Article

Emergence or Grammaticalization? The Case of Negation in Kata Kolok

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Abstract: Typological comparisons have revealed that signers can use manual elements and/or a non-manual marker to express standard negation, but little is known about how such systematic marking emerges from its gestural counterparts as a new sign language arises. We analyzed 1.73 h of spontaneous language data, featuring six deaf native signers from generations III-V of the sign language isolate Kata Kolok (Bali). These data show that Kata Kolok cannot be classified as a manual dominant or non-manual dominant sign language since both the manual negative sign and a side-to-side headshake are used extensively. Moreover, the intergenerational comparisons indicate a considerable increase in the use of headshake spreading for generation V which is unlikely to have resulted from contact with Indonesian Sign Language varieties. We also attest a specialized negative existential marker, namely, tongue protrusion, which does not appear in co-speech gesture in the surrounding community. We conclude that Kata Kolok is uniquely placed in the typological landscape of sign language negation, and that grammaticalization theory is essential to a deeper understanding of the emergence of grammatical structure from gesture.

Keywords: Kata Kolok; negation; grammaticalization; language emergence; language change; non-manuals; gesture

1. Introduction

Studies on sign languages from all around the world have demonstrated that signed languages—just like spoken languages—vary from each other, and that, for the most part, the attested variation aligns well with typological patterns identified for spoken languages. A fairly recent addition to the typological study of signed languages are rural isolates, which typically arise in areas of the Global South with high incidences of hereditary deafness (Zeshan et al. 2013; de Vos and Pfau 2015). The expression of negation in signed languages has received considerable attention in recent years. In fact, standard negation is one of the domains of linguistic inquiry that gave the impetus to the field of sign language typology (Pfau 2016; Zeshan 2004). In the present study, we add to the picture data from Kata Kolok (KK), a rural, isolate sign language from Bali. Our goal is twofold: First, we aim to situate Kata Kolok typologically with respect to other sign languages, thus contributing to our understanding of variation in this grammatical domain. Second, the use of corpus data from different generations of Kata Kolok signers also allows us to address age-related variation that may be indicative of ongoing language change, in particular the emergence of non-manual negation strategies.

We start in Section 2 by providing some background on the emergence of structure in visual communication systems, addressing also documented instances of grammaticalization. In Section 3, we present a typological sketch of negation in spoken and signed languages, and in Section 4, we briefly introduce sociolinguistic characteristics of Kata

Kolok and its users. The methodology of the present study is laid out in Section 5. Our findings are then presented in Section 6, separately for the specific manual and non-manual markers of negation that we identified. In the discussion in Section 7, we address synchronic and diachronic aspects pertinent to the study of Kata Kolok negation: First, we evaluate the theoretical and practical implications of the observed patterns from a typological perspective; second, we sketch potential pathways of diachronic language change. We close with some remarks on the limitations of the present study and suggestions for future research in Section 8.

2. On the Emergence of Structure in Visual Communication Systems

2.1. Emergence

As languages emerge, structure emerges (Kocab and Senghas 2021). Given the time depth of spoken languages, it is notoriously difficult to make claims about the emergence of structure at their early stages, but various types of experimental data have been taken to provide evidence, e.g., iterated learning experiments involving non-linguistic structures (Kirby et al. 2008) and gestural descriptions produced by hearing non-signers (Goldin-Meadow 2014; Meir et al. 2017; Motamedi et al. 2019). The sign languages which are still in use are assumed to be much younger, with the oldest ones being approximately 250–300 years old (McBurney 2012). This time depth is reminiscent of some creole languages, with which sign languages have been argued to share certain (socio)linguistic properties (see Adone 2012 for an overview). Still, with respect to availability of data, the situation for sign languages is not much different from spoken languages. As sign languages do not have a written form, the oldest informative documents available date back only 100 years (Supalla 2001) and extensive corpus data are much more recent.

While the opportunities to study the emergence of new sign languages remain few and far between (cf. Meir et al. 2010; de Vos and Nyst 2018), linguists have been able to study this phenomenon by comparing sign language use by older and younger signers in a handful of cases. For example, they were able to capture, among other things, the emergence of word order and spatial grammar (for Nicaraguan Sign Language, see Kegl et al. 1999; Senghas and Coppola 2001; for Al-Sayyid Bedouin Sign Language, see Sandler et al. 2005; Meir and Sandler 2020), the gradual development of phonology (Sandler et al. 2011), and the use of reference tracking devices (Stamp and Sandler 2021). While it is impossible to present a comprehensive overview within the context of this paper, it is important to note that these studies have shown mixed results across grammatical domains and across language communities. For example, while Dachkovsky et al. (2018) report a reduction in the simultaneous use of manual and non-manual markers in personal life stories in Israeli Sign Language, Stamp and Sandler (2021) report an increase in simultaneity in the use of referential shift devices. Moreover, while Al-Sayyid Bedouin Sign Language did not develop spatial verb morphology over the course of three generations, Israeli Sign Language—about the same age as ABSL—did develop spatial verbal morphology in the same three-generation time period (Padden et al. 2010). In Nicaraguan Sign Language, spatial morphology emerged even more rapidly (Senghas 2005). All in all, these comparisons suggest that who learns the sign language and how signers interact may well lead to very different patterns of grammaticalization. In order to arrive at a unified understanding of the earliest stages of language formation, we therefore require more intergenerational analyses focused on particular grammatical domains.

As for negation—the focus of the present chapter—we are not aware of any other work on emerging sign languages, perhaps with the exception of a case study reported by Franklin et al. (2011). Franklin and colleagues report that David, the American homesigner whose productions they analyzed, systematically employed non-manual and/or manual markers of negation, namely a side-to-side-headshake and a 'flip' gesture, the former being the most frequent marker (84% of the negative sentences). Furthermore, they observed that 79% of the headshakes appeared sentence-initially. The authors conclude "that side-to-side headshakes crystallize early as the expression of logical (i.e., sentential) negation in David's

homesign system, and that the form for this meaning has a fixed position at the beginning of the sentence" (Franklin et al. 2011, p. 404).

2.2. Grammaticalization: A Special Case of Language Change in Sign Languages

Sign languages, just like spoken languages, are subject to synchronic and diachronic variation. As for the former type of variation, it has been demonstrated that sociolinguistic variables like region, age, gender, ethnicity, and family background (deaf relatives) may be responsible for variation at all levels of linguistic structure (see Lucas et al. 2001; Schembri and Johnston 2012; Bayley et al. 2015 for overviews). As for the latter type of variation, it can be due to language-external and language-internal factors. In the following, we will only be concerned with age-related variation and its relation to language change, focusing, for the most part, on the role of language-internal factors, because variation across generations allows us to investigate the unfolding process of grammaticalization.[1] That is to say, by comparing signers from different age groups, we are able to see how learning biases may shape language structure from one generation to the next.

Age-related changes have already been reported for American Sign Language (ASL) by Frishberg (1975), who documents systematic changes in the place of articulation and handshape of signs (Frishberg 1975; for BSL, see Woll 1987). While these changes were not explicitly linked to sociolinguistic factors, but were taken to be triggered by ease of production and/or perception, Schembri et al. (2009) demonstrate that phonological variation, with respect to place of articulation in Australian Sign Language (Auslan), is driven by age; lowering (of a particular class) of signs occurs as a result of age, among other (socio)linguistic factors, such that younger signers drive the change towards lowered locations. As with the other sociolinguistic factors, reports on (morpho)syntactic variation related to age are scarce in the literature.

Finally, an important language-internal process leading to changes in the lexicon is grammaticalization, whereby lexical elements take on a grammatical function. It has been shown that grammaticalization works pretty much the same way in sign languages as it does in spoken languages. For instance, in both modalities, auxiliaries (e.g., future tense markers) commonly develop from verbs and complementizers from nouns (Pfau and Steinbach 2011). Yet, there is also an interesting modality-specific side to grammaticalization, as in sign languages, manual and non-manual gestures may grammaticalize, such as pointing gestures (see Coppola and Senghas 2010 for Nicaraguan Sign Language; de Vos 2015 for Kata Kolok; Dachkovsky 2020 for Israeli Sign Language), the 'palm up' gesture (which belongs to the same gesture family as the before-mentioned 'flip' gesture; cf. Cooperrider et al. 2018; Mesh and Hou 2018), and headshakes (cf. Pfau 2015). In a sense, grammaticalization of a gesture displays properties of language-external and language-internal change. In a first step, the gesture enters the language system, and this, of course, involves contact with the community in which the gesture is used. Subsequently, the gesture may take on further, increasingly grammatical functions, as has been argued, for instance, for pointing (Pfau 2011; Kwok et al. 2020) and 'palm up' (van Loon et al. 2014)—and this is fully in line with traditional conceptions of grammaticalization for spoken languages. This modality-specific potential to grammaticalize gestures will turn out to be relevant in the context of our study.

