

Trevor Johnston*

A corpus-based study of the role of headshaking in negation in Auslan (Australian Sign Language): Implications for signed language typology

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Abstract: Signed languages have been classified typologically as being manual dominant or non-manual dominant for negation. In the former negation is conveyed primarily by manual lexical signs whereas in the latter negation is primarily conveyed by nonmanual signs. In support of this typology, the site and spread of headshaking in negated clauses was also described as linguistically constrained. Headshaking was thus said to be a formal part of negation in signed languages so it was linguistic, not gestural. This paper aims to establish the role of headshaking in negation in Auslan with reference to this typology. In this corpus-based study, I show that Auslan users almost always negate clauses using a manual negative sign. Although headshakes are found in just over half of these manually negated clauses, the position and spreading behaviour of headshakes do not appear to be linguistically constrained. I also show that signers use headshakes as the sole negating element in a clause extremely rarely. I conclude that headshaking in Auslan appears similar to headshaking in the ambient face-to-face spoken language, English. I explore the implications of these findings for the proposed typology of negation in signed languages in terms of the type of data that were used to support it, and assumptions about the relationship between gesture and signed languages that underlie it.

Keywords: negation, sign language, corpus, typology, gesture, headshake

1 Introduction

Headshaking and other head movements, such as tilting the head back and nodding, are nonmanual signs that play a very important part in the grammar of

*Corresponding author: Trevor Johnston ['tʰiɛvə 'dʒɒnstən], Linguistics, Macquarie University, Sydney, Australia, E-mail: trevor.johnston@mq.edu.au

signed languages (SLs). Together with facial expressions, such as eye-brow movements and mouth actions, the nonmanual signs co-occur with manual signs and are associated with grammatical functions such as polar question markers, topic markers, conditional markers, relative clause markers and adverbial modification. Researchers have claimed that in these functions the associated nonmanual behaviours in SLs are neither gestural nor prosodic, but are linguistic, i.e. they have grammaticalised into conventional morphemes (for overviews see Wilcox et al. 2010; Pfau & Quer 2010; Pfau & Steinbach 2011; Janzen 2012; van Loon et al. 2014). Other researchers have questioned whether this is always the case with nonmanuals. They claim that some of these associations are not incompatible with the nonmanual in question remaining gestural or prosodic in nature, e.g. mouth gestures associated with adverbial modification (Johnston et al. 2016), and raised eyebrows associated with polar questions (Johnston 1996; Sandler 2011) or associated with conditionals (Johnston 1996).

The question of the status of nonmanuals like headshaking (or headshake, henceforth also HS) is a case in point. The typological literature on negation in SLs suggests that HS *has* grammaticalised. A proposed typology of negation in SLs (Zeshan 2004, 2006) claims that in SLs HS in negated clauses is a grammatical marker for three reasons: (i) HS can be the only element that marks negation in a clause; (ii) HS usually co-occurs with the manual negation sign; and (iii) the spreading behaviour of the HS in manually negated clauses is linguistically, i.e. syntactically, constrained (see also Pfau 2015; Oomen & Pfau 2017).

This paper investigates the use of HS in negation in Auslan (Australian Sign Language, ISO 639–3 [asf]) in the light of this typology, using naturalistic data from the Auslan Corpus.¹ It focuses on clause negation rather than standard negation. Clause negation is broader than standard negation as defined in the typological literature (Miestamo 2005). Standard negation was first identified by Payne (1985) as a basic type of negative construction for comparative and typological studies; namely, pragmatically neutral simple clauses, i.e. declarative main clauses with a verbal predicate. According to Payne, the negative markers found cross-linguistically in these environments are primarily

¹ The Auslan Corpus is based on a video archive of elicited and naturalistic signing collected between 2004–2007 and deposited at the Endangered Languages Archive, University of London in 2008 (Johnston 2008). The collection continues to be annotated and is thus being transformed into a machine readable linguistic corpus. It has been updated several times as additional annotations have been completed.

morphological negation, negative particles, and negative verbs. Miestamo (2013) has since defined standard negation thus:

[...] the basic way (or ways) a language has for negating declarative verbal main clauses. Negative constructions that fall outside standard negation include the negation of existential, copular or non-verbal clauses, the negation of subordinate clauses, and the negation of non-declarative clauses like imperatives [...].

The study presented here looks at all negated clauses regardless of whether the predicate is a verb, or some other predicating element in a verbless clause; or, indeed, if the clause is an existential, subordinate or imperative one. This investigation is thus a study of clause negation rather than standard negation so defined. Nonetheless, negative markers in SL clauses include negative particles, negative verbs and morphological negation which parallel those described in standard negation in spoken languages. However, unlike spoken languages, SLs also potentially make grammatical use of HS. The focus in this paper is on evaluating the typological generalisations made by Zeshan (2004, 2006) about these various means of clause negation in SLs and not on the typology of standard or clause negation in the widest sense.

The paper is structured as follows: in the background to the study, I describe Zeshan's typology of SL negation and how she compares it to negation in spoken languages, and then I compare HS in spoken language and SL from the perspective of co-speech gesture. After comparing previous research on negation in Auslan with Zeshan's overview of the features of negation in SLs compared with spoken languages, I then present the method and results of this study. In the discussion I raise two issues arising from the study: the comparability of the Auslan corpus-based data presented here with the data in the language sample upon which the typology is based; and the assumptions about gesture and grammaticalisation in SLs implicit in that typology. I conclude that Auslan is either a primarily manual dominant SL for negation taking the typology at face value or, more likely, that the typology itself needs to be revised once more corpus-based studies of negation in multiple SLs become available.

2 Background

2.1 Signed language typology

Zeshan (2004) proposed a typology of negation in signed languages, based on a sample of thirty-eight different SLs, including Auslan. Zeshan found two main

types of SLs with respect to negation: i) manual dominant SLs in which negation was conveyed primarily by manual negative signs, even though HS often co-occurred with these signs; ii) nonmanual dominant SLs in which negation was primarily conveyed by head movements and perhaps facial expressions during the production of the negated constituent, even though the nonmanuals could also sometimes be accompanied by manual negative signs.

The HS co-occurred with the negated constituent, if no manual negative sign was also present, or with a manual negating sign, if it was present. It could also spread to other constituents in the clause. See Table 1 for Zeshan’s summary of the characteristics of each type.

Table 1: Characteristics of nonmanual and manual dominant systems of negation (adapted from Zeshan 2006).

Nonmanual dominant	Manual dominant
Nonmanual negation is obligatory	Nonmanual negation is not obligatory
Clause can be negated nonmanually only, manual basic clause negator is optional	Clause cannot be negated nonmanually only, manual negator is required
Choice of nonmanual marking does not depend on manual signs	Choice of nonmanual marking depends on choice of manual clause negator (if there is more than one nonmanual configuration)
Nonmanual negation spreads freely over the clause	Scope of nonmanual negation is over the manual negator only or is closely tied to the manual negator
German SL (DGS), Swedish SL (SSL), American SL (ASL)	Kata Kolok (Bali), Turkish SL (TID), Japanese SL (NS)

From Table 1 one would assume that a prototypical nonmanual dominant SL would *always* use HS during a negated clause, with or without a manual negative sign being present; and that a prototypical manual dominant one would never allow negation by HS alone. However, the distribution in the data reported by Zeshan (2004, 2006) suggests these prototypes are logical possibilities, rather than realities. Zeshan reports that Swedish SL and Finnish SL come close to the nonmanual dominant prototype, but nonetheless manual-only negation is reported as possible in each (Savolainen 2006; Bergman 1995). Japanese SL and Kata Kolok, a village SL on the island of Bali (Indonesia), were the only two SLs in which HS-only negation was reported not to be possible.

Zeshan (2006: 43) concedes that “some sign languages may display a mixed system where neither manual nor nonmanual negation can be seen as *primary*

[my stress]”. The notion of *primary* mode of expression of negation suggests that some SLs could be more or less nonmanual dominant or manual dominant than others. However, if HS-only negation is possible in a SL, then according to the criteria in Table 1, it is nonmanual dominant, even if this is extremely rare. Consequently, there is a tension between *primary* and *possible* means of negation within the typology. Empirical usage-based data on negation in each SL thus becomes very important in evaluating the reality and usefulness of this typological categorisation.

Zeshan (2004: 52) concludes that SLs appear to differ in five main ways from (standard) clause negation as described in the typological literature on spoken languages (Dahl 1979, 2010; Payne 1985):

1. Intonation (i.e. headshaking) can be used as a grammatical marker of negation in almost all SLs, whereas spoken languages rarely use a specific intonation contour for negation, and even if there is a tone associated with negation, reports suggest it is nonetheless always in the presence of a negative morpheme (Payne 1985: 228; Dryer 2013a). (Zeshan explicitly equates head movements, and not just facial expressions, with intonation in spoken languages, p.6.)
2. Morphological negation in SLs commonly involves suffixes or internal modification, but there are no examples of negative prefixes in SLs. Spoken languages, in contrast, rarely make use of stem internal modification for negation and use both negative prefixes and suffixes, with the former being much more common (Dryer 2013a).
3. Across the thirty-eight SLs surveyed, negative words or particles appear more frequently in post-predicate and clause-final position, whereas in spoken languages the pre-verbal position predominates (Dryer 2013b).
4. Double or multiple manual negative elements in a single negated clause appear to be far more common in SLs than in spoken languages. If we accept HS as a grammatical negative marker, then doubling is also manifested by its co-occurrence with a manual grammatical negative sign. The combination of a negative morpheme with a grammatical intonational element is uncommon in spoken languages. (Headshakes are not considered grammatical markers in these languages.) However, one should note that double particle constructions, such as the *ne...pas* construction in French, are common in spoken languages (Dryer 2013c) but to date unattested in SLs.
5. The form of negative signs and particles in SLs are often iconic and/or appear to be related to or derived from co-speech gestures used in surrounding communities. Headshaking is a universal nonmanual gesture of naysaying, even if tilting the head backwards is also found in a

culture.² Among manual gestures, the ipsilateral sideways movement of a raised hand palm facing outward, or rocking side to side, is found in many cultures (Kendon 2002). Zeshan observes that it is very similar to at least one of the manual negative sign(s) found in most SLs. In spoken languages negation markers appear arbitrary, with similar word forms not being found across unrelated languages.

