) tray'.

Figure 6.
Tracing size-and-shape specifier (SASS): '(shape of) vase'.

Gloss:	[<u>GIRL</u> SMALL MAYBE SIX-YEARS-OLD SEVEN-YEARS-OLD]	
Reference type:	noun	
Referent status:	introduced

Gloss:	[Ø WALK + CA: HAPPY]	
Reference type:	zero anaphor (plain verb)	
Referent status:	maintained

Gloss:	[1-SEE-L	THIN <u>WOMAN</u>]
Reference type:	zero anaphor (spatial agreement verb)	noun
Referent status:	maintained	introduced
Gloss:	[Ø SELL	<u>BALLOON</u>]
Reference type:	zero anaphor (rotated agreement verb)	noun
Referent status:	maintained	introduced

Gloss:	[CA: Ø HOLD-CL:A(balloons)]	
Reference type:	zero anaphor (rotated constructed action)	
Referent status:	maintained

Gloss:	[<u>GIRL</u> 1(girl)-SEE-FU(woman) + CA: AWED]	
Reference type:	noun	
Referent status:	reintroduced	
<i>'There's a girl, maybe six or seven years old. She is walking happily. She sees a tall thin woman. She's selling balloons. She holds a bunch of balloons in her hand. The girl looks up at her, awed.</i>		

Figure 7.

Excerpt from an L2 signer's narrative.

Notes. This excerpt exemplifies the transcription and coding. Glosses in bold indicate an illustration. Underlined glosses indicate a referring expression. Letters and numbers before and after a verb indicate a locus, such that *I* is the speaker's own locus, and *FU* is a locus in front and up.

Table 1.

Participant background.

Participant	Age	Self-rating: production*	Years of use	Current use	Other languages
A	20	7	3	daily (5 days a week)	
B	22	4	1	daily (5 days a week)	Spanish: 0 years of age
C	22	8	2	daily (5 days a week)	Korean: 0 years of age
D	21	4	1	daily (5 days a week)	Spanish: 0 years of age
E	19	8	1–2	daily (5 days a week)	
F	20	5	1	daily (5 days a week)	
G	22	5	1	daily (5 days a week)	
H	21	5	2	once a month	German: 9–12 years of age

Note. * We used a 0–10 point self-rating scale asking ‘How well do you express yourself in ASL?’, where 0 was ‘not at all’ and 10 was ‘perfectly’.

Table 2.

Reference categories and reference types.

Reference category	Reference type
Nominal	Bare noun Fingerspelled noun Modified noun (point noun; noun point; noun CL; CL noun)
Pronominal	Pronoun
Zero anaphor	Constructed action/dialogue, CA (spatial marking; mentally rotated space) Plain verb Agreement verb ⁴ (spatial marking; mentally rotated space)
Classifier	SASS Semantic classifier Handle classifier

⁴.Our data yielded no examples of verbs agreeing with locations (spatial verbs; see Padden, 1988). This category therefore only comprises verbs that agree with person.

Table 3.

References as a function of discourse status and group.

Discourse status	Group	Sum	Mean proportion (SD)
Introduced	L2	125	0.25 (0.04)
	Native	109	0.25 (0.03)
Maintained	L2	307	0.62 (0.09)
	Native	310	0.69 (0.05)
Reintroduced	L2	72	0.14 (0.07)
	Native	30	0.06 (0.04)

Table 4.

References as a function of reference category and group.

Reference category	Group	Mean proportion (SD)
Classifier	L2	0.12 (0.13)
	Native	0.09 (0.12)
Noun	L2	0.43 (0.36)
	Native	0.39 (0.42)
Pronoun	L2	0.03 (0.10)
	Native	0.00 (0.01)
Zero anaphor	L2	0.43 (0.36)
	Native	0.47 (0.40)

Table 5.

Mean proportion (number in parentheses) of references as a function of discourse status, reference category and group.

	Noun	Pronoun	Zero anaphor	Classifier
<i>Introduced reference:</i>				
L2	0.88 (109)	0.00 (0)	0.00 (0)	0.13 (16)
Native	0.91 (101)	0.01 (0)	0.89 (1)	0.07 (7)
<i>Maintained reference:</i>				
L2	0.11 (34)	0.01 (2)	0.77 (238)	0.12 (33)
Native	0.07 (24)	0.01 (4)	0.71 (219)	0.20 (63)
<i>Reintroduced reference:</i>				
L2	0.31 (22)	0.07 (2)	0.51 (39)	0.11 (9)
Native	0.20 (10)	0.00 (0)	0.68 (20)	0.00 (0)

Table 6.

Mean proportion (number in parentheses) of zero anaphora from different sources.

Zero anaphor source	Group	Mean proportion
Agreement verb	L2	0.29 (73)
	Native	0.25 (58)
Constructed action	L2	0.26 (78)
	Native	0.24 (60)
Plain verb	L2	0.45 (126)
	Native	0.51 (122)

Table 7.

Mean proportion (number in parentheses) of zero anaphora as a function of source, discourse status and group.

	Agreement verb	CA	Plain verb
<i>Maintained reference:</i>			
L2	0.28 (62)	0.26 (67)	0.45 (109)
Native	0.23 (50)	0.23 (50)	0.54 (119)
<i>Reintroduced reference:</i>			
L2	0.24 (11)	0.24 (11)	0.40 (17)
Native	0.40 (8)	0.45 (9)	0.15 (3)