3. Negation: A Typological Overview

Our study is concerned exclusively with the encoding of standard negation. Standard negation describes the most basic strategy to convert a sentence (S1) into a semantically opposite sentence (S2) so that S1 is true whenever S2 is false and vice versa, or, put differently, the most neutral strategy for changing the polarity of a sentence from affirmative to negative. Standard negation is by definition sentential (e.g., English *He is not happy*). Consequently, constituent negation (e.g., by means of affixation: *He is unhappy*) and other specialized forms of negation, such as negative adverbials (*He is never happy*), neg-words (*Nobody is happy*), negative existentials (*There is no happiness*), and negative imperatives (*Don't be happy!*) go beyond the scope of the present study. Deviating from some of the

definitions offered in the literature (e.g., Miestamo 2005; Dahl 2011), but in line with the procedure applied by Oomen and Pfau (2017) in their study on standard negation in Sign Language of The Netherlands (NGT), we will include in our data set sentences with (apparent) nominal and adjectival predicates, for the simple reason that determining word class is notoriously difficult in Kata Kolok (Schwager and Zeshan 2008).

Some variation in the theoretical approach notwithstanding, classifications of negation are often based on the nature of the basic clause negator (Payne 1985; Dahl 2011)—and this is the strategy we adopt in the next subsection on spoken languages. We then turn to sign languages and show how sign language negation has been classified, and how this compares to spoken languages.

3.1. Spoken Languages

Typological studies on a large number of typologically diverse spoken languages have revealed that by far the most common strategies for expressing negation are negative particles and negative affixes (Dahl 2011, 1979; Payne 1985; Dryer 2005; Miestamo 2005).[2] The use of a negative particle, i.e., an uninflected and free-standing (in this case, pre-verbal) morpheme, is illustrated in the Indonesian example in (1), while example (2) shows that Turkish employs a morphological strategy, viz. the negative suffix *-mV*, which attaches to the verbal root and is subject to vowel harmony.

(1)   a.   *Saya*   *tidur*
           I   asleep
           'I am asleep.'
     b.   *Saya*   *tidak*   *tidur*
     a.   I   NEG   asleep
           'I am not asleep.'   [Indonesian; Dahl (2011, p. 19)]

(2)   a.   *Oku-*   *yor-*   *um*
           read-   PROG-   1SG
           'I am reading.'
     b.   *Oku-*   ***mu-***   *yor-*   *um*
           read-   **NEG-**   PROG   1SG
           'I am not reading.'   [Turkish; Dahl (2011, p. 14)]

Beyond these two very common options, we wish to introduce two further strategies, as they will become relevant in our discussion of sign language negation in the next subsection. First, some languages require the combination of two (or more) elements for the expression of standard negation; this is commonly referred to as split negation or Negative Concord. French is probably the most famous example, but in (3), we provide an example from Cuiba, a Guahiban language of Venezuela. In this language, a pre-verbal particle combines with a verbal suffix, thus, in a sense, combining the Indonesian and the Turkish strategy.

(3)   *wajjan-* *be*   ***jopa***   *apänchi-*   ***yo-***   *be*
      1.INCL- DU   **NEG**   drink.1.INCL-   **NEG-**   DU
      'We two do not drink.'

                                 [Cuiba; Mosonyi et al. 2000, in Miestamo (2005, p. 156)]

Second, in a few tone languages, the morphological change that realizes negation may be suprasegmental in nature. In Mbembe, a Niger-Congo language from Nigeria, for instance, it is only the tone change (from high to low) on the tense prefix that signals negation, as is shown in (4).

(4)   a.   *mɔ́-*   *tá*
           3.FUT-   go
           'He will go.'
     b.   *mɔ̀-*   *tá*
           3.NEG-   go
           'He won't go.'   [Mbembe; Dahl (2011, p. 17)]

3.2. Sign Languages

For sign languages, too, efforts have been made to classify their negation systems. However, the most common typological classification is different from that suggested for spoken languages in that it focuses on the use and combination of manual and non-manual negative markers.

All sign languages studied to date employ manual negative signs and specific non-manual markers—mostly a headshake[3]—for the expression of standard negation. The way in which these two types of markers combine, however, may differ from one sign language to the next. Consider the two examples in (5) from Catalan Sign Language (LSC) and Italian Sign Language (LIS), respectively.[4] At first sight, the two negated clauses look very similar: both sign languages have SOV order, and the negative particle (NOT/NON) follows the verb. In fact, even the form of the negative particle is similar: a handshape with extended index finger (fingertip pointing upward) performing a repeated side-to-side movement in front of the signer's body. Additionally, in both examples, a headshake (hs) accompanies the manual negator. However, in LSC, the headshake is not confined to co-occurring with the negative particle; it may optionally spread onto the verb or the verb phrase, as indicated by the broken line in (5a). In contrast, in LIS, the headshake cannot spread beyond the negative particle.

(5) a.
$$\underbrace{}_{\_\,\_\,\_\,\_} \quad \underbrace{}_{\_\,\_\,\_} \quad \underline{\text{hs}}$$

SANTI	MEAT	EAT	NOT

'Santi doesn't eat meat.'   [LSC; Quer (2012, p. 318)]

b.
$$\qquad\qquad\qquad\underline{\text{hs}}$$

PAOLO	CONTRACT	SIGN	NON

'Paolo didn't sign the contract.'   [LIS; Geraci (2005, p. 221)]

The possibility of spreading already suggests that in LSC, the headshake is less tightly associated with the manual negator than in LIS. That this is indeed the case is further evidenced by the observation that using the manual particle is optional in LSC, that is, sentences are commonly negated by a headshake only in this language. In this case, the headshake minimally accompanies the verb, but it may optionally spread onto the object (6a). As opposed to LSC, headshake-only negation is impossible in LIS, irrespective of the scope of the headshake, as indicated by the brackets in (6b).

(6) a.
$$\qquad\underbrace{}_{\_\,\_\,\_\,\_} \quad \underline{\text{hs}}$$

SANTI	MEAT	EAT

'Santi doesn't eat meat.'   [LSC; Quer (2012, p. 318)]

b.

(_____ (_____ (____ (__hs)

PAOLO	CONTRACT	SIGN

'Paolo didn't sign the contract.'   [LIS; Geraci (2005, p. 221)]

Despite syntactic commonalities, LSC and LIS thus belong to different typological groups: LSC is a so-called non-manual dominant sign language, while LIS is a manual dominant sign language (Zeshan 2004, 2006). In the former type, the use of a manual negative sign is optional, and the headshake is capable of spreading. In contrast, in the latter type, the use of a manual negator is obligatory, and the headshake is (generally) confined to accompanying the manual negator. Beyond this broad distinction, it is worth noting that within-group variation with respect to certain grammatical characteristics is also attested, for instance, when it comes to the availability of Negative Concord involving two manual negative signs (van Boven et al. Forthcoming). Additionally, research has claimed that within the group of non-manual dominant sign languages, there are differences in spreading options for the headshake (see Pfau and Quer 2002 for a comparison of LSC, ASL, and German Sign Language, three non-manual dominant sign languages; also see our discussion in Section 7). If confirmed by the analysis of naturalistic corpus data, these combinatorial restrictions would strongly suggest that the headshake is not just a co-speech gesture (cf. Kendon 2002), but rather a grammatical marker, the use of which is language-specific and tightly linked to the syntactic structure of the respective sign language. In

other words, and as already alluded to above, the non-manual gesture has grammaticalized (van Loon et al. 2014; Pfau 2015).

Some recent studies, however, suggest that not all sign languages fit neatly into this two-way classification, that is, the classification may be too simplistic. First of all, it has been argued that in Russian Sign Language, a manual dominant sign language, the headshake is capable of spreading, thus presenting us with a hybrid system (Rudnev and Kuznetsova 2021). Secondly, Kuder (2020) observes for Polish Sign Language that headshake-only negation is attested, but that the headshake almost never spreads beyond a single sign. Finally, a corpus-based study on Auslan (Johnston 2018) suggests that this sign language employs a headshake in negative contexts, but that the headshake is not (yet) grammaticalized. In particular, (i) a headshake is only observed in half of the negative clauses extracted from the corpus; (ii) the headshake hardly ever negates a clause by itself; and (iii) the position and spreading behavior of headshakes, when present, do not appear to be linguistically constrained in this sign language. Johnston (2018) further draws attention to non-manuals surfacing in negative contexts in addition to or instead of headshaking (nodding and negative facial expressions, incl. mouth gestures) and points out the impact these may have on the interpretation of headshaking and other non-manuals as formal markers of negation.