Finally, Zeshan also concludes the facial expressions are not, unlike head movements, grammatical markers of negation, but remain gestural in nature because of “their optionality in clauses, the absence of clear-cut rules for their use in clauses, and their use in conjunction with individual signs.” (Zeshan 2004: 14). It would follow from this that if in a given SL the use of HS in negation was shown not to be obligatory, and/or its domain (established through spreading patterns) was unable to be shown to be linguistically constrained, then HS may not, just like facial expressions, be a grammatical marker of negation in that language.

2.2 Headshaking in spoken and signed languages compared

If we are to understand the role of HS in SL negation, we also need to have a clearer idea of how HS functions in face-to-face communication, spoken or signed. This includes contexts where there appears to be no overt grammatical negation.

Head movements have long been studied as a feature of language in face-to-face communication (Jakobson 1972; Goodwin 1980; Schegloff 1987; McClave 2000). Building on earlier researchers, Kendon (2002) analysed the use of headshake in co-speech gesture. He showed that headshakes were not just a non-verbal equivalent of saying no (though they obviously could be), but could separately contribute to the overall meaning of a spoken utterance in a number of ways. This was important because it underlined how co-speech gestures were not simply a substitute for spoken words—they could make their own non-redundant contribution to an utterance. As Kendon put it: “Why should we use gesture if they are just ‘words’ in another form?” (2002: 148).

Importantly, he stressed that all uses of headshake were unified by an underlying theme of negation even if there was clearly no grammatical negation of an otherwise positive co-occurring utterance. This was in contrast to some of

² If tilt-head-back is also used with a negative association by the ambient hearing culture it will also be found in the local SL, e.g. in SLs in the Near East (Zeshan 2004; Pfau 2015).

the earlier researchers on head movements who had maintained that some uses of the headshake were clearly unrelated to the semantic theme negation because they could appear during an utterance that did not overtly involve grammatical negation.

The theme of negation was illustrated in the eight major ways Kendon observed the headshake being used in his data (Table 2).³

Table 2: The eight main types of uses of headshake identified by Kendon (2002: 151–152).

Type	Description	Example sentences [] = period of headshaking
i.	As the equivalent of the verbal particle ‘no’, as a naysaying utterance in its own right	Self-evident
ii.	Used in combination with the verbal naysaying particle ‘no’ (they need not be perfectly synchronous)	[No!]
iii.	Used during a negative expression	[I don’t know your name.]
iv.	Expresses meaning in addition to the wording, e.g. disapproval related to utterance	The doctors [are going on strike.] (i.e. I don’t approve of this)
v.	Implied negative meaning in the simultaneous wording	[I could give it to the committee to follow up on], but they are not meeting for another month. (i.e. I won’t do it)
vi.	Exceptionless statement (“no exceptions allowed”)	[It’ll last forever.] (i.e. It won’t break)
vii.	Superlative or intensified expression	[He’s the worst President we’ve ever had.] (i.e. There isn’t a worse President)
viii.	As a meta-comment on one’s own utterance (e.g. self-correction or doubt)	She’s from Austria [...Australia.] (i.e. No, not Austria)

Researchers have recognised that some of the uses of headshake in Table 2 also occur in SLs in similar environments (Sutton-Spence & Woll 1999; Pfau 2015; Zeshan 2004, 2006). However, SL researchers also claim that there is a profound difference in headshakes used *during negation* in these languages: they have grammaticalised and become formal markers of negation. They are linguistic in SLs, not gestures as they are in spoken languages.

This is based on two claims. First, in SLs the HS alone can be the sole operator that negates a clause. Strictly speaking, this ability of headshake alone

³ Kendon did not claim that this list was exhaustive and recognised that other use types could later be identified.

to negate a clause appears not to be covered in Kendon's list of eight types, though it is close to (iv). For example, imagine a mother talking to her teenage daughter (once again the square brackets indicate the period of headshaking):

- (1) Utterance [You're wearing that to the party!?!]
 (i.e. **I don't approve** or **I don't give my permission**)
 paraphrases '**I don't approve of** you wearing that to the party, **so you are not.**' or
 'You're **not** wearing that to the party.'

Even though the pragmatic effect on the meaning conveyed in example (1) can be that of a simple negative assertion (second paraphrase), in spoken languages the utterance is still regarded as grammatically positive. In SLs, on the other hand, the headshake is said to be able to change the polarity of the clause: all things being equal, i.e. none of the uses (i)-(viii) from Table 2 applying, the addition of the headshake makes an otherwise positive clause a grammatically negative one. This type of headshake (ix), apparently only possible in SLs, can alone make a clause grammatically negative. There are constructions of this type in Auslan:⁴

- (2) _____ HS
 SEE CLIFF FS:CLIFF
 '(The dog) didn't see the cliff edge.'
 BGMQ_c7a,B = 00:01:50.140,E = 00:01:52.390

Second, the spreading of headshakes within the negated clause is *linguistically constrained* in SLs, whereas in spoken languages HS placement is said to be variable and strongly associated to particular lexical items (Andrén 2014). Take a possible invented SL utterance superficially like the type (iii) English example in Table 2:

- (3) (HS) _____ HS (_____ HS)
 PRO^{→1} NOT KNOW POSS^{→2} NAME
 'I don't know your name.'

⁴ See Appendix 1 for relevant SL glossing and transcription conventions used in this paper. The format of the Auslan Corpus source file citations is as follows: "ABC" = participant identifier; "cX" = task identifier; "B" = beginning time and "E" = end time in hrs:mins:secs.millisecs.

The HS may or may not spread from the equivalent of the negative particle or negative verb to the subject or to the object, only as each SL language allows. Zeshan (2004) and Zeshan (2006 including several chapters therein) give examples of HS site and spreading patterns in different SLs in support of the claim that they vary from SL to SL and are subject to language-specific syntactic constraints. Pfau (2015) and Oomen & Pfau (2017) augment Zeshan (2006) with data using more examples and additional SLs.

3 Previous research on negation in Auslan and related SLs

At least five negative particles (henceforth NEG-particle) have previously been documented for Auslan (Johnston 2004) (Figure 1).

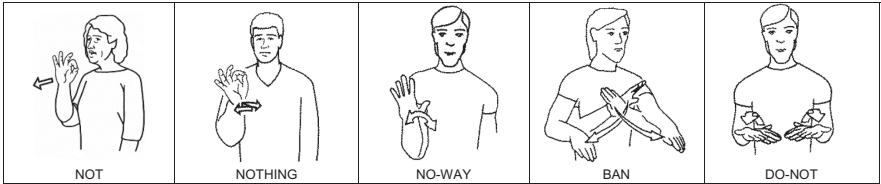


Figure 1: Negative particles in Auslan.

Examples (4) to (8) illustrate the use of these NEG-particles (highlighted in bold).

(4) HS
PRO^{→1} **NOT** BELIEVE PRO^{→1}
‘I don’t believe it.’ (lit: ‘I don’t believe (it) me’)
AMW2_c4a,B = 00:12:37.683,E = 00:12:38.609

(5) BUT PRO^{→1} **NOTHING** FS:EVER THINK
‘but I didn’t ever think’
MSQ_c4,B = 00:17:43.327,E = 00:17:44.567

(6) HS
PRO^{→3} FS:LAZY **NO-WAY** **NOT**
‘They are not lazy, not at all.’
AAS_c4a,B = 00:09:39.675,E = 00:09:40.768

- (7) HS
 OLD ROOF WALK **BAN**
 ‘Don’t walk on the old roof.’
 MCD_c3,B = 00:01:22.990,E = 00:01:24.640
- (8) HS
 PRO^{→2} GO THROUGH WHAT PRO^{→3} **DO-NOT** GO THROUGH
 ‘You go through, what they didn’t go through.’
 MKB2_c4a,B = 00:11:25.608,E = 00:11:27.553

Three other types of negative manual signs that negate the clause they occur in have also been identified: negative auxiliaries (NEG-aux) such as HAVE-NOT, CAN-NOT, and WILL-NOT (9); negative adverbs (NEG-adv) such as NEVER, NOT-YET, NOT-SINCE (10); and negative verbs (NEG-verb) such as WANT-NOT, AGREE-NOT, KNOW-NOT, HAVE-NOT, BELIEVE-NOT and BOTHER-NOT (11).⁵

- (9) HS
 PRO^{→3} **CAN-NOT** HELP BOY
 ‘They can’t help the boy.’
 BCH_c2a,B = 00:03:02.165,E = 00:03:05.645
- (10) HS
 PRO^{→3} **NOT-YET** ELIMINATE **NOT-YET**
 ‘It (the gene) has not yet been removed.’
 SAW_c4,B = 00:17:59.566,E = 00:18:01.915
- (11) HS
 PLUS SISTER **WANT-NOT** CHILDREN
 ‘What’s even worse (unfortunately for my parents), my sister doesn’t want children.’
 MBH_c5,B = 00:03:29.800,E = 00:03:32.030

In sum, NEG-particle, NEG-aux, NEG-adv, and NEG-verb signs are used as manual negators in Auslan. (Henceforth, we will collectively refer to these as the *NEG-related* signs.)

Other earlier reports on negation in Auslan suggest it is very similar to the SLs in Zeshan’s sample set. The summary reported below is themed under each

⁵ All Auslan signs referred to in this paper can be found in the on-line dictionary of Auslan at www.auslan.org.au (Johnston 2004).

of the five ways she describes SLs as differing from spoken languages. I also mention research on British SL (BSL) (Sutton-Spence & Woll 1999) and New Zealand SL (NZSL) (Collins-Ahlgren 1989; McKee 2006) because these are two very closely related SLs (Johnston 2003).

