



The Kata Kolok Pointing System: Morphemization and Syntactic Integration

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Abstract

Signed utterances are densely packed with pointing signs, reaching a frequency of one in six signs in spontaneous conversations (de Vos, 2012; Johnston, 2013a; Morford & MacFarlane, 2003). These pointing signs attain a wide range of functions and are formally highly diversified. Based on corpus analysis of spontaneous pointing signs in Kata Kolok, a rural signing variety of Bali, this paper argues that the full meaning potentials of pointing signs come about through the integration of a varied set of linguistic and extralinguistic cues. Taking this hybrid nature of pointing phenomena into account, it is argued that pointing signs may become an intrinsic aspect of sign language grammars through two mechanisms: morphemization and syntactic integration. Although not entailed in this research, this approach could implicate that some highly systematized pointing systems of speaking communities may to a degree be grammatical as well.

Keywords: Grammaticalization; Deixis; Gesture; Rural sign language; Language emergence; Sign language typology

1. Introduction

Philosophers, linguists, psychologists, and other students of the human mind have had an interest in pointing for almost a century. Pointing has been understood as the foundation of human social cognition (Tomasello, 2006), a primordial form of language (Kita, 2003), and as a universal, prelinguistic form of communication in infants (Liszkowski, Brown, Callaghan, Takada, & de Vos, 2012). Ethnographic descriptions have shown that pointing gestures, which are part of multimodal utterances, have sometimes become formally conventionalized in culture-specific ways (Enfield, 2009; Kendon, 2004). The pointing systems of sign languages appear to have grammaticalized even further and

pointing signs are key expressive forms in the domains of person, time, and spatial deixis (Kegl, 2003). Cross-linguistic and cross-modal comparisons indicate that the Kata Kolok pointing system may have expanded on the existing pointing conventions of Balinese speakers (Perniss & Zeshan, 2008). Based on new empirical data, this paper suggests that this process of conventionalization from gesture to sign should be understood along the dimensions of morphemization and syntactic integration.

Kata Kolok (KK) is an indigenous sign language shared by the deaf and hearing inhabitants of a farming village in the North of Bali, in the region of Buleleng. The community has had a high incidence of hereditary deafness for a long time, and KK has been acquired by at least five subsequent generations of deaf native signers (de Vos, 2012). Aside from casual chatting, KK is also used in professional, liturgical, and educational settings, and it should therefore be regarded as being on a par with urban signing varieties. There are at present 46 deaf signers in the community, and additionally, approximately 1,500 hearing villagers can understand and use KK with varying degrees of proficiency (Marsaja, 2008). As a result, 96% of KK signers are bimodal bilinguals, that is, hearing signers who use spoken Balinese and Balinese gesture as a primary mode of communication. This intense cross-modal contact situation appears to have led to considerable overlap among the gestural forms used in both modes of communication (de Vos, 2014; Marsaja, 2008; Perniss & Zeshan, 2008). For this reason in particular, KK is expected to critically inform our understanding of the emergence of linguistic structure from gestural forms.

Sign languages most commonly exhibit use of the relative frame of reference. KK is, however, among the first sign languages in which an absolute spatial construal has been positively attested, parallel to the cardinal direction systems used by some spoken languages (de Vos & Zeshan, 2012). KK signers also deploy a system of absolute pointing, in the sense that, with rare exceptions, pointing signs are directed at geographical locations, rather than arbitrary locations in the articulatory space in front of the signer. These absolute points retain a certain level of abstraction, as the referent may not inhabit the designated location at that moment of time, or the indicated location may be indirectly associated with the referent. In order to discuss the notion of “abroad,” for instance, signers point to an airport which went out of business over two decades ago. In addition to place reference, KK pointing signs are recruited as demonstratives, (local) pronouns, temporal adverbs, and for body part indication and color descriptions. As will be laid out below, some of these functions are marked by parameters such as articulator type, hand-shape, palm orientation, movement, and co-occurring facial expressions, and are thus formally highly diversified. Furthermore, in 6 hours of spontaneous KK discourse, containing a total of 33,687 annotated manual signs, one in six was identified as pointing sign. Given the high frequency and the many forms and functions of pointing in signed discourse, understanding the conventionalization of the KK’s pointing system from Balinese co-speech gestures may be key to understanding the emergence of this language more broadly.

The structure of this paper is as follows: Section 2 briefly summarizes the literature on pointing signs with an emphasis on unresolved theoretical issues. Section 3 reports on the

corpus analysis that has led to the identification of the linguistic and non-linguistic cues that contribute to the meanings of various types of pointing in KK. In Sections 4 and 5, I discuss how these form-meaning mappings reflect the mechanisms of morphemization and syntactic integration, and ultimately, the grammaticality of various pointing types in KK.

2. The linguistic status of pointing signs

Since the mid-1970s pointing signs have been a focal theme in the grammatical description of signed languages (Kegl, 2003; McBurney, 2002). The literature on pointing signs has been focused on two related issues. On the one hand, some descriptive accounts primarily revolve around the issue of to what extent pointing signs align with deictic word classes—such as locatives, demonstratives, and pronouns—proposed for spoken languages. On the other hand, other accounts are more concerned with the degree to which pointing signs are linguistic at all, that is, whether they are distinct from the pointing gestures that feature in hearing interactions. Here, I discuss these issues in relationship with pronominal points in particular.