With this in mind, we return to the typological classification of negation in spoken languages (i.e., use of negative particles vs. negative affixes). Pfau (2015) and Oomen and Pfau (2017) argue that the spoken language classification can be applied to at least some sign languages. As for prototypical manual dominant sign languages, they suggest that these sign languages employ a negative particle that is lexically specified for a headshake, that is, the headshake is part of the lexical entry of the manual negator. In contrast, in non-manual dominant sign languages, the negative particle and the headshake are independent negative elements, which implies that these sign languages involve split negation, whereby the manual negator is optional. Pfau and Oomen further argue, adopting a proposal made in Pfau (2008), that the headshake is a suprasegmental affix that attaches to the verb, comparable to tonal affixes in spoken languages. Given this line of reasoning, negation in LSC (and, for instance, German Sign Language) combines characteristics of Cuiba and Mbembe: just as in Cuiba (3), split negation involves a free particle and a verbal affix; just as in Mbembe (4b), the verbal affix is suprasegmental in nature (and just as in, e.g., Colloquial French, one of the two elements is optional).

4. Kata Kolok

4.1. Community Characteristics

Kata Kolok (KK) is a sign language isolate that emerged in a rural Balinese village community (Marsaja 2008; de Vos 2012; Lutzenberger, forthcoming). It thus belongs to the group of so-called rural (or village/shared) sign languages (Nyst 2012; Zeshan and de Vos 2012). Rural signing varieties represent a special sociolinguistic case, as they emerge rapidly in mostly isolated, rural enclaves, often as a result of an exceptionally high incidence of hereditary deafness. Sign languages arising in such contexts are relatively young. As for Kata Kolok, genetic and genealogical evidence indicates the first instance of a deaf cohort approximately six generations ago, and Kata Kolok has been used and acquired by deaf children ever since (Winata et al. 1995; Friedman et al. 1995). Moreover, Kata Kolok, just like other rural sign languages, represents a communicative tool that is shared by the deaf and a large proportion of the hearing community members. Deafness is not stigmatized, and the community has adapted culturally and linguistically to deafness in various ways (Marsaja 2008). Kata Kolok thus serves as means of communication in social, political, and religious contexts. Deaf children receive language input in Kata Kolok from birth, and Kata Kolok has been used at a local primary school as a medium of instruction since 2007 (Marsaja 2008; de Vos 2012).

There is a growing body of research investigating the diversity, as well as the similarities, among rural signing varieties, comparing them with sign languages used in urban

settings (de Vos and Pfau 2015; Meir and Sandler 2020). Until recently, Kata Kolok has developed under virtually no influence from any other sign languages. Yet, nowadays, deaf youngsters may pursue further education in other parts of Bali where Indonesian signing varieties are used, and contact with and influence from other sign languages will thus likely increase (Moriarty 2020; Lutzenberger, forthcoming).

4.2. Typological Sketch

According to Marsaja (2008), the basic word order in Kata Kolok is SVO; yet de Vos (2012) shows that Kata Kolok signers do not primarily rely on word order to mark argument structure, as subject and object are frequently omitted in spontaneous interaction. de Vos (2012) has studied the use of space in Kata Kolok, and reports that the use of an enlarged signing space and an absolute frame of reference are common. Another typologically unusual pattern is the absence of mouthings, i.e., silent articulations of spoken words accompanying signs (Marsaja 2008; de Vos 2012).

4.3. Previous Work on Negation in Kata Kolok

Compared to other signed languages, the range of manual signs considered to be negative in Kata Kolok is rather small. Marsaja (2008) discusses the basic clause negator NEG (glossed as SING in his study) and the negative completive marker NOT.YET (which he glosses as KONDEN), and Perniss and Zeshan (2008) add the sign FINISH, which expresses a negative existential meaning and can be used interchangeably with NEG in most contexts of negative existence and possession. These negative signs occur predominantly in post-predicative or clause-final position, with the exception of NOT.YET, which occurs clause-initially (Marsaja 2008; de Vos 2012). Since the focus of the present study is on standard negation, we will concentrate on the basic clause negator NEG, which is articulated with a 5-handshape performing a side-to-side handwave (Figure 1).

Figure 1. Basic manual clause negator in Kata Kolok including a negative facial expression with furrowed brows and pulled-down corners of the mouth, as described by Marsaja (2008). Adapted with permission from de Vos (2012); copyright 2012 Max Planck Institute for Psycholinguistics.

Marsaja (2008, p. 194) claims that NEG is mandatory in all negative utterances, and provides one example involving doubling of NEG within a clause (but does not further discuss this phenomenon). He further suggests that the use of a headshake is optional in standard negation. In those instances in which a headshake does occur, "it is generally small and quick; it never exceeds the scope of SING's manual component, and never extends to previous or subsequent signs in a sentence" (Marsaja 2008, p. 197). As all sign languages described to date make use of both kinds of markers, this pattern would be typologically highly marked (Zeshan 2006, 2004). In the present study, we add to the picture another non-manual marker—a protruded tongue—addressing also its potential role as a negative existential marker in Section 6.2.2.

4.4. Focus of the Present Study

The current study offers a revised and more thorough account of negation in Kata Kolok. Using naturalistic corpus data, we address the following questions: (i) Is NEG indeed the main negator in Kata Kolok, while the headshake plays a minor role? (ii) What is the role of non-manual markers in Kata Kolok negation? (iii) Is there evidence for language change in the expression of standard negation across generations of Kata Kolok signers? Based on examples previously elicited by Marsaja (2008), we expect to find few instances where NEG co-occurs with a negative headshake. Based on observations from fieldwork and corpus data, however, there is reason to expect that NEG frequently co-occurs with (a) non-manual element(s), specifically a headshake and/or tongue protrusion, and that negation is occasionally expressed without the use of the manual negator. We hypothesize that non-manual negators may still be grammaticalizing within the three generations of Kata Kolok signers studied in this paper. For this reason, we opted for an intergenerational sample of naturalistic corpus data for the current study of standard negation in Kata Kolok.

5. Methodology

5.1. Data

The current study is based on the Kata Kolok Corpus, a naturalistic data set of deaf Kata Kolok signers of generations II through VI (de Vos 2016). The corpus is stored and archived in *The Language Archive* at the Max Planck Institute for Psycholinguistics, The Netherlands (König 2011). For the purpose of this study, three dialogues between close friends with a relatively high level of transcription detail were selected. The most important selection criterion was to cover signers from different generations. Given that there are very few recordings of a single generation II-signer available and that generation VI consists of infants and small children, the final data set comprised generations III through V. Details of the sample, including their length in minutes, are provided in Table 1. The variance in the length of recordings will be taken into account by reporting values of negation per minute rather than absolute frequency.

Table 1. Detailed information on the sample used in the present study.

Generation	III		IV		V	
Participant	Signer 1	Signer 2	Signer 3	Signer 4	Signer 5	Signer 6
Gender	male	male	female	female	male	male
Length of Recording	61 min		18 min		25 min	
Dyad	Dyad I		Dyad II		Dyad III	

With the exception of Palfreyman (2019), who reports a correlation between gender and syntactic position of the negator in two urban signing varieties of Indonesia, gender has never been reported to affect the grammatical realization of negation. For Kata Kolok, there is some indication that gender may affect lexical variation, and we therefore account for individual variation in the statistical analyses by adding signer ID as a random intercept (cf. Mudd et al. 2020).

5.2. Coding and Procedure

Although the selected data included detailed transcriptions, all files were enriched by manual coding, using the annotation software ELAN (Wittenburg et al. 2006; *ELAN [Computer Software]* (version 5.9) 2020).[5] Moreover, while negative forms such as negative interjections, negative existentials, etc. were included in the initial coding, our report here focuses on standard negation. In addition to coding the manual and non-manual activity, separate tiers were dedicated to selected functional and analytic information (for the coding scheme, see Appendix A). All coding was done by the first author and proceeded in three rounds, initially targeting all instances of negation, then completing the information in the remaining tiers, before reviewing the coding in a final round. Data were systematically checked for missed tokens by searching for NEG, headshakes, and tongue protrusion in the

prior transcriptions. Some instances had to be excluded due to reasons such as (i) absence of a felicitous translation of the utterance, (ii) the camera being out of focus temporarily during the recording, and/or (iii) bad lighting conditions in the video. Coding presented several challenges, of which the most frequent ones are addressed briefly.