3.1. The use of nonmanuals, especially head movements, in negation in SLs

Auslan, BSL and NZSL have all been reported as using HS, both as the only negating element in a clause (12) and as co-occurring with a manual negative sign (13) (Johnston 1989).⁶

- (12) $\frac{\text{HS}}{\text{POSS}^{\rightarrow 2} \text{ BROTHER HAVE LOC}^{\rightarrow 1}}$
 ‘Your brother isn’t here.’
 (#100)

- (13) $\frac{\text{HS}}{\text{POSS}^{\rightarrow 2} \text{ BROTHER NOT HAVE LOC}^{\rightarrow 1}}$
 ‘Your brother (definitely) isn’t here.’
 (#101)

With respect to the domain or site of the headshake, Sutton-Spence and Woll also point out that in negated clauses with a headshake, the headshake does not extend over the topic, a fact also noted for NZSL (Collins-Ahlgren 1989; McKee 2006). This is attested in Auslan (there is no overt nonmanual marking over the topic):

- (14) $\frac{\text{HS}}{\text{CAN PLASTIC NMS:HS}}$
 ‘They can’t be flexible.’ (lit: ‘as-for-able-flexible no’)
 MFK_c4a, B = 00:00:51.816, E = 00:00:54.950

Sutton-Spence & Woll (1999) found that a clause-final headshake, without any manual negative sign, was possible in BSL, as it also is in Auslan, see (14).

⁶ In examples (12), (13), (17), and (20) the source citation is taken from Johnston (1989). The hashtag cites the example number in the original. Some minor changes in glossing conventions have been made for this publication.

Most importantly for this study, Sutton-Spence and Woll also point out that a HS need not negate a clause. It can “express emotions such as regret, frustration, disbelief, or sorrow” about the content of a clause that remains grammatically positive (p. 94), as can happen in Auslan too:

- (15)
- SHOULD ASK WHAT COLOUR PRO^{→1} FORGET

‘I should have asked what colour it was, **but unfortunately** I forgot.’

SSN_c3,B = 00:01:24.633,E = 00:01:27.010

With respect to other nonmanuals in negation, such as facial expressions, Sutton-Spence & Woll (1999) report that facial expressions do not alone negate clauses, rather they express related negative feelings, such as displeasure, disgust, and dislike. The negation itself is made either by headshaking and/or by the use of a manual negative sign (p. 73). This is similar to the conclusion Zeshan draws on the role of facial expressions and negation in SLs generally (see Section 2.1):

- (16)
- head movement

expression

mouth gesture

mouth

gloss

translation

“disabled”

“sign”

HANDICAPPED

‘I [really] don’t use the handicapped (i.e. cripple) sign [yuk]

“sign”

SIGN,

PRO^{→1}

NOT

NOT

USE

(to refer to deaf people).’
- HS

squint ± wrinkle-nose

frown

“use”

3.2. The type of morphological negation found in SLs

Signs negated by a final negative suffix-like element; those negated with an internal modification of the sign; and those that have irregular suppletive forms have been reported for Auslan (Johnston 1989) (Figure 2). These morphologically negative verbs render the clause they appear in grammatically negative.

3.3. The position of manual negators in SLs

Manual negators were reported to occur both before (13) and after a negated verb (17) in Auslan (Johnston 1989) but the post-verbal position, which is often also clause-final, was said to be preferred. This was also later reported for BSL



Figure 2: Morphological negation in Auslan: WILL-NOT appends the negative up-turned open handshape (possibly a reduced one-handed form of DO-NOT) to the sign WILL; SEE-NOT appends/ blends the negative sign NOT to the sign SEE (there is assimilation of some of the extended fingers of the ‘okay’ handshape of NOT into the handshape of SEE at the beginning of the new affixed/blended sign); WANT-NOT reverses the direction of WANT; and finally CAN and CAN-NOT have no regular relationship.

(Sutton-Spence & Woll 1999) and NZSL (McKee 2006). McKee suggested that the pre-predicate position is probably influenced by English grammar, i.e. Signed English (p. 86).

- (17) _____ HS
SMOKE PRO^{→1} NOT
‘I don’t smoke.’
(#104a)

3.4. The common use of double or multiple negative elements in SLs

Sutton-Spence & Woll (1999) also note the possibility of more than one manual negation sign appearing in a single clause, often for emphasis:

- (18) _____ HS
LAZY, PRO^{→1} NOT BELIEVE-NOT
‘I certainly don’t believe they are lazy.’ (lit: ‘as-for-lazy I not believe-not.’)
BGL_c4a,B = 00:04:59.357,E = 00:05:01.237

If we accept that HS is an independent formal negating element in negated clauses, then (18) is actually an example of triple negation.

Johnston & Schembri (2007) observed that negative auxiliaries, such as CAN-NOT, were also often doubled in negated clauses, with the double usually in a clause-final position:

- (19) $\frac{\hspace{10em}}{\text{CAN-NOT FS:DO PRO}^{\rightarrow 3} \text{ CAN-NOT}} \text{HS}$
 ‘(You) can’t do that.’
 SGM_c3,B = 00:02:17.800,E = 00:02:18.785

3.5. The gestural origins of manual and nonmanual negative signs found in SLs

The obvious case of headshakes aside, the signs NOTHING, NO-WAY and BAN in Auslan (see Figure 1) and many similar signs in other SLs appear to have their origins in a commonly found negative gesture described by Kendon (2002).

In these five aspects, therefore, Auslan has been described in ways that suggest it has all the features of negation that Zeshan finds typical of SLs which make them distinct from spoken languages.

Only McKee (2006) suggests what might be the typical or unmarked way to express negation: “In relaxed discourse particularly, nonmanual negation alone is typical, and articulation of the negation headshake may be reduced to a single sideways movement [...]” (p. 81). And “Predicates containing a negation sign—or at least the sign itself—tend to be marked by a negative headshake, but not invariably” (p. 84). Indeed, negative imperatives in Auslan were the only constructions in which HS was reported *not* to occur during negation:

- (20) $\frac{\hspace{10em}}{\text{NOT SIT-DOWN}} \text{!}$
 ‘Don’t sit down!’
 (#105)

On the basis of these reports, the categorisation of NZSL as nonmanual dominant for negation (Pfau 2015), from either *primary* or *possible* perspectives on the typology, seems reasonable. Given that all of the examples of negated clauses in Auslan discussed above contain HS (except for the negative imperative), one might well conclude that Auslan too is nonmanual dominant for negation.

4 Method

4.1 Source of data

The study dataset consisted of 24.7 hours of video taken from the Auslan Corpus. This was edited into 413 separate clips linked to ELAN annotation files, henceforth referred to as *texts*. All the texts were segmented into signs and glossed. A large subset of these texts had additional annotations as the result of previous studies, e.g. free translations in English, grammatical class, mouth gestures, and clause boundaries. The annotation schema used in the corpus is described in Johnston (2010) and in the Auslan Corpus Annotation Guidelines (Johnston 2017a). The ELAN⁷ annotation software used to create these texts allows for the precise time-alignment of annotations with the corresponding video sources on multiple user-specifiable tiers (Wittenburg et al. 2006). Only those annotation practices that are directly relevant to understanding the examples in this paper and how quantitative data were extracted are discussed here. At the conclusion of the study-specific annotation process described below, the number of clauses identified in the entire reference dataset had risen from 9,000 to 12,661 of which 1,672 were negated clauses.⁸ A subset of 89 texts was comprehensively annotated from beginning to end on multiple tiers for various linguistically relevant features. In these texts there were 6,322 clauses of which 144 were negated.

4.2 Study-specific data preparation and annotation

To conduct this study, it was necessary to be able to identify cases of clause negation in Auslan. Given the nature of the corpus and the existing annotations, there were only three ways in which to locate potential examples of negation in an ELAN annotation file: i) search the glossing tier, ii) search the translation tier, or iii) search the head movement tier. The data preparation described here ensured that these searches would yield meaningful results.

⁷ ELAN (Version 5.0) [Computer software] (2017). Nijmegen: Max Planck Institute for Psycholinguistics. Retrieved from <https://tla.mpi.nl/tools/tla-tools/elan/>

⁸ Note that this figure does not represent an accurate guide to the proportion of negated to non-negated clauses in the corpus overall: negated clauses have been deliberately targeted as part of this study, as described in the next section, so their numbers are inflated.

4.2.1 Searching the glossing tier

I searched for the glosses of signs known to be associated with negation in Auslan, determined if the clause they occurred in involved negation, and identified the type of head movement(s) that co-occurred with the negated clauses.

It was necessary to inspect each token of potential NEG-related signs to determine whether it was being used as a clause negator because in Auslan a single sign form (identified with a unique gloss) can often function in more than one way, e.g. as a noun or a verb. For example, BAN can function as a NEG-particle that negates a verb and its clause (7), or it could function as a lexical VERB that does not negate the clause it occurs in, as in (21):

- (21) PRO^{→3} BAN SIGN
 ‘It (the oral school) banned sign language.’
 ADC_c4a,B = 00:10:34.087,E = 00:10:35.495

Similarly, NOT, NOTHING, NO-WAY, and BAN can all also be used as naysayers, i.e. stand-alone negative expressions meaning “no” (henceforth NEG-interact signs); and NOTHING may function as a negative pronoun (NEG-pro). In these other uses the signs are not clause negators.

The gesture-like *palm up* sign was also included in these searches because PALM-UP has been associated with negation in some SLs (Oomen & Pfau 2017) (Figure 3).

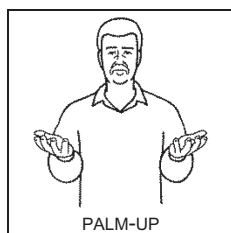


Figure 3: The gesture-like PALM-UP sign.

Occurrences were tagged if they were associated with negation, produced with a HS and, importantly, whether the PALM-UP with HS was the only negating element in the clause, as in (22).

- (22) _____ HS
 FS:BUT SAME PRO^{→1} = PRO^{→3} PALM-UP
 ‘But they are not like me.’ (lit: ‘But similar me (and) them well-no.’)
 ADC_c4a,B = 00:10:34.087,E = 00:10:35.495

When a NEG-related sign was located, the aligned video for each was viewed, the relevant clause identified and each constituent sign tagged for the presence or absence of head movement, as follows: headshake (HS), one strong turn of the head (HS1), or, much less frequently, tilting-back (TILT-BACK), wobbling (WOBBLE), or a side to side motion of the head alone or the head and the torso together (SIDE-TO-SIDE)⁹; nodding (NOD), and one strong nod (NOD1). Nodding was included in the annotation schema because a pilot study (Filipczak et al. 2015) had identified a number of cases where nodding co-occurred with negated clauses.