First, just as in Spanish and other spoken languages, the means of negative interjection and the clause negator are formally identical in Kata Kolok. Second, Kata Kolok relies heavily on shared knowledge and context, which makes the omission of sentential constituents a very common pragmatic strategy; as a result, elliptic standard negation and negative interjections are not always distinguishable. We coded conservatively by excluding instances with subtle articulatory breaks or changes within the accompanying non-manuals, as these features indicate separate prosodic domains as would be expected in the case of a negative interjection (Sandler 1999). Third, together with the frequent omission of constituents in spontaneous discourse, it was not always straightforward whether the negative element operated on a declarative clause or a negative existential. Fourth, every instance that did not clearly involve a negative existential meaning was coded as standard negation. Fifth, and finally, instances of negator doubling are noted as such in the comment tier, but counted as a single negative sentence. Similarly, immediate repetitions of the same negative utterance were counted as a single instance of negation.

We double-coded 10% of the data (11 min) to provide an intra-coder reliability measure, ensuring the validity of the findings of the present study. Cohen's Kappa was calculated using the irr package (Gamer et al. 2012) in R (R Core Team 2019) and yielded substantial intra-coder agreement between both rounds of coding ($\kappa = 0.951$; $z = 15.6$; $p < 0.05$) (Fleiss et al. 2003).

6. Results

With a total of 162 instances in the final data set, standard negation occurred on average 1.6 times per minute (1.1/min in generation III, 2.7/min in generation IV, 1.8/min in generation V).[6] Table 2 provides an overview of the negation strategies employed by the six signers. Use of the manual negator NEG is most frequent: it is attested in 86% (139/162) of the examples—also note that NEG mostly appears in clause-final position (75%; 104/139). Yet, non-manual markers are also frequently observed: a headshake occurs in 80% (130/162) and tongue protrusion in 19% (30/162) of the data. Hence, the headshake is almost as frequent as the manual negator, while tongue protrusion is used notably less often. Below we will suggest that tongue protrusion functions as a specialized negation marker for non-existence and negative evaluation. Video clips of all our examples can be viewed as Supplementary Materials on the Open Science Framework.

Table 2. Absolute and relative frequency of manual and non-manual markers used in standard negation.[7]

| | Manual Particle | Non-Manual Element | | Total |
	NEG	Headshake	Tongue Protrusion	
Generation III	56 (81.2%)	61 (88.4%)	5 (7.2%)	69
Generation IV	41 (85.4%)	35 (72.9%)	10 20.8%)	48
Generation V	42 (93.3%)	34 (75.6%)	15 (33.3%)	45
Total	139 (85.8%)	130 (80.2%)	30 (18.5%)	162

6.1. Manual Marking

In line with Marsaja's (2008) observation, NEG is the only manual negator attested for negating a clause in Kata Kolok; this suggests that NEG is used for various kinds

of negative meanings, including 'not', 'never', 'nobody', etc. The distribution of how manual and non-manual markers combine in our dataset is illustrated in Figure 2 for each generation separately, i.e., combinations of NEG with a negative headshake and/or tongue protrusion. Note that the figure also contains the cases in which negation is only expressed non-manually.
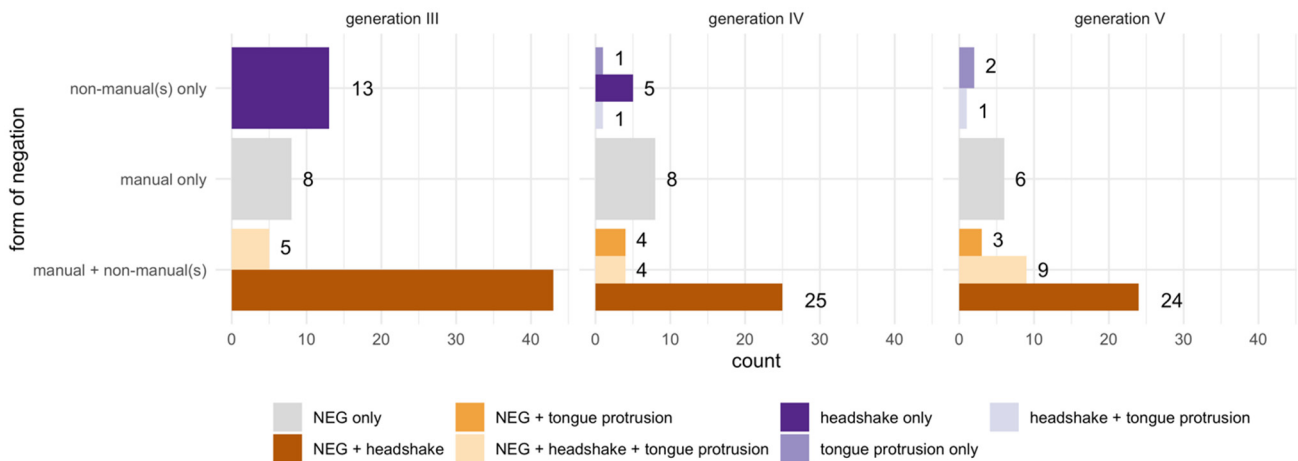

Figure 2. Combinatorial patterns of relevant manual and non-manual markers shown per generation.

As for the examples featuring NEG (139 instances), the pattern in example (7a) is the most common one: the (clause-final) manual negator is accompanied by a headshake in 57% (92/162) of all tokens, which amounts to half of the data from generations III and IV and almost two thirds of the data from generation V. Considerably less frequently, the manual negator combines with tongue protrusion (4%; 7/162), illustrated in (7b), or with both non-manual markers (11%; 18/162). Note that example (7b) contains two negative particles as a result of full repetition; that is, this is not a case of negator doubling, as the verb is also repeated, and the prosody suggests that we are dealing with two separate clauses. In 14% of cases (22/162), and at similar rates across generations, the manual negator is not accompanied by any negative non-manual markers (7c). Remember that this is the pattern which Marsaja (2008) claimed to be the most common.

$$\qquad\qquad\qquad\qquad\qquad\underline{\text{hs}}$$

(7)　a.　BI$_1$　IX'locative'　IX'locative'　COFFEE　NEG
　　　　'I don't take my coffee over here.'[8]　　　　　　　　　　　[GD3jan7 00:27:55.880]

$$\qquad\qquad\qquad\qquad\underline{\text{tp}}\qquad\qquad\underline{\text{tp}}$$

　　b.　SPRAY　RAIN　NEG　RAIN　NEG
　　　　'No rain came after the pesticides had been sprayed.'

　　　　　　　　　　　　　　　　　　　　　　　　　　　　[SuJu16jan7 00:16:21.209]

c.   DRINK   SWEET   NEG
          'She does not drink tea.'   [PiKe4jan7 00:16:14.000]

Although examples (7a) and (7c) are semantically and syntactically similar, only (7a) contains a headshake. Based on the variety of topics covered, the topic of conversation does not appear to have an impact on the use of headshake.

As for the different types of negation systems, Pfau (2015) refers to Jespersen's Cycle and hypothesizes that sign languages start out as purely manual systems, go through a stage with a combined pattern, before developing into a non-manual dominant system (see Section 7.2). If this hypothesis is true, we would expect intergenerational differences with older generations using the manual negator more often than the non-manual one. However, Figure 2 paints a more complex picture. First, we note a slight decrease in the use of negation with NEG only in younger generations. Second, more diverse combinations are observed in the two younger generations as compared to the older generation. Third, this, in turn, is paired with less instances of non-manual only negation. This suggests that, if anything, there might be a slight trend towards using the manual negator more frequently in younger generations (see Figure 2). However, these numerical differences across generations remain rather small.[9]

6.2. Non-Manual Marking

6.2.1. Scope of the Headshake

In 67.9% of cases (110/162), both the manual negator and a headshake are involved. The high frequency of headshakes identifies it as the canonical non-manual negation marker. Note that whenever the manual negator and the headshake co-occur in a negated clause, the headshake can either accompany only NEG (8a) or extend over NEG and one or more adjacent signs (headshake spreading)—the latter pattern contradicting claims made by Marsaja (2008). Although headshake spreading is clearly an option, it is attested in only 26% (28/110) of the examples. Nevertheless, in six examples, the spreading can be considered a harmony phenomenon as a result of negator doubling or repetition of the entire negative clause; in two cases, a manual sign cliticizes to NEG, which makes it impossible to distinguish true headshake spreading from a lexical headshake bound to NEG; and three cases include co-articulatory, thus phonetic, headshake spreading, e.g., a locative point includes a sidewards head movement that fuses with the headshake. This leaves us with 17 instances (15.5%; 17/110) of the data that include clear spreading of the negative headshake across adjacent sign(s), (8b) and (8c) being examples. Example (8b) shows the most common form of headshake spreading; the headshake precedes the manual negator NEG and is co-articulated with (part of) the preceding sign. Example (8c) shows an example in which spreading occurs over multiple signs, a pattern which is only rarely attested.

                                                          ____hs
(8) a.   THINK   IX$_2$ MONEY   GIVE   NEG
           'You know, he does not give me money.'   [SuJu16jan7 00:04:06.600]

                                                                   _____ hs

b.   TIME   NINE   NEG   TIME   EIGHT   BI$_1$ TALK

       'I was told to come at eight o'clock in the morning, not at nine.'

                                                                    [PiKe4jan7 00:04:20.000]

TIME   NINE   NEG   TIME   EIGHT   BI$_1$ TALK

                                  _____ hs

c.   ANGRY BI$_1$ NEG

       'Me, I am not angry.'   [GD3jan7 00:12:39.360]

ANGRY   BI$_1$ NEG

    At this point, it is unclear whether headshake spreading is indeed highly restricted to the preceding constituent, or whether the fact that we observed only minimal spreading can be attributed to the fact that Kata Kolok utterances prototypically are short, often consisting of a single sign. From an articulatory point of view, the headshake can precede the manual negator because the hands produce signs in sequence—one after the other.

    Figure 3 exemplifies how headshake spreading is distributed across the different generations, and more specifically across the different signers. Clearly, headshake spreading very rarely occurs among signers from generation III and generation IV and is considerably more frequent in generation V signers. The observation of an inter-generational difference in the occurrence of headshake spreading is enhanced by the fact that individual variation among the signers from each generation is generally low. For signer 1 from generation III, no instances of headshake spreading are attested at all, and it occurs few times in signer 2 from generation III (12.5%; 4/32). Among both signers of generation IV, headshake spreading is extremely uncommon, in 6% (1/17) in signer 3 of generation IV and in 10% (1/10) signer 4 of generation IV. Headshake spreading is much more common in both signers of generation V; it is attested in 57% (4/7) in signer 5 of generation V and in in 35% (7/20) of signer 6 of generation V. In sum, while headshake spreading occurs at 6–12% among signers from generation III and generation IV, it is at least three times as common among signers of generation V.[10] While those numbers suggest inter-generational differences—with generation III and IV displaying more similar patterns and generation V showing a strikingly different pattern—it needs to be noted that the phenomenon remains relatively low overall. Crucially, however, the pattern observed does not seem to be driven by individual variation: Although there are, of course, small differences as to how frequent spreading is across different signers, the overall pattern is similar across signers from the same generation.
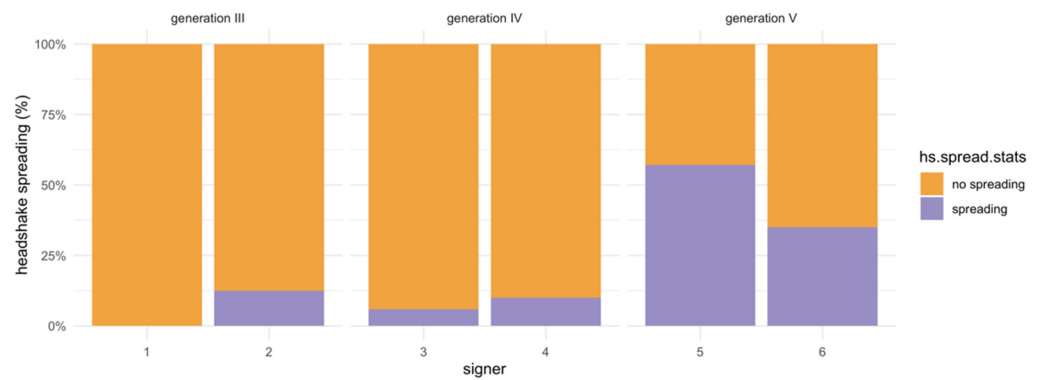
Figure 3. Distribution of headshake spreading across the three generations.

6.2.2. Tongue Protrusion

Tongue protrusion is observed in a total of 30/162 instances of negation (18.5%). Four different patterns are attested: tongue protrusion may combine with NEG, as in example (7b), repeated here as (9a) (N = 7); it may be co-articulated with NEG and headshake (N = 18), as shown in (9b); it may be the sole negator (N = 3), illustrated in (9c); and it may be co-articulated with a headshake (N = 2) in the absence of the manual negator (9d).

(9)　a.　　　　　　　　　　　　　‾‾tp‾‾　　　　　　　‾‾tp‾‾
　　　　　　SPRAY　RAIN　NEG　RAIN　NEG
　　　　　　'No rain came after the pesticides had been sprayed.'

[SuJu16jan7 00:16:21.209]

　　b.　　　　　　　　　　　　　　　　　　　‾‾hs+tp‾‾
　　　　　SIGN-NAME$_A$　　SIGN-NAME$_B$　NEG
　　　　　'*A* and *B* are not coming to the event.'　　　　　　　　[GD3jan7 00:08:54.100]

　　c.　　　　　　　　　　　　　‾‾‾‾‾‾tp‾‾‾‾‾‾
　　　　　SIGN-NAME$_A$　FISHING　GOOD
　　　　　'*A* did not catch anything.'　　　　　　　　　　　　[SuJu16jan7 00:13:03.780]

$$\overline{\hspace{2em}\text{hs+tp}\hspace{2em}}$$
d.   BI$_1$ DRUNK   IX'locative'
      'I hadn't been drinking over there.'   [PiKe4jan7 14:31.500]

As the examples in (9) illustrate, tongue protrusion is commonly observed in examples which may be interpreted as negative existentials—in fact, this is true for 83% of the 30 examples including tongue protrusion. The non-existential meaning in (9a) is obvious: the absence of rainfall. Example (9b) deals with the fact that two villagers are not coming, which entails that they will not be present during a specific social event. The villager in (9c) returns home with empty hands—FISHING is negated with a protruded tongue to express that villager *A* did not catch any fish when going on a fishing trip with other villagers. Similarly, tongue protrusion is co-produced with a negative headshake in (9d) in order to express that a particular signer did not gather with peers to consume alcohol. Besides non-existence, it is also possible that tongue protrusion relates to another, previously identified function: negative evaluation. This interpretation is compatible with all examples provided above. The lack of rain after the spreading of pesticides, as described in example (9a), prevents the chemicals from diffusing in the soil, and thus minimizes its effects. In (9b), villagers may be expected to attend this particular meeting due to ceremonial responsibilities. The negative evaluation of (9c) is straightforward: the lack of prey means that the family will not have food to eat. Lastly, the negative judgment in example (9d) may arise from the events that occurred as a consequence of drinking, since drinking itself is not necessarily always regarded negatively.

Testing whether tongue protrusion expresses negative evaluation reveals the following pattern: although 60% of all instances of tongue protrusion are compatible with an interpretation of negative evaluation, all of them are also examples of negated phrases. Essentially, both negative evaluation and non-existence are inferential and therefore more implicit than explicit, i.e., they require contextual knowledge that allows the interlocutor to judge that something is considered negatively. Nevertheless, the use of tongue protrusion as a pragmatic marker for negative evaluation and as a specified negative element may have co-evolved alongside the general negation markers, now co-existing in Kata Kolok. This idea is further supported by the examples that do not contain any non-manual elements (*manual-only*). The *manual-only* examples in our dataset do not allow (inferential) negative evaluation as a reading, i.e., they do not require contextual knowledge to evaluate whether something is good or bad but simply (and exclusively) negate phrases. Similarly, a maximum of five instances of *manual-only* negation may be compatible with (inferential) non-existence. This suggests that tongue protrusion may be treated as a pragmatic marker of negative evaluation and potentially as a negation marker that is used for a specific type of negation, namely, non-existence.