Any sign in the clause that did not display any of these movements was tagged as having no headshake (NHS) to clearly signal that the clause had been investigated for head movement, and to enable searches for clauses with NEG-related signs that did not have a HS over them or anywhere else in the clause. This is important for identifying spreading patterns. Headshakes that were observed to occur when no manual sign was being performed were also annotated over a place-holder gloss annotation on the glossing tier when this occurred, if they were deemed part of the clause and not independent fragmentary interjections. The placeholder gloss had the prefix NMS (for ‘nonmanual sign’) thus: NMS:HS, see (14). Each identified clause was given a free translation and a literal or close translation into written English, if this had not already been done at that point in the annotation file in previous studies.

It is obvious that a search for the glosses for NEG-related signs will only yield clauses that are negated with manual signs, because otherwise there would be no gloss to match the search criteria.

4.2.2 Searching the translation tier

I searched the parallel English translations for any words or word forms associated with negation in English—*no*, *not*, *nothing*, *n’t*, *never*, *not yet*, *none*, *dis-*, *un-*, etc., that may indicate the presence of negation in the Auslan source text. (They almost always did.) The aligned video was viewed to determine which manual or nonmanual features of the signing prompted the negative translation. The clause was annotated and tagged as previously described.

⁹ There were so few tokens of TILT, WOBBLE, and SIDE-TO-SIDE that they are not discussed further here and are simply included in HS category count.

4.2.3 Searching the head movement tier

The third strategy entailed visually inspecting a video text from beginning to end, identifying each and every instance of headshake and nodding on the head movement tier and annotating the co-occurring clause for the presence or absence of negation. Only after doing this was it certain that all relevant head movements, and thus all HS-only negated clauses, were discoverable to the search function within ELAN for a specific video text. Importantly, visual inspection for all instances of headshaking and nodding enabled quantification of how often each was used with negation, or, in the case of headshaking, was the *only* marker of negation in a clause. It also enabled clearer appreciation of the semantic contribution headshaking was making to clauses that were not negated at all.

Finally, negated clauses were tagged for aspects of the discourse context in which they occurred. I did this because during the annotation process it became obvious that HS in a negated clause was possibly more frequent when the negated clause was part of a response. This appeared to be potentially very significant for understanding the role of HS given observations of HS in spoken language interactions (Kendon 2004) and Payne’s observation (1985: 199) that “negative sentences are most frequently used to deny propositions which are contextually given, rather than to introduce new propositions [...]” I also tagged NEG-related signs that appeared twice in a clause, or if a clause presented a contrast or an alternative because these, too, appeared to attract HS. Tagging in this way meant these environments could then be quantified.

With respect to NEG-related signs, *response* was suffixed to its grammatical class tag if the clause within which the NEG-related sign was found was an immediate response to a question from the interlocutor, or expressed a negative appraisal of what the interlocutor had just said (23).

(23)

		HS
PRO ^{→1}	NEVER	HEAR
PRONOUN	NEG-adv- response	VERB
'No, I never heard (about that).'		
BRC_c4a,B = 00:13:54.663,E = 00:13:55.456		

Reprise was suffixed to a NEG-related sign if it was the second NEG-related sign in a clause *and* appeared after the verb or another core constituent (24), i.e. the repeated element is not *in situ* as in (16).

- (24) HS
 PRO^{→3} NOT SUCCEED NOT
 PRONOUN NEG-particle VERB NEG-particle **reprise**
 ‘They don’t succeed/They are not successful.’
 STM_c4a,B = 00:09:47.395,E = 00:09:48.380

In addition, NEG-particles were further distinguished by the following suffixes: with *imperative* for clauses that were imperative; and with *contrastive* in clauses that presented an alternative (often, but not always, appearing in the English translation as *not only*, *or not*, *or*, or *but*).

With respect to the clause as a whole, two types of what I will call ‘self-directed responses’ by the signer were also identified: one to a topic and the other to a rhetorical question (RhQ). These clauses were tagged as (i) *internal response to Topic*, e.g. (25), and (ii) *internal response to RhQ*, e.g. (26), for responses that were deemed not to be separate clauses in themselves but part of a larger single clause; and (iii) *external response to RhQ*, e.g. (27) for responses that were deemed separate clauses. (This clause level tag is between square brackets below.)

- (25) HS
 DEAF SCHOOL UNIT PRO^{→1} NOT AGREE WITH PRO^{→1}
 [.....internal response to Topic]
 ‘I don’t agree with separate schools for the deaf.’
 (lit: ‘As for separate deaf schools, I don’t agree with (them).’)
 SKP_c4a,B = 00:17:13.677,E = 00:17:15.409

- (26) HS
 TEACHER DET/LOC^{→3} FLUENT AUSLAN NOTHING
 [.....internal response to RhQ]
 ‘Those teachers were not fluent in Auslan’ (lit: ‘Those there teachers fluent signers? not’)
 ADC_c4a,B = 00:37:58.438,E = 00:38:01.780

- (27) ↑
 BUT PRO^{→1} DET^{→3} TIME HANDICAPPED?
 []

HS

PRO^{→1} NOT SIGN WILL-NOT PRO^{→3} PRO^{→1}
 [.....external response to RhQ]
 ‘But did I at that time (use the sign) handicapped? No, I wouldn’t have
 signed that then.’
 AAS_c4a,B = 00:00:27.585,E = 00:00:30.398

Finally, clauses were tagged as ‘contrastive’ when they presented unexpected or contrastive information to an immediately preceding clause (expressed in (28) with the manual sign BUT and the HS, the latter expressed as *surprisingly* in the translation).

(28) HS

WATER DRINK DSM(5):WATER-OVER-FACE BUT PRO^{→1} NOT WAKE
 [.....contrastive]
 ‘Water from a drink was thrown all over my face, but **surprisingly** I didn’t
 wake up.’
 SKP_c5,B = 00:13:17.780,E = 00:13:19.884

5 Results

5.1 Headshaking in negated clauses

Almost all (98%) of the grammatically negative clauses in the corpus included a NEG-related sign and of these 61% overall also included a HS during, at minimum, the production of that sign (Figure 4). In other words, only 1.7% were negated nonmanually with HS-only, as in (2).

From Figure 4 one can also see that in a very small number of clauses, mouthing conveyed negation without any NEG-related sign being produced, but there was always also a HS in such clauses. If one includes these clause tokens as exemplars of nonmanual only negation types, the overall count increases to just 2%.¹⁰ One should not forget that mouthing is, nonetheless, extremely frequent in Auslan for all classes of signs, including NEG-related signs (Johnston et al. 2016).

¹⁰ Alternatively, the mouthing could be said to mark the negation in the same way as a manual negative sign. Thus these tokens could instead be kept distinct from HS-only negation. But the numbers are so low that it makes little impact on the overall categories. At present there are no examples of clauses negated only with mouthing and without a headshake. It may be possible, but is not expected. A systematic investigation has yet to be conducted.

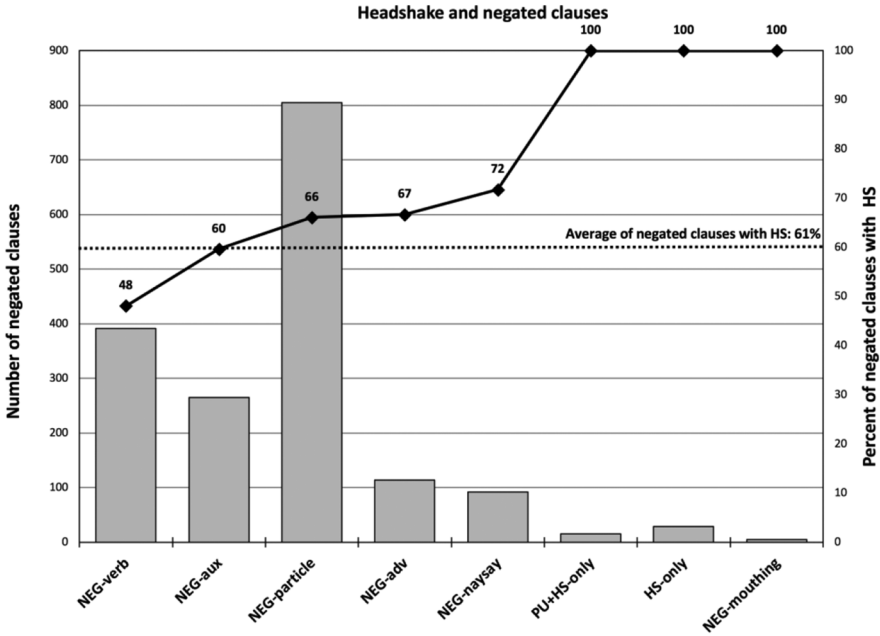


Figure 4: Presence of HS in negated clauses using different types of NEG-related sign (N = 1,672), in ascending order of percentage of each type with co-occurring HS. For obvious reasons, the three columns on the right, which are sub-types of HS-only negation, have 100% presence of HS.

Equally rarely, one sees that PALM-UP with a HS (PU + HS) can function as the *sole* negating element in a clause. It could be argued that such combinations are essentially tokens of HS-only negation (PALM-UP not being a lexical sign). Be that as it may, the low numbers mean that even if one added these tokens to the tally of nonmanual only ways of negation they would barely reach 2.9% of all negated clauses. Thus, whichever way one regards PU + HS, nonmanual HS-only negation is rare in Auslan.

The rarity of HS -only negation was somewhat surprising to the author, who is a hearing native signer. (Recall the impression created in the literature on Auslan, BSL and NZSL reported on earlier.) It is possible that text-type could have been a factor in this result because many, but not all, were narrative retells. It is also possible that since translations had previously been added to only about half of the texts in the dataset (i.e. in terms of total duration of the files), even though all of them were glossed, a number of HS-only negated clauses may have been overlooked in the files with translation gaps. If these texts had also been scanned from beginning to end, more HS-only negated clauses might have been identified.

expresses part of the signer's stance towards what the interlocutor has just signed or some discourse presupposition they both share.

This simply appears to reflect the general pragmatic function of nodding in face-to-face language, signed or spoken (see McClave 2000 for spoken language). NOD has a clear interactive role in marking and framing responses and reactions to questions or statements of one's interlocutor or audience, regardless of whether the co-occurring clause is grammatically negated or not. In the corpus, it can appear in negated or non-negated clauses alike and even combine sequentially with HS in both, as in (32) and (33). The distribution and function of nodding in SLs does warrant further investigation and analysis in its own right because it may well carry more functional weight in SLs, such as helping to signal the end of clauses (Puupponen et al. 2016). However a detailed discussion of nodding is beyond the scope of this study.