This interpretation is corroborated by the fact that the examples provided above are strikingly different from examples that feature tongue protrusion but no negation. While tongue protrusion may feature in lexical signs such as DIE or SALT, tongue protrusion in Kata Kolok has also been observed in contexts that are clearly evaluated negatively, such as examples (10a) and (10b). In example (10a), the signer expresses his despair over the fact that everything is expensive, marked by the protruded tongue accompanying the sign HIGH-PRICE. In example (10b), the signer's (and possibly the community's) attitude towards appropriate behavior is evident; it is expected that one cleans their hand after consuming food (which is commonly done with the right hand). Clearly, both examples express a negative judgment towards a state or event rather than negating it.

$$\overline{\qquad\qquad \text{tp} \qquad\qquad}$$

(10) a. HIGH-PRICE MONEY ALL
       'Everything is expensive.'   [SuJu16jan7 00:17:14]

HIGH-PRICE   MONEY   ALL

$$\overline{\qquad\qquad \text{tp} \qquad}$$

b. RUB-CLEAN   FINISH GOOD
    'It is good when your hands are completely clean (from the leftover food).'
                                                                    [GD3jan7 00:15:22]

RUB-CLEAN   FINISH   GOOD

These examples, combined with the examples provided before, corroborate the interpretation that tongue protrusion is linked to negative evaluation. This is in line with a general property of tongue protrusion being associated with a negative stance; tongue protrusion serves as a gestural reflex expressing mood, specifically disgust, among all humans (Fridlund 1994; Rozin and Fallon 1987; Givens 2002), and has been observed to cover a range of semantic meanings, including disgust and rejection, in some sign languages (e.g., Johnston et al. 2016 for Auslan). As such, the use of tongue protrusion in Kata Kolok appears to be another instance of grammaticalization, not from a gesture from the ambient culture but of a more basic human trait.

6.2.3. Choice of Non-Manual Marker

The non-manual elements that we focus on in this study are headshake and tongue protrusion. Both these markers are most commonly co-articulated with NEG (72.2%; 117/162). Yet, in a substantial number of examples (14%; 23/162), non-manual elements occur independently, i.e., without the accompanying manual negator—be it in combination or on their own; thirteen examples occur in generation III, seven are attested in generation IV, and three in generation V (see Figure 2). Among these examples of non-manual elements occurring in the absence of NEG, the headshake occurs more frequently (86.9%; 20/23) than tongue protrusion (21.7%; 5/23)—see also examples (9c) and (9d). Generally, what we observe in these cases is that the headshake is co-articulated with the clause-final constituent (11a). Nevertheless, in some cases, the headshake and the non-negative sign it is co-articulated with are not fully synchronized, i.e., articulation of the manual sign precedes the onset of the headshake or vice versa. As a result, in (11b) the headshake starts only while the manual sign RICE is already being articulated. This example highlights the challenge of analyzing maximally reduced instances of negation, as is common in Kata Kolok. In addition, four cases are attested in generation III-signers in which the headshake is produced completely independently of manual signs, i.e., it is articulated by itself following a manual sign (11c). This pattern has also been reported for a few other sign languages (e.g., Hendriks 2008 for Jordanian Sign Language; Johnston 2018 for Auslan).

(11) a. BI$_1$ TWICE-MARRIED
$\overline{\text{\hspace{3em}hs\hspace{3em}}}$

'I won't get married a second time.'   [GD3jan7 00:30:31.119]

BI$_1$ TWICE-MARRIED

b. RICE
$\overline{\text{\hspace{1em}hs\hspace{1em}}}$

'I don't bring any rice.'   [PiKe4jan7 00:13:41.000]

RICE

c. MOTORBIKE
$\overline{\text{\hspace{1em}hs\hspace{1em}}}$

'He does not like driving the motorbike.'   [GD3jan7 00:49:02.470]

MOTORBIKE

7. Discussion

In an effort to elucidate standard negation in Kata Kolok, we conducted a study of 1.73 h of intergenerational data drawn from the Kata Kolok Corpus. In line with what Marsaja (2008) described previously, we found examples that are negated by using only the manual negator NEG (13.6% of the dataset). Most commonly, however, the manual negator is combined with a clearly articulated headshake, a pattern which does not align with Marsaja's observations. Importantly, we identified an additional non-manual marker, namely, tongue protrusion, which functions as a specialized marker for negative evaluation and non-existence. Furthermore, and again contradicting Marsaja, the data reveal that a clause can be negated only by a non-manual marker (14.2% of the dataset), and this is more likely to happen in generation III—the oldest generation in our sample. Finally, while it is true that the headshake does not usually spread onto adjacent signs, headshake spreading seems to emerge in generation V. In short, the Kata Kolok pattern does not neatly fit into the existing classifications of manual dominant and non-manual dominant sign languages. This does not necessarily mean that this classification is wrong—there may well be sign languages that fit neatly into the proposed dichotomy. However, as already pointed out in Section 3.2, the classification may well be insufficient, as a sign language may display characteristics of both systems, or may employ a non-manual marker in a more gesture-like, i.e., less grammaticalized fashion.

It is likely that Kata Kolok and other recently studied sign languages challenge the proposed dichotomy because this dichotomy has been mostly based on elicited data, and corpus data may not always fully support such a clear-cut distinction. Alternatively, the patterns attested here could be the result of diachronic language change across three generations of signers. In the following, we first review the general pattern and tendencies

identified in this study from a typological perspective. Then, we contextualize the results from the perspective of diachronic language change by drawing comparisons between generations.

7.1. Kata Kolok Negation in Typological Perspective

As described in the introduction, sign language negation systems are differentiated by (i) the presence of an obligatory manual marker and (ii) the scope of the headshake (Zeshan 2004, 2006). Systems in which the manual negator functions as the main negator require this negative sign at all times, and the headshake does not usually spread beyond this sign. In contrast, in systems where the headshake is the main negator, the manual negator is optional and the headshake may have scope over adjacent signs. In Table 3, we reproduce, with some adaptations, a comparative chart from Oomen and Pfau (2017), which details selected characteristics of negation systems in seven sign languages; these characteristics relate to the presence of NEG and the scope of the headshake. We added Kata Kolok, the only rural sign language in the table.

Table 3. Typological comparison of negation patterns across seven sign languages (adapted from Oomen and Pfau 2017; Kata Kolok added).

	DGS	LSC	ASL	NGT	LIS	TİD	KK
Country of Usage	Germany	Catalonia	USA	The Netherlands	Italy	Turkey	Bali
manual dominant?	−	−	−	−	+	+	(+)
NEG **clause-final?**	+	+	+/−	+/−	+	+	+
hs only on NEG**?**	−	+	+	?	+	+	+
hs only on predicate (if NEG **is absent)**	+	+	−	+	−	−	+
hs spread onto object?	+	+	+	+	−	−	+/−
hs spread onto subject?	−	−	+/−	−	−	−	+/−

The patterns reported in this study reveal that (i) as in the other sign languages included in Table 3, negative particles occur predominantly in clause-final position in Kata Kolok;[11] (ii) Kata Kolok negation is incompatible with either system, that is to say neither the manual nor the non-manual element appears obligatory; and (iii) Kata Kolok exhibits a language-specific pattern when it comes to the use of the headshake—headshake spreading is uncommon, and when present, it is very restricted in scope.

Interestingly, Kata Kolok is the only attested sign language where the headshake can accompany the negative particle, spread onto the subject or the object when the manual negator is present, *and* over the (verbal or non-verbal) predicate when the manual negator is absent. This observation may be related to the fact that many utterances comprise very few signs, irrespective of the type of constituent. Thus, it is possible that headshake spreading is associated with the clause-final position regardless of a specific word class. In line with Marsaja (2008), the manual negator represents the most frequent marker, which might suggest it as the main negator. This is supported by the rare and highly restricted nature of headshake spreading in Kata Kolok, which is typical for this pattern. Nevertheless, one must not forget that, despite the optionality of the manual negator in systems in which the headshake is the main negator, it still is commonly used; it was attested in 86% of cases in this sample (cf. Oomen and Pfau 2017 for NGT). Crucially, the manual negator is absent in 14% of all instances. The present results are thus also compatible with a system where the headshake functions as the main negator. In both classificatory scenarios, 14% of the data is negated by the use of the manual negator or the headshake only. In other words, it is impossible to categorize Kata Kolok as either a manual dominant or a non-manual dominant system. Growing evidence from studies investigating negation based on corpus data, much like the present study, shows that such naturalistic data may present us with characteristics from both extremes (Oomen and Pfau 2017; Johnston 2018; Kuder 2020).

Hence, they present a challenge to the established dichotomy, suggesting that the balance between manual and non-manual elements involved in sign language negation entails a continuum rather than binary categories. The present study contributes to sign language typology by adding a sign language of the lesser-studied type to the picture. Our results also suggest that prior classifications based on elicited data may have to be re-evaluated.