The relevant question is this: Is it possible that in some manually-negated clauses HS is also, like NOD, not part of the negation, but rather contributes additional information, albeit negative, about those grammatically negated clauses?

5.2 Headshaking in non-negated clauses

When the subset of 89 texts that had comprehensive annotations were systematically scanned, almost 200 non-negated clauses with headshakes, but only 5 HS-only negated clauses, were found. This means there were 40 non-negating HS to every one HS-only negator. Recall also that these 89 texts contained in total 144 negated clauses. Since 65% of manually negated clauses (see Figure 4) are also accompanied by a HS this means that HS is *associated* with approximately 94 instances of clause negation, compared with approximately 250 instances where it is not. A HS occurring during a clause did not negate a clause in the overwhelming majority of cases, but rather it made its own semantic contribution to the utterance. Clearly, therefore, HS is used more frequently *outside of* grammatical clause negation than within it.

The relatively high frequency of HS in non-negated clauses was, again, not surprising as it, too, has long been recognised to be a very common behaviour in face-to-face multimodal human communication, spoken or signed, as discussed above (Section 2.2). As Kendon's headshake usage types describe, negative semantics underlie the uses of the headshaking he identifies, irrespective as to whether the headshakes are produced during negated clauses or not. They tend to express a negative response, direct or indirect, to a question, statement or presupposition, or reflect a negative appraisal by the speaker about what they are saying, see examples (31) to (36). (The implied negation appears in bold. Types (i)-(iii) are not exemplified as they are self-evident)

Type iv. (additional meaning, e.g. disapproval)

- (31) HS
 PRO^{→3} HIDE PROBLEM LOC[→] = DSL(B):VERTICAL-BARRIER
 ‘They hide the problem out of view (**the doctors shouldn’t do this**).’
 AAP_c4,B = 00:10:46.320,E = 00:10:49.572

Type v. (implied negative meaning in simultaneous wording/signing)

- (32) NOD HS
 DEAF = PRO^{→3}, PRO^{→3} DEAF SEEM HEARING PERSON WITH NOT HANDICAP
 ‘As for first seeing a deaf person, you’d be surprised to learn they are deaf just by looking at them because they seem to be like a hearing person (**but they are not, they are deaf**) with no disability.’
 MGC_c4a,B = 00:04:39.887,E = 00:04:42.592

Type vi. (exceptionless statement)

- (33) HS NOD1 NOD
 BOTH OLD FS:OF ALL PALM-UP
 ‘(**No you cannot deny that**) the two of them were **certainly** the oldest of anyone there, **absolutely**.’
 MBH_c5,B = 00:04:11.105,E = 00:04:15.215

Type vii. (superlative or intensified)

- (34) HS
 BUT REAL PRO^{→1} LOVE DEAF CHILD PALM-UP WONDERFUL
 ‘**But** really I’d love to have a deaf child, gosh, (**nothing would be so**) wonderful!’
 MSQ_c4,B = 00:14:06.716,E = 00:14:09.666

Type viii. (meta-comment, e.g. self-correction, doubt)

- (35) HS
 RABBIT TORTOISE G(CA):TURN-HEAD G(5-DOWN):PHOOEY
 ‘The hare (**no not hare**) tortoise turned (to the hare) and dismissed him with a wave.’
 STC_c2b,B = 00:00:47.720,E = 00:00:49.048

There can be little doubt, therefore, that signers use headshakes *in these environments*, with respect to both form and function, in much the same way as the hearing people they interact with in their surrounding communities.

However, there even appears to be another type (*contrastive*) to be added to the list:

Type x. headshake indicates a contrastive clause, see also (15)

- (36) _____ HS
 PEOPLE ONLY TWO DSM(2):TWO-PEOPLE-APPROACH
 ‘**but this time only** two people come.’
 BRC_c2a,B = 00:02:44.730,E = 00:02:46.475

The vast majority of non-clause-negating headshakes are able to be assigned to one of these types or occur in clauses which are a response to an immediately previously stated or implied proposition of the signer or the interlocutor, i.e. a *response frame*. How does this dynamic interact with manually negated clauses? Let us now return to the results in the light of this.

5.3 Headshaking and the response frame

Figure 5 presents the data in Figure 4 again, but in terms of the different contexts in which the negated clauses appear. In Figure 5 all NEG-negator signs or clauses that had been tagged as *response*, *reprise*, *contrastive*, or *imperative* (or simply left as *negator*) have then been grouped together accordingly. This allows us to begin to see the impact of the context on the likelihood that headshaking will also be present during the production of a manually negated clause.

One can see from Figure 5 that the rate of co-articulation of HS with apparently straightforward manual negation reduces from 65% to 51%. More telling, the rate of HS increases significantly (up to 89%) when the utterance is part of a response frame rather than merely the assertion of a negative state of affairs (which the manual negation is achieving anyway in virtually all Auslan negated clauses). Two of the clause internal response frames that were identified—one with either a topic, e.g. (25), and one to a pre-posed rhetorical question, e.g. (26)—have already been noted in the literature as environments in which clause-final negation (both manual and nonmanual) is frequently found in SLs (Pfau 2015).

The reprise context, itself, can also be construed within the response frame: reprises tend to occur not only after the first NEG-negator sign (by definition) but they also tend to be clause-final *and* in many cases, are realised not as a simple

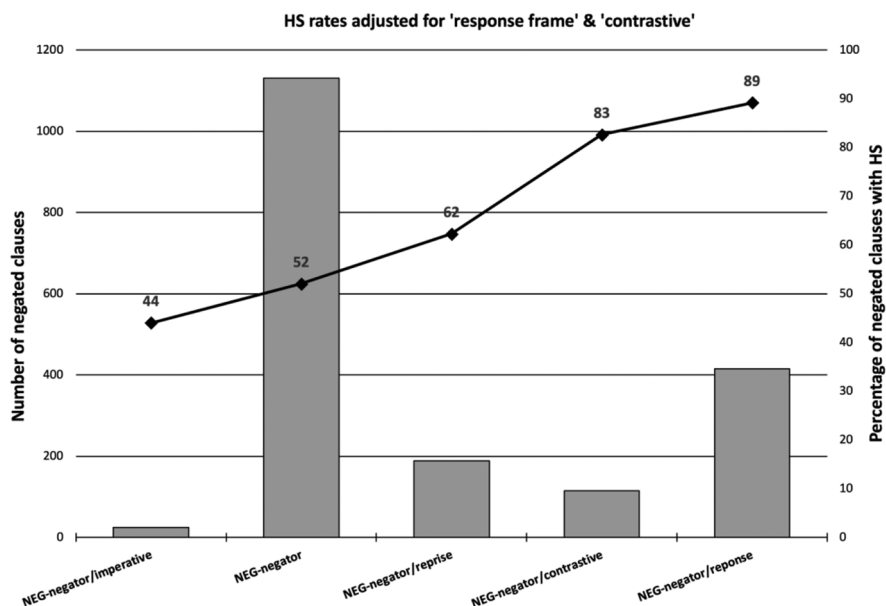


Figure 5: Number of negated clauses according to semantic and pragmatic context type in ascending order of percentage of each type with co-occurring HS ($N = 1,672$).

repetition of the first NEG-negator but as a NEG-particle. These NEG-particles (NOT, NOTHING, NO-WAY) are all also used alone as straightforward negative responses (NEG-interact) in the language. Moreover, during the reprise element the signer tends to fix their gaze on the interlocutor (or return it to the interlocutor if it had been elsewhere), thus suggesting it also has a strong interactive role in the discourse.

Of course, many of the NEG-negator clauses in Figure 5 are examples of Kendon's type (iii) for headshake usage—headshakes straightforwardly associated with a negative expression. However, we still do not know the extent to which the other headshakes that accompany manually negated clauses in Auslan may actually be instances of the other types of Kendon's categories. Only the most easily located examples of response frames were identified. Other negative appraisals that make their own semantic contribution, in ways shown above, undoubtedly exist. Take the following example in which the contrastive nature of the HS in the second clause is only obvious in the context of the previous clause, see also (15). Without any translation and without an overt signed BUT in the contrastive clause, such instances are difficult to locate.

- (37) DEAF, HEARING $PRO^{\rightarrow 3}$ LOOK $^{\rightarrow 1}$ $PRO^{\rightarrow 1}$ SAME TITLE DISABLED
 [.....independent clause]
HS
 $PRO^{\rightarrow 1}$ NOT LOOK $^{\rightarrow 1}$ DISABLED
 [dependent (contrastive) clause]
 ‘As for deaf people, hearing people they see us as like disabled, **but** we
 don’t see ourselves as disabled.’
 STM_c4a,B = 00:15:22.731,E = 00:15:26.111

Detailed textual analysis of all negated clauses is needed to reveal any additional semantic contribution of the HS, if present. So we cannot assume that they simply echo, reinforce or mark the manual negation. Many would do more than this.

The small set of HS-only negated clauses is revealing in this regard. Of these 27 clauses, only 3 are not in some kind of response frame, as in (2). Of the 24, 11 are in internal response frames which, by definition, mean they are also clause-final, see (25) and (26); and 6 are direct responses to the interlocutor and consisted of a single pointing sign, usually to the signer (i.e. ‘not me’), but also elsewhere (‘not you’, or ‘not him/her’, or ‘not this/that’). So even HS-only negation underlines the interactive nature of the headshaking. Many also have a negative facial expression (mouth gesture)—communicating rejection or displeasure—which again underlines the interactive nature of the headshaking (cf Bergman 1995).

The 3 non-response frame HS-only negated clauses also have no relevant mouth gesture, so are the only clauses in the dataset which one could say unequivocally are definitely HS-only negated clauses. Interestingly, two of these are imperatives (38) and are thus counterexamples for the claim made in Johnston (1989) on negative imperatives (20).

- (38) HS
 LOOK $^{\rightarrow 3}$ $PRO^{\rightarrow 2}$
 ‘Don’t you look (at the picture).’
 MKB2_c9a,B = 00:01:36.885,E = 00:01:38.661

5.4 Headshaking and the position of neg-negator signs

The special status of HS in SLs as a marker of negation (or *the* obligatory marker of negation in some SLs) is also said to be manifest in language-specific

grammatical constraints (position within clause, spreading of HS over particular syntactic domains and not others).

NEG-negators were found both before (4) and after the verb (39), with a preference for before the verb at 62% of tokens (Table 3). This was the opposite of the preference previously claimed for Auslan (and BSL and NZSL) (Section 2.2).

(39) HS1
 ANSWER NOT
 ‘(He) didn’t reply.’
 PRF_c2b,B = 00:01:21.850,E = 00:01:22.700

Table 3: Position of NEG-particle, NEG-aux and NEG-adv.

	NEG-particle	NEG-aux	NEG-adv	All
Pre-predicate	59%	79%	83%	62%
Post-predicate (non-reprise)	14%	6%	2%	12%
Post-predicate (non-reprise & clause-final)	10%	4%	1%	8%
Reprise (non-clause-final)	2%	9%	8%	6%
Reprise (clause-final)	15%	3%	6%	12%
Total	100%	100%	100%	100%

It would be disingenuous not to acknowledge that this is also the position of negators in English, the ambient spoken language. It is also the most common position for negators cross-linguistically (Dryer 2013b). However, in contradistinction to English, negators also occur *after* the predicate *without also being a reprise element* (20% of tokens). This flexibility of position is not surprising given the variability in the order of other constituents that has been observed in Auslan, e.g. verbs and their core arguments, or modifiers and their nominal or verbal heads (for Auslan see Johnston 2014a, 2017b; Johnston et al. 2015).

As mentioned above, the negative reprise element was often not simply a repetition of the first NEG-negator that occurred in the clause; the majority of reprise tokens were one of the NEG-particles NO-WAY, NOTHING, or NOT, and in this role they are often clause-final and often attract a HS (Table 4).

This can result in the phenomenon where there is actually no HS over the primary initial NEG-negator sign, but there is one over the reprise element (yet again underlining the interactive role of HS) (40).

Table 4: % of NEG-particle, NEG-aux and NEG-adv with HS by position.

	NEG-particle % + HS	NEG-aux % + HS	NEG-adv % + HS	All % + HS
Pre-predicate	56%	41%	43%	52%
Post-predicate (non-reprise)	61%	33%	100%	59%
Post-predicate (non-reprise & clause-final)	57%	60%	0%	56%
Reprise (non-clause-final)	72%	58%	25%	38%
Reprise (clause-final)	69%	100%	83%	71%
Total	n/a	n/a	n/a	n/a

(40) _____ HS
PRO^{→3} NOT FS:EXPECT FS:TO CHILDREN DEAF NOTHING
‘They didn’t expect to have deaf children, at all.’
SAS_c4a,B = 00:16:17.260,E = 00:16:20.630

In fact, NO-WAY is always at the clause extremities, mostly final but also initial, unless it is part of a self-correction, and is rarely signed without a HS in any position. A marked topic is also found in many of these post-predicate constructions (41).

(41) _____ ↑ _____ HS
GO-TRACE NO-WAY
‘He definitely wasn’t going to go around the long way.’
(lit: ‘As for taking the long way around, no way.’)
AAM2_c2b,B = 00:01:26.270,E = 00:01:26.980

In sum, the position of NEG-negators relative to the predicate is not fixed, though there is a strong tendency to precede it. When they follow the predicate and are also clause-final reprise elements, they very frequently attract a co-occurring HS.

5.5 The spreading of headshaking within clauses

I have dealt with the site of HS with respect to NEG-related signs (almost one third have no HS), and the possibility of clauses being negated by HS alone (very few are); but the spreading behaviour of headshaking is another factor relevant to determining its role in negation in Auslan. Here I only make generalisations based on HS in manually negated clauses because it has already been noted that almost all HS-only negated clauses were internal responses to topic-like

elements. (We already know that the HS in these cases is clause-final and does not spread over the topic-like element. Thus the numbers of the other HS-only negated clauses are too low to make any meaningful generalisations about site and spreading in them.)

At the most general level, two-thirds of manually negated clauses had HS or NHS throughout the entire clause. This is compatible with the notion that headshaking behaviour is strongly related to the status of the clause as a turn within the discourse (including the self-directed responses), and not just to the presence of a NEG-related sign. However, this may also be related to the fact that the average simple Auslan clause is quite short. Just over half of all clauses consist of two or fewer signs, and almost three quarters of three or fewer signs (Johnston 2014a). Moreover, we know that at least one overtly manually expressed argument in a clause is very likely to be realised by a pronominal pointing sign. Pronominal pointing signs are usually unstressed and very brief (Johnston 2013a). Because the NEG-negator may be positioned on either side of the negated verb, pronominal pointing signs are thus likely to be articulated while the HS is beginning (for the NEG-negator or NEG-verb that follows) or ending (for the NEG-negator or NEG-verb that precedes).¹² The relative short length of the average simple clause and the likelihood of at least one argument being realised by a pronominal pointing sign means that many clauses have a HS, NHS or NOD throughout the entire clause.

Nonetheless, there remain many different attested spreading patterns. In order to describe these, let us add Auslan to the comparison of six other SLs as described by Oomen & Pfau (2017) (Table 5).

There are attested Auslan examples of all negation features (iii) to (viii) in Table 5:

(iii) NOT clause-final (i.e. one of three NEG-particles, glossed as NO, NO-WAY or NOTHING in the Auslan corpus) see (39) and also:

- (42)

	HS
PRO ^{→3} SIGN NOTHING	
PRO VERB NEG-particle	
'They don't sign.'	
AMW2_c4a,B = 00:12:51.209,E = 00:12:52.614	

¹² The claim that regressive HS spreading over pronominal subjects in ASL is possible (unlike non-pronominal subjects) has been challenged as being a misinterpretation of an anticipatory movement as an instance of true HS spreading (Neidle et al. 2000; cited in Oomen & Pfau 2017).

Table 5: Typological comparison of negation patterns in seven SLs (adapted from Oomen & Pfau 2017)*.

	DGS	LSC	ASL	LIS	TİD	NGT	Auslan
(i) word order	SOV	SOV	SVO	SOV	SOV	SOV	‘SVO’ ¹³
(ii) manual dominant?	–	–	–	+	+	–	+
(iii) NOT clause-final?	+	+	+ / –	+	+	+	+ / –
(iv) HS only on NOT?	–	+	+	+	+	?	+ / –
(v) HS only on predicate (in the absence of NOT)?	+	+	–	–	–	+	+ / –
(vi) HS spread onto object?	+	+	+	–	–	+	+ / –
(vii) HS spread onto subject	–	–	+ / –	–	–	–	+ / –
(viii) Negative Concord?	–	–	+	–	+	+	+ / –

*Abbreviations for names of SLs used in table: DGS (German SL), LSC (Catalan SL), ASL (American SL), LIS (Italian SL), TİD (Turkish SL), NGT (SL of The Netherlands).

(43) HS
MANY NO-WAY
DET NEG-particle
‘but not many’
BKP_c3,B = 00:02:50.410,E = 00:02:51.210

(iv) HS only on NOT, see (39) and (41).
(v) HS only on predicate:

(44) HS
WANT RISK PRO^{→3}
VERB VERB PRO
‘I don’t want to risk that.’
SVIAP_DH,B = 00:00:51.741,E = 00:00:53.111

(vi) HS spread onto object:

(45) HS
NOTHING WASTE TIME
NEG-particle VERB NOUN
‘(oral instruction) doesn’t waste time’
AMW1_c4,B = 00:08:56.965,E = 00:08:57.845

13 The categorisation ‘SVO’ is in inverted commas because it has yet to be established (and I do not wish to presume) that grammatical relations such as ‘subject’ or ‘object’ are necessary or appropriate in describing the grammar of Auslan (Johnston 2014a, 2017b).

(vii) HS spread onto subject:

(46)

						HS
BECAUSE	DET	TEACHER	NOT	UNDERSTAND	SIGN	
CONJ	DET	NOUN	NEG-particle	VERB	NOUN	
'because the teachers don't understand sign language.'						
ADC_c3,B = 00:00:52.335,E = 00:00:54.436						

(viii) Negative Concord, see e.g. (18)

As we have seen, Auslan almost always uses manual NEG-negator in clause negation, yet it is displaying some features believed not to be associated with manual dominant negation according to Oomen & Pfau (2017). Indeed, almost every possible permutation of HS spreading cited in Zeshan (2004, 2006), Pfau (2015), and Oomen & Pfau (2017) is attested in the corpus. Space and word limits prevent us from listing them all here, but see the Supplementary Materials for all of the examples cited in Oomen & Pfau with an Auslan Corpus time stamp of at least one equivalent for each.

Overall the data suggest that in Auslan the domain of spreading of HS over constituents of the negated clause does not appear to be constrained by specific syntactic constructions. It is not the case that HS spreads only over some types of constituents but not others, e.g. necessarily over the NEG-negator and its negated predicate, and/or over the ‘subject’ or ‘object’ arguments with or without regard to their position relative to the NEG-negator and the negated predicate, or the NEG-verb.

5.6 The spreading of headshaking across clauses and/or negative transport

Like intra-clause HS spreading patterns, inter-clause spreading has been assumed to show that SL HS is linguistic, rather than gestural (Padden 1988; van Gijn 2004; Pfau 2015; Oomen & Pfau 2017). Spreading can occur in clause complexes (between two or more clauses in a dependency relationship) or in complex clauses (in which one clause is embedded within another as an argument or complement of a verb in the matrix clause, i.e. sentential complementation). There are two different issues here: the one regarding HS spreading from a negated matrix clause to a complement clause (which is not negated by the spread HS); the other regarding negative transport (i.e. negative raising) in which negation marking moves from the embedded clause to the matrix clause.

With respect to HS spreading from a matrix to a complement clause, the focus of Padden's (1988) observations of ASL and van Gijn's (2004) of Sign Language of The Netherlands (NGT) is that the HS marks the syntactic subordination of the complement to the matrix clause. This issue will not be pursued further here because spreading in these environments would be no different than the spreading in simple clauses, as already described, i.e. it is driven primarily by pragmatic and semantic factors whose scope can unproblematically cover the entire utterance unit, and is thus not evidence of formal marking of syntactic subordination.