7.2. Emergence of Structure in the Domain of Negation

It is possible that Kata Kolok negation is currently in a transitional stage where different systems co-exist. The sampling method used in this study provides us with intergenerational data, which enables us to adopt the perspective of diachronic language change across three generations of signers. Five key observations can be made:

1. The combination of NEG and headshake is the most common strategy across all three generations.
2. There is a trend towards an increased engagement of the manual particle over the three generations.
3. Signers from the youngest generation make use of a greater range of combinatorial variants of NEG, headshake, or/and tongue protrusion.
4. The use of independent non-manual markers slowly decreases over time.
5. The frequency of headshake spreading increases considerably in generation V.

Although the effect appears small, we note a tendency towards more combined forms and greater presence of the manual negator in generation V compared to generations III and IV. In contrast, the difference in the use of headshake spreading in younger (generation V) versus older signers (III–IV) is striking, and we interpret this difference as evidence of language change. Nonetheless, there are at least four alternative explanations for this development. First, headshake spreading might be characteristic of a sociolinguistic youth-variant. Potentially, this feature is used only at a certain age, while it is abandoned again when growing older (Labov 1965, 1994; Sankoff 2006). Second, headshake spreading in generation V may be caused by a single lexical item: the verb GIVE precedes the manual negator in six out of eleven instances of headshake spreading in generation V, while GIVE accompanied by headshake is not attested in any other generation. Nevertheless, possible interactions of signer and predicate would have to be studied in detail in a separate study. Third, in spite of the striking pattern across generations (the significant result in the linear mixed effects model), the possible influence of idiosyncratic inter-signer variation cannot be excluded. Increasing the sample size could ameliorate the effect. Fourth, one may hypothesize that the emerging headshake spreading in generation V represents a language contact phenomenon. This is, however, unlikely, since the headshake plays a minor role in negation in signing varieties across Indonesia (Palfreyman 2019), including the variety used in Singaraja, a nearby city (p.c. with Nick Palfreyman).

We now offer some hypotheses on possible diachronic scenarios in the expression of negation. Pfau (2015) proposes that sign language negation conforms to the key principles of Jespersen's Cycle (Jespersen 1917). According to this theory, negative elements are reinforced through the use of a second negative particle and then weakened again by losing one of the two, as has been observed, for instance, in the history of French negation (van der Auwera 2011). Pfau (2015) hypothesizes that sign languages may have emerged as systems where the manual negator (derived from a manual gesture) dominates, and a headshake is only associated with the manual negator in a second step. In a subsequent step, the headshake may become more flexible and may eventually become an independent marker of negation, i.e., it may increasingly detach from the manual element and may then take over the status of the obligatory element. In this scenario, headshake spreading can only occur in the second step, where both markers are used, and the ability of spreading necessarily can only occur with the disassociation of the headshake and the manual particle. Ultimately, this can result in a system in which the headshake assumes the role of the main negator. Due to the shared modality of gesture and sign, the grammaticalization of manual gestures is common in sign languages (Wilcox 2004; Pfau and Steinbach 2011; van Loon et al.

2014), and especially prominent in negation (Zeshan 2004). For Kata Kolok, it is likely that the manual negator originates in a manual gesture used by (hearing) members within the community (Marsaja 2008). Notwithstanding these findings, non-manual elements function as fundamental elements in sign languages (Sandler and Lillo-Martin 2006; Pfau and Quer 2010). Thus, the visuo-gestural modality also favors the integration of non-manual gestures into sign language grammar (Pfau and Steinbach 2011). However, what motivates the assumption that manual gestures precede non-manual ones? Pfau (2015) argues with the aid of linguistic typology: cross-linguistically, the existence of particles is universal. Given that manual negators are used as particles, it seems likely that they arise before non-manual markers do. It is plausible that manual (handwave) and non-manual (headshake and protruded tongue) gestures entered the linguistic system of Kata Kolok around the same time after the language's emergence. What is unclear, however, is what the distribution of these forms may have looked like at these early stages. One way of gaining more insight into this issue would be a study of homesign data from the region to bridge the empirical gap between the data of generation III–V signers analyzed in this study and the very initial stages of the language. Such a study would allow us to extrapolate whether Kata Kolok is indeed likely to have started out as a manual dominant/only system, as suggested in the scenario created by Pfau (2015).

In this scenario, Kata Kolok initially made use of a range of diverse variants based on manual (NEG) and non-manual (headshake, tongue protrusion) elements, all of which originated in culture-specific gestures (Spitz 1957; Meltzoff and Moore 1989, 1977; Rozin and Fallon 1987; Fridlund 1994; Kendon 2002; Marsaja 2008; Kettner and Carpendale 2013; Pfau 2015). Later, signers start to converge on different, yet functionally redundant markers. Sign languages strive for simultaneity where possible in order to increase language efficiency (Pfau 2015). The Kata Kolok data set endorses this: the use of independent non-manuals decreases alongside an increase in combinations. In favor of enhancing language efficiency, and to reduce redundancy, individual markers begin to specialize, as in the case of tongue protrusion, for which a negative existential meaning is crystallizing.[12] It is possible that Kata Kolok negation has reached the stage of a manual dominant system: the use of only non-manual markers to negate decreases whilst the proportions of the manual negator remain stable. Although the increase in headshake spreading in generation V may even delineate a first step towards freeing the negative particle from its non-manual counterpart, a reduction in the use of the *manual-only* pattern would be expected if Kata Kolok were to move towards a *non-manual dominant* system.

One can envisage at least three scenarios for future generations: (i) Headshake spreading occurs as an artefact of a system in transition towards a system where the manual negator dominates. As the manual negator becomes dominant, the headshake will stabilize in its dedicated position, and headshake spreading may eventually decrease or fully disappear. Thus, the scope of the headshake is reduced to a single sign, namely, the manual negator, which functions as the obligatory marker. (ii) Headshake spreading remains, and becomes more systematic and productive. At the same time, instances that are negated exclusively by non-manuals steadily decrease until they have disappeared completely, and the manual negator stabilizes as an obligatory element. (iii) The systematicity of headshake spreading increases, and manual negators are progressively dropped. As a result, the headshake becomes obligatory. The different scenarios are visualized in Figure 4.

If the grammaticalization patterns attested here were to represent the initial stages of the emergence of negative structures in the language, one may have expected either gradual differences between each generation, or, alternatively, larger differences between generations III and IV, than between IV and V. Although the findings from this study do not necessarily suggest that Kata Kolok negation primarily used the manual negator in its initial stages, it is possible that this pattern precedes the analyzed data. Thus, such a system may have been characteristic of the language use of signers from generations I and II. In that case, however, it remains unclear what motivated the use of independent non-manual markers and why this is considerably more frequent in generation III than

in younger signers. While the earlier generations of Kata Kolok signers are no longer alive, our proposed way forward is to study the distribution and functional diversification of negative gestures alongside speech (cf. Mesh and Hou 2018), in addition to various homesign languages that have been identified in the region.
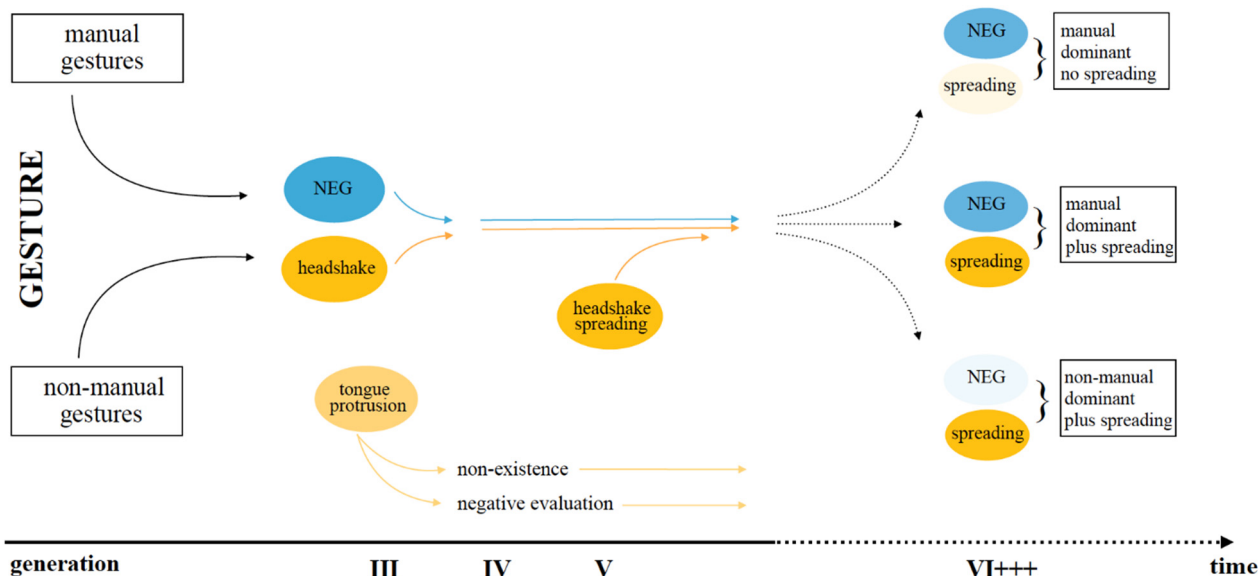

Figure 4. Sketch of possible grammaticalization scenarios of the main two negation markers in Kata Kolok. Note that the pathway for tongue protrusion is not integrated into the main pathway of negation given the low numbers attested in this study. Instead, tongue protrusion is kept as a somewhat separate pathway with more specialized, i.e., restricted, negative meanings.