With respect to HS moving from complement clause to matrix clause, the focus of Pfau's (2015) and Oomen & Pfau's (2017) discussion, similar observations can be made. However, if one assumes HS is itself a marker of negation, then the movement of HS from dependent or embedded environments to the matrix could be treated as an instance of negative transport commonly understood (Horn 1978). Consider the following English example: *I don't think she'll come*, rather than *I think she won't come*. In this example, the negator appears in the matrix clause, rather than the complement clause. However, potential corpus equivalents do not seem to behave as might be expected, i.e. being linguistically constrained.

In Auslan we see not so much the 'movement' of the negator HS from the embedded or complement clause to the matrix clause, rather we see its spread, i.e. HS is still retained in the latter, even if it also appears in the former. This should, in principle, leave the complement clause still negated while the matrix is also negated (*I don't think she won't come*). However, the meaning does not support this:

- (47) HS
 [PRO^{→1} PALM-UP PRO^{→1} THINK] [NOT NEED PHOOEY]
 'Well, no I disagree, I think it's not needed at all.'
 (not 'Well I don't think that it's not needed, at all.' i.e. not 'Well I think that it's needed.')
 ADC_c4a,B = 00:20:07.090,E = 00:20:07.870

This type of spreading of HS seems to be subject to the kinds of pragmatic and semantic factors we have already discussed, rather than parallel negative transport. Hence the translation in (47). The reference is to neonatal screening for deafness, i.e. the HS is either part of the denial of a presupposition (namely, that neo-natal screening for deafness is good and supported by deaf people too), or is simply regressive spreading from the complement clause and does not change the polarity of the matrix, or it is in fact overdetermined, i.e. both factors operate.

The same phenomenon is attested when what is supposedly moved is both a HS and a NEG-negator:

- (48) $\frac{\text{HS}}{\text{[NOT THINK] [PRO}^{\rightarrow 3}\text{ NOT GOOD IDEA]}}$
 ‘I don’t think it’s a good idea.’ or better ‘No I disagree, I don’t think it’s a good idea.’
 (lit: ‘I don’t think it’s not a good idea.’)
 BAOB_c4a,B = 00:12:40.270,E = 00:12:41.860

Unlike negative transport, there still appears to remain overt negation in the complement clause. Interestingly this is not manifested in the meaning because the two negatives do not cancel each other out (\neq ‘I think that it’s a good idea.’). It appears more like a case of double negation vis-à-vis the NEG-negator, and spreading vis-à-vis the HS, as well as indexing a response frame (hence the second, better, translation). As we have seen, in Auslan multiple negations are possible, without producing a positive reading, see (18).

Nonetheless, there are some attested examples that look much closer to negative transport:

- (49) $\frac{\text{HS}}{\text{[PRO}^{\rightarrow 1}\text{ NOT THINK] [WORK]}}$
 ‘I don’t think that it’ll work.’ (not: ‘I don’t think that it won’t work.’)
 SKP_c4a,B = 00:08:18.007,E = 00:08:18.967

The *manual* signs in this example create a pattern that closely parallels English negative transport, but the nonmanuals do not (if we assume they are, in fact, part of the grammatical negative marking of the clauses). With respect to the manual signs, we should not be surprised to find English-like constructions appearing in Auslan due to language contact. As for (49), it is either **not** the same as the English structure because there remains a negative marking in the complement clause (the HS) and this does not occur in English negative transport; or it **is very much** the same as the English because the HS is not, in fact, part of grammatical negation. After all, English speakers can be easily imagined saying *I don’t think it’ll work* while headshaking throughout (cf Padden 1988; van Gijn 2004).

Once again it appears hard to support the notion that HS is a formal marker of grammatical negation in Auslan. The following example thus appears to be a case of spreading rather than negative transport.

- (50) HS
 [PRO^{→3} SAY] [KNOW-NOT WHO]
 ‘They say they don’t know who (it is).’
 (not: ‘They don’t say they don’t know who (it is).’)
 SKP_c4a,B = 00:16:53.709,E = 00:16:54.769

And the following appears to be a case of spreading *and/or* response frame indexing rather than negative transport.

- (51) HS
 [PRO^{→1} BELIEVE] [WILL-NOT CHANGE]
 ‘(No I disagree) I believe it won’t change.’
 AAM1_c4,B = 00:26:38.315,E = 00:26:40.170

In sum, not only do HS spreading patterns in negated clauses not appear to be linguistically constrained, but the participation of HS in negative transport also appears open to question.

5.7 Summary

The results show that Auslan users negate clauses using only a headshake extremely rarely; instead, signers almost always negate clauses using NEG-related manual signs which, in just over half of cases, are also likely to be accompanied by a headshake. Many of these headshakes add pragmatic negative appraisal about the co-occurring clause, or negate an unstated or implied proposition or assumption. In these clauses the headshake does not, strictly speaking, also formally mark clause negation additional to that provided by the NEG-related manual sign. The pragmatic role of headshaking is reinforced by the fact that they are much more likely to co-occur during manually negated clauses that are part of a response or a *response frame*. The remaining cases in which headshaking does not add negative appraisal appear to be semi-regular non-obligatory pairings of a nonmanual sign (the headshake) with a manual sign (the NEG-related element). Headshakes also frequently appear in non-negated clauses: so frequently, in fact, that this is overwhelmingly the most common construction in which headshakes are found. Headshakes in manually negated clauses thus appear to be like the majority of headshakes in non-negated clauses in the corpus which, in turn, are like headshaking in the face-to-face language of comparable spoken language using communities (cf Kendon 2002; Harrison 2009, 2010; Andrén 2014). Finally, position and spreading behaviour of

headshakes during manually negated clauses appears related to pragmatic and semantic factors rather than language-specific syntactic constraints.¹⁴ This interpretation of the spreading data accords with observations on the meta-comment role that headshake plays in the language, the rarity of HS-only clause negation, and the variability of the position of NEG-related signs within clauses, complex clauses and clause complexes.

6 Discussion

According to these results, Auslan appears to be *primarily* manual dominant for negation because manual negation is overwhelmingly found in negated clauses, HS is optional, and HS-only negation is possible, but rare. (However, from the perspective of *possible* means of negation, Auslan could still be classed as a nonmanual dominant SL.) This result is still somewhat unexpected from either perspective, given that in previous research Auslan appeared nonmanual dominant in both *primary* and *possible* ways of negation. Moreover, the Auslan data also showed that the behaviour of HS in negated clauses was far less like the proposed typology (Zeshan 2004, 2006) and subsequent related research (van Loon et al. 2014; Pfau 2015; Oomen & Pfau 2017) describes HS or expects it to behave in SLs, both as a sole marker of negation and in terms of constraints on its spreading in manually negated clauses. There are possible methodological and theoretical explanations for this discrepancy.

With respect to methodology, the use of a naturalistic corpus in the Auslan study may be an important factor in the results. Zeshan reports that the data in her sample set were mostly gleaned from questionnaires answered by SL researchers and/or representatives of deaf associations and communities, on the one hand, and from fragmentary published resources by SL researchers—often based on elicitation—on the other. The data were not supported by or drawn from reference grammars of any of these SLs (because none existed) and, certainly, the data were not corpus-based. Given that linguistic typology generalises over large samples of languages, one may legitimately point out that the facts of one SL, Auslan, do not in themselves necessarily invalidate a typological generalisation based on 38 SLs. However, if the reported profile of many of the languages in a sample appears incomplete, provisional, or actually inaccurate

¹⁴ There is recent potentially supporting evidence for this observation: neuroscience research on negative headshakes in BSL suggests they are not processed syntactically (Campbell & Woll 2017).

one may legitimately raise questions as to the validity of a typological generalisation based on them. The results of three corpus-based studies of negation in SLs that have been conducted (this Auslan study, Lutzenberger 2017; on Kata Kolok, and Oomen & Pfau 2017; on NGT) suggests this issue deserves serious consideration. They have all produced observations that are at variance with previous descriptions of each SL. The Auslan results have been presented. The study of Kata Kolok reported headshaking with manual negation was common and there were many attested examples of nonmanual-only negation, mostly by HS-only (contra Marsaja 2008). The study of NGT reported greater variability in the NGT corpus data than in earlier studies by Coerts (1992); van Gijn (2004); and Smith (2004), especially with respect to the frequency of manual negation. And, the Kata Kolok study, like the Auslan study, found more variety in headshake spreading behaviour than described in the SL typological literature. Given that most SL-using communities are fragmented, very young and have few native users (Johnston 2010, 2014b; Fenlon et al. 2015; Schembri et al. 2018), studies of negation based on naturalistic corpora could well present a much more variable picture of what can and can't occur than hitherto reported.

With respect to theory, assumptions about the grammaticalisation of some nonmanual signs in SLs may be open to question. The most-cited SL researchers have long maintained that there is a radical discontinuity between gesture and SLs (e.g. Petitto 1987; Singleton et al. 1995). It has been claimed that gestures become linguistic when they take on certain functional roles as part of a SL. Indeed, an important aim of SL research over the past fifty years has been to show that what may appear to the naïve observer to be gestures when deaf people sign are, in fact, morphemes organised and processed on linguistic principles. It was shown that even though some content and functional signs could trace their origins to gestures found in the ambient spoken language communities, they had evolved over time into language-specific conventional pairings of forms and meanings (e.g. Janzen & Shaffer 2002; Wilcox 2004). This observation applied especially to manual gestures, but also applied to nonmanual gestures, such as particular head movements and facial expressions.

Assumptions about headshaking that underlie the proposed typology of negation in SL are a case in point. It is claimed that headshaking during negation in SLs has grammaticalised and is not gestural. But is this accurate? As we have seen, the data presented here suggest that this appears not to be the case for Auslan. It is possible that larger representative datasets of other SLs may reveal that Auslan is not alone.

Moreover, there is also another reason for looking at the phenomenon of headshaking in Auslan, and other SLs, in another way. It stems from research into co-speech gestures (e.g. Okrent 2002; Kendon 2004) and SLs (e.g. Armstrong

& Wilcox 2007; Liddell 2000, 2003) which has opened up a new perspective on the relationship between gesture and language. It has shown that language in both modalities contains gesture, and that gestures themselves vary from speech community to speech community, display different degrees of conventionality in form and meaning, and, importantly, can make an independent and significant contribution to the meaning of spoken or signed utterances. Gestures are clearly present when humans communicate in language, whether spoken or signed (Okrent 2002; Dingemanse 2011; Johnston 2013b).