8. Conclusions

To conclude, Kata Kolok is uniquely placed in the typological landscape of sign language negation, as it can neither be classified as a manual dominant system nor as a non-manual dominant system. Adopting a grammaticalization theory approach, we furthermore suggest multiple trajectories regarding how this distinct pattern may have arisen from its gestural precursors. It is hoped that future comparisons to home sign languages in the broader area of Bali will allow us to evaluate these possible grammaticalization scenarios. The study of the relationship between standard negation and other negative forms, e.g., negative interjections, imperatives, existentials, incompletives, and completives, entails a promising contribution to the study of diachronic language change. While the hands are often the focus of studies on sign language grammar (Puupponen 2019), the use of specific non-manual elements is of equal interest; the data provided in this article may indicate a grammaticalization continuum for all negative non-manual markers used in negative contexts. This highlights the need to consider the full repertoire of different signals that signers have at their disposal. At any rate, our study contributes to a better understanding of how grammaticalization may unfold throughout a sign language's lifespan with specific reference to negation. As such, this paper contributes to the contrastive analyses that are needed to pinpoint the factors that shape sign language grammars.

Author Contributions: Conceptualization, H.L., R.P. and C.d.V.; methodology, H.L., R.P. and C.d.V.; formal analysis, H.L., R.P. and C.d.V.; resources, C.d.V.; data curation, H.L.; writing—original draft preparation H.L.; writing—review and editing, H.L., R.P. and C.d.V.; visualization, H.L.; supervision, R.P. and C.d.V.; funding acquisition, C.d.V. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki. Data used for this project was originally collected by de Vos (2012, 2016), and reuse was approved by the Ethics Assessment Committee of the Faculty of Arts and the Faculty of Philosophy, Theology, and Religious Studies (EAC) of Radboud University as part of the research project The emergence of phonology in six generations (application #2013, approved 17 March 2017).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: All data presented in this paper stem from the Kata Kolok Corpus, curated by The Language Archive (TLA) at the Max Planck Institute for Psycholinguistics, The Netherlands. Metadata are available at https://hdl.handle.net/1839/7ea873da-5ad4-474a-8cc7-7dfc51bbb552 (accessed on 19 December 2021) and access can be requested through the TLA website.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Coding Scheme

Tier Name	Function	Code
manual (dom./non-dom)	glosses	
non-manual	tongue protrusion	
non-manual_head	headshake	
translation	translation into English	
negation	marks instance of negation indicates the signer	
negation category	specifies the negation category	refusal, non-existence, denial
constituent order	position of the negator in relation to predicate, subject and object	
combined form	manual negator co-articulated with non-manual elements	0 (absent) 1 (present)
pt function	function of tongue protrusion	0 (absent), gestural, lexical, death marker, negative evaluation, negation
negation type	specifies the type of negation	standard negation negative imperative negative completive negative modal negative interjection negative existential negative contrast
NEG presence	presence of manual negator	0 (absent) 1 (present)
hs presence	presence of headshake	0 (absent) 1 (present)
pt presence	presence of tongue protrusion	0 (absent) 1 (present)
hs spreading	presence of headshake spreading	0 (absent) 1 (present)
Comment	additional comment	

Notes

[1]   Language-external factors include processes like standardization (e.g., Schermer 2003) and borrowing—be it from another sign language or the surrounding spoken language, e.g., in the form of mouthings or fingerspelling (Brentari 2001). Fischer (1975) describes how due to external factors, i.e., contact with English, word order in American Sign Language has changed from SOV to SVO.

[2]   Other, far less common, strategies are higher negative verbs and negative auxiliaries (Payne 1985), but these will not be considered here.

[3]   In some sign languages of the Eastern Mediterranean region, besides a headshake, a backward head tilt is also used as a non-manual marker of negation (e.g., Gökgöz 2011 for Turkish Sign Language; Hendriks 2008 for Jordanian Sign Language); this is clearly an areal feature, as a backward head tilt is also used as a negative co-speech gesture in that region. Moreover, for Chinese Sign Language, it has been claimed that a negative facial expression functions as the main non-manual device for negating a clause while a headshake alone cannot yield a negative interpretation (Yang and Fischer 2002). Except for a brief note when discussing Auslan below, we will not further address these non-manual markers (see also Zeshan 2004), but in Section 6.2.2, we add to the typological picture another non-manual marker, viz. tongue protrusion.

[4]   Following the convention in sign language linguistics, signs are represented as glosses in small caps (GLOSS). Examples are accompanied by video stills where available. Written examples of signed sentences are represented in three lines, one including the non-manual markers, one including the glosses, and a free translation. Non-manual markers are represented in common letters with an underscore line indicating the scope of the respective marker and brackets to indicate where the spreading of the non-manual is optional. Glosses are provided in English throughout.

[5]   The software is accessible from http://tla.mpi.nl/tools/tla-tools/elan/, (accessed on 19 December 2021).

[6]   As pointed out in the section on the typology of negation, our study focuses on standard negation. Still, for the sake of completeness, we want to point out that the corpus search also yielded numerous examples of other negation strategies, namely negative existentials (89 instances), negative imperatives (78 instances), and negative interjections (69 instances).

[7]   Values do not add up to 100% since the manual particle may combine with one or even both of the non-manual markers listed here.

[8] BI_1 represents the gloss for a first-person-pointing with a flat-B-handshape. IX is generally used for a pointing sign, specifying IX'locative' for locative reference and IX_2 for a second-person point. Note that non-manuals may be more clearly visible in the video clips provided on the OSF page than in the stills.

[9]   In addition to the descriptive statistics provided in the main text, we also used a linear mixed effect model in R (R Core Team 2019), using the lme4 package (Bates et al. 2015), to determine whether generation (fixed effect) is a significant predictor for the use of the manual negator, taking into account individual variation (random intercept by participant). The significance value was determined at 0.05. Contrasts were defined manually to compare the youngest generation (V) against generation III and generation IV, as well as the two older generations against each other. The model did not provide any evidence that older and younger generations differ significantly in the use of the manual negator. Note, however, that any statistical analysis should be interpreted with caution, given the size of our sample.

[10] In addition to the descriptive statistics provided here above, we also used a linear mixed effect model in R (R Core Team 2019), using the lme4 package (Bates et al. 2015), to determine whether generation (fixed effect) is a significant predictor for headshake spreading when taking individual variation (random intercept by participant) into account. The significance value was determined at 0.05. Contrasts were defined manually to compare the youngest generation (V) against generation III and generation IV, as well as the two older generations against each other. This model revealed a significant effect for generation V when compared to generations III and IV ($z < 0.05$). Thus, the headshake spreads significantly more often in productions of the youngest signers than in those of the older signers (Figure 3). Given that signer ID was defined as random intercepts, the observed differences between signers from different generations are unlikely to be caused by idiosyncratic variation. This is corroborated by the relative frequency of scope that is considerably higher for both generation V-signers than for older signers. In addition, we checked for potential effects of gender in both models by defining gender as fixed effect. In both cases, gender does not seem to influence the use of the manual negator and headshake spreading. Note, however, that any statistical analysis should be interpreted with caution, given the size of our sample.

[11] Similarly, Zeshan (2004, p. 39) reports for her sample of 38 sign languages, that "independent of word order typology, there is a striking preference for post-predicate or clause-final position of negatives across sign languages. [. . .] In some cases, this is the only acceptable position." Interestingly, Zeshan's sample includes Auslan, but Johnston's corpus-based study reveals that the negative particle predominantly precedes the predicate. We thank one of our reviewers for drawing our attention to this fact.

[12] See also Mesh and Hou (2018) on the use of TWIST as a negative existential marker in San Juan Quiahije Chatino Sign Language.

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