Within this context, the Auslan data suggest that headshaking behaviour by signers is similar to the headshaking behaviour of speakers of English as described by Kendon (2002). The similarity becomes evident if we remember to adopt a multimodal approach to spoken languages, i.e. consider them in their face-to-face mode when comparing them to SLs (Johnston 2013b). For instance, in a study on the acquisition of spoken Swedish, Andrén (2014) demonstrates how headshaking is acquired with particular negative words and phrases to form tightly bound symbolic units. Likewise, in Auslan, there are many NEG-related signs that attract a headshake, and some of these more than others, e.g. final reprise NO-WAY. But they are not obligatory. Similarly, in a study on the site and spreading ('node' and 'scope') of headshaking with negation in spoken English, Harrison (2009, 2010) shows that it is not as idiosyncratic as previously thought, but is patterned, not unlike the patterns observed in the Auslan data. Interestingly, research from a multimodal perspective suggests that headshaking during negation in SLs may be less constrained than previously assumed in the literature, while in spoken languages it may be less unconstrained than previously imagined. A multimodal perspective on language overall seems to be leading to a degree of convergence in our understanding of some phenomena found in both SLs and spoken languages.¹⁵

¹⁵ It is somewhat simplistic to discriminate symbolic units into those that are gestural as opposed to those that are linguistic. Discussion of the details of an alternative viewpoint is beyond the scope of this paper, but suffice it to say that recent work into multimodality, co-speech gesture and SL description suggests that Peirce's (1955) semiotic theory of sign types can help us rethink this relationship. There is an increasing recognition of 'semiotic diversity' in all face-to-face language, signed or spoken (Kendon 2014). Semiotic diversity means that exchanges or moves in face-to-face communication in both language modalities should be understood as 'composite utterances' in that they are often composed of signs of more than one semiotic type (as described by Peirce) which, together, all form a part of language. For examples of this approach see Enfield (2009) for spoken languages, and Johnston (2013b) and Janzen (2017) for SLs. Indeed, Increasing awareness of multimodality in spoken language has recently led some other SL researchers to re-consider the role of gesture in SLs (Goldin-Meadow & Brentari 2017).

Indeed, even the small number of HS-only negated clauses that were identified are perhaps not unequivocal instances of grammatical negation, from two perspectives. First, consider that the HS in (1) could have instead been produced immediately after, rather than simultaneous with, the utterance (recall that example (1) was earlier used to show that in spoken English a co-occurring headshake during a grammatically positive statement can result in a meaning which is pragmatically negative):

- (52) utterance You're wearing that to the party!? [HS]
 (i.e. **I don't approve** or **I don't give my permission**)
 paraphrases 'You're wearing that to the party!? [(**No I don't approve, so you're not.**')] or
 'You're wearing that to the party!? [(**No you aren't doing that.**')] or
 "You're **not** wearing that to the party."

In (52), as in (1), we do not consider the English spoken clause to be grammatically negative, yet the former is very similar to the majority of the Auslan tokens of HS-only negation which were part of an *internal response* frame, as in (25) or (26). It may be moot therefore if the small set of HS-only negative internal responses in the Auslan data are correctly treated as instances of clause negation, even though they have been described as such in this study because they are comparable to negative constructions cited in the SL literature. Despite being analysed as one clause because the two parts seem to form one prosodic unit (hence the tag *internal response*), the relationship could alternatively be described as one of dependency between two clauses, the second of which is only expressed by the headshake. If anything is negated, it is the second (implied) clause, rather than the first. Of course, the implied clause has no overt wording in (1) or in (52), but in the sequential version the implied negative, in bold, could also actually be verbalised together with the headshake. Constructions of this type in Auslan may in fact be borderline cases of clause negation.

Second, turning now to the tiny set of HS-only negated clauses identified in the corpus *which were not also part of an internal response frame*, but co-occurred with the utterance, we must recognise the possibility that they too use headshake to signal an implied negative proposition vis-à-vis the overtly articulated grammatically positive clause, just as in the English example (1). Take example (2), reproduced here with alternative paraphrases:

- (53) _____ HS
 SEE CLIFF FS:CLIFF
 ‘(Unexpectedly/unfortunately it didn’t happen that) (the dog) saw the cliff edge’ or
 ‘(The dog) seeing the cliff **unfortunately did not happen**’ or
 ‘(The dog) **didn’t** see the cliff edge.’
 BGMQ_c7a,B = 00:01:50.140,E = 00:01:52.390

Or consider example (38) also reproduced with alternative paraphrases:

- (54) _____ HS
 LOOK^{2→3} PRO^{→2}
 ‘**No,I don’t want** you to look there/ **No,I don’t want that** you look there.’ or
 ‘Looking-there you **no that isn’t allowed/no I don’t want that**, or
 ‘**Don’t** you look there (at the picture).’
 MKB2_c9a,B = 00:01:36.885,E = 00:01:38.661

These types of examples may thus not be straightforward cases of HS-only clause negation in Auslan either, as the alternative paraphrases try to capture. There is no doubt, however, that a negated clause also clearly captures the intended meaning of these ‘counter-factual negation constructions’ (constructions in which one clause proposes a possible state of affairs and is immediately followed by an act of denial (headshaking) or a second clause that explicitly denies or counters it, often also with headshaking). Herein lie the seeds of the potential grammaticalisation of headshake. One can easily imagine a scenario in which the headshaking spreads over the positive/neutral clause and all other material is elided (cf. Pfau 2015).

Perhaps it is not surprising that HS has not grammaticalised in this environment as a marker of negation in Auslan because the construction appears to be rare. Of course, if the construction was extremely common in an SL, then it is possible HS may grammaticalise as a marker of negation. However, given the methodological concerns discussed above, we would still be much more cautious in concluding that HS has grammaticalised as a marker of negation in many SLs cited in the literature because not enough is known about the range and frequency of possible types of negative constructions each uses, and the discourse environments in which they occur.

From a multimodal perspective, I maintain that headshaking does not need to have undergone a transformation from gestural to linguistic substance in order to perform the functions it does in Auslan. Of course, this observation does not rule out the possibility that in SLs manual gestures may lexicalise and grammaticalise or

that nonmanual gestures may grammaticalise directly (bypassing lexicalisation) (Wilcox 2004; Janzen 2012; van Loon et al. 2014). However, whether or to what extent lexicalisation and/or grammaticalisation processes have occurred with each potential candidate from the manual and nonmanual gestural substrate in each SL is an empirical question. It should not simply be assumed. The evidence from the Auslan Corpus is that grammaticalisation of HS has not occurred in this language. On the other hand, the processes of lexicalisation and grammaticalisation seem to be well advanced for those manual negative signs that evidently have their origins in the gestural substrate.

7 Conclusion

Taking Zeshan's typology at face value, Auslan appears to be primarily manual dominant for negation. However, the behaviour of headshake in Auslan is far less how the SL research literature describes headshake, or would predict it to behave in negation. Headshaking thus appears not to have been incorporated into the linguistic system of Auslan in any unexpected or language-specific way. It is possible that Auslan is one of those SLs that "go beyond the prototypes" (Zeshan 2006: 46) and is an outlier within this typological space; but, if that is the case, then so is Kata Kolok, another SL that has been corpus-analysed for negation. We have no real way of knowing if they are exceptional because we simply do not have enough naturalistic data on negative constructions across multiple SLs.

The behaviour of headshaking in Auslan has implications also for the typology of negation in SLs first posited by Zeshan (2004) and applied by contributors to Zeshan (2006), and further developed by Pfau (2015) and Oomen & Pfau (2017). Though Zeshan describes the typology as an empirical generalisation, the two prototypes that underpin this typology—nonmanual versus manual dominant for negation—may represent an over-interpretation or over-systematisation of the data that were once available. We still know very little about negative constructions in most SLs, so perhaps the typology should not be taken at face value. A better understanding of negation in SLs, not to mention many other aspects of SL structure, is certain to come when representative SL linguistic corpora become commonplace, are used to test generalisations and claims, and are used to inform reference grammars and make theoretical and cross-linguistic generalisations in the first place.

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Appendix 1

The transcription conventions used in this paper.

GLOSS (e.g. FINISH, MEET, etc.)	In sign language research sign glosses (rough translations of the core meaning) are written in (small) capitals.
GLOSS-GLOSS (e.g. CAN-NOT, WILL-NOT, etc.)	A single sign glossed with more than one English word.
GLOSS ^{→3} (e.g. POSS ^{→3} , PRO ^{→1} , LOC ^{→1} etc.)	A directional sign, i.e. a sign which is directed to or move towards a certain location, the target (1, 2 or 3): 1 = first person, signer, near signer 2 = second person, interlocutor, near interlocutor 3 = not first or second person, or not near first or second person. An additional number before the arrow shows origin if this is relevant.
DSX(Y):DESCRIPTION (e.g. DSL(1-UPRIGHT):PERSON-HERE)	DS prefixes a depicting sign (of type x) which contains a classifier handshape (of handshape y). The contextual meaning is written after colon. Used in this paper: DSM = MOTION; DSL = LOCATED-OBJECT; 5 = SPREAD HAND, 2 = TWO HAND, B = FLAT HAND, 1 = UPRIGHT INDEX HAND.
FS:WORD (e.g. FS:DO, FS:LAZY, etc.)	FS prefixes a fingerspelled word
GLOSS = GLOSS	= separates two simultaneously articulated signs (LEFT-HAND/ RIGHT-HAND). The right hand is the strong hand for right-handed people. (All the signers are right-handed in this dataset.)
,	a pause is represented with a comma
HS	The domain of a nonmanual behaviour. In this case, the headshake (HS) extends only over the period of the second and third glosses.
GLOSS1 GLOSS2 GLOSS3	
POSS	Possessive pointing sign.
PRO	Pronominal pointing sign.
LOC	Locative pointing sign.

(continued)

(continued)

NMS:	Nonmanual Sign (place-holder on the glossing tier if no manual sign occurs during its articulation): followed by code for, or description of, the nonmanual activity.
HS	Headshake.
HS1	One strong turn of head.
NOD	Nodding.
NOD1	One single nod.
!	Stressed production and visual fixation with staring and/ leaning forward.
↑	Range of upper face features most salient of which is raising of eyebrows.
↓	Range of upper face features most salient of which is lowering of eyebrows (knitted brow).

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