Pointing signs have often been analyzed in parallel with personal pronouns in spoken languages (Cormier, Schembri, & Woll, 2013). For referring to first-person singular, the signer points to him/herself, usually by touching the chest. In order to refer to addressees, the signer points toward the person one is talking to. For third-person reference, in other words reference to non-conversational partners, the direction of the pointing sign is motivated by the actual location of that person if present at the scene. In the physical absence of third-person referents, the pointing signs are usually directed toward the area directly in front of the signer as arbitrary points, on the left and right sides, for anaphoric reference. Crucial to the grammatical analysis of these pointing signs, it has been observed that they establish a grammatically relevant *locus*. A locus is “a direction from the signer or a point in the signing space by which a referent is represented” (Engberg-Pedersen, 1993, p. 14). With rare exceptions, sign languages subsequently allow for predicates to be spatially modified according to these loci, thus reflecting the source and goal of a (di)transitive action (Meir, 2002).

The main critique of the grammatical status of loci is based on the fact that, as they constitute points in space, there is a potentially infinite number of formally distinct pronominal forms (Liddell, 1990). Lillo-Martin and Klima (1990) point out that such an analysis in terms of unique loci might also result in the unlikely situation where the signed lexicon lists an infinite number of phonologically distinct pointing signs. According to Liddell (1990), this leaves sign language linguists without an adequate phonological model to describe pointing signs, and pointing signs are therefore best analyzed as gestural in nature. Further challenges to the presumed analogy between pointing to indicate people in sign languages and personal pronouns in spoken languages comes from the fact that although pointing signs may refer to people, they are formally indistinguishable from locative points, or demonstrative references (Ahlgren, 1990). On other accounts,

only the first-person versus non-first-person distinction is maintained, given the fact that the first-person point touches the chest and therefore constitutes a listable form (Meier, 1990).

Most of the studies described above have aimed to provide a formal description of pointing signs primarily on the basis of their spatial realization and independent of the discourse context in which they are used. It is important to realize, however, that due to basic geometric facts, pointing signs do not effectively single out precise locations in space (de Vos, 2012; Wilbur, 2013). By definition, the vector projected by a pointing sign is determined by the conceived location of a relatum. However, if one were to point in any given direction, any mathematical point along this projected vector could potentially hold the referent. Similarly, raised pointing signs may indicate a nearby referent at a higher elevation, or any distal referent, including those at a higher elevation. Additionally, due to the inherent restrictions on human perceptual abilities, the search domain selected by a pointing sign becomes less accurate with the distance of the selected referent.

The relationship between the spatial forms and the meanings of pointing signs is obscured even further by a number of cognitive mechanisms. First, the location that determines the direction of a pointing sign can in itself refer to another location through a deictic shift called *deixis am phantasma* (Bühler, 1934). More generally, individuals point at locations that are associated with a non-locative referent, for example, a person who has just left the indicated chair. This phenomenon is known as deferred ostension (Quine, 1960). These ambiguities raise the question of what cues contribute to a full understanding of pointing on the part of the interlocutor. Although one important element of referent resolution is based on extralinguistic elements in the spatial context, the context of the discourse contributes as well. That is to say, even when the location has been identified and the referent is visible, such situational information is not sufficient to retrieve the full meaning of a pointing sign.

Although the evidence is marginal, various descriptive studies have in fact indicated that the different linguistic functions of pointing signs may be marked out by formal parameters such as movement patterns, handshape, palm orientation, and eyegaze (Pfau, 2011). Other studies have argued for the existence of lexicalized pointing signs in addition to pronominal forms, for instance in body part terminology (Pyers, 2006), and color terms (Nonaka, 2004). In a recent corpus analysis of Australian Sign Language, Johnston (2013a) shows that some of these generalizations may not hold when substantial data sets are considered, and pointing signs should, therefore, be considered as blends between gesture and language, displaying characteristics of both language and gesture.

This paper also adopts a corpus-based approach but examines KK pointing signs in situ, taking into account all contextual and formal cues that might contribute to their full meaning potentials within the spontaneous interactions of which they are part and parcel. As such this study presents new linguistic evidence of the diversity among pointing systems across sign languages, by providing data from a rural signing variety in which absolute pointing predominates, which is substantially different from previously described

pointing systems in signed languages. The findings in this paper are consistent with the view that a differentiated perspective on pointing is needed: Pointing signs within a particular sign language may vary along the dimensions of morphemization and syntactic integration and thus be considered linguistic to varying degrees.

3. A corpus-based analysis of the Kata Kolok pointing system

3.1. Methodology

This study presents a corpus-based analysis of 2 h and 11 min of spontaneous video data featuring 10 deaf KK signers in five dialogic conversations; additionally, the sample included narrative from two signers. In the narrative data set included here, points constitute 7% out of 2,449 manual signs, which is similar to the 6% reported by Morford and MacFarlane (2003). In the dyadic data, 11% out of 4,974 manual signs are points, as opposed to 16% in the overall KK corpus (de Vos, 2012). The later number is similar to corpus frequencies of American Sign Language (17%) and Auslan (16%). It is unclear at present what the differences between the current data set and the overall KK discourse are, but discourse genre might be an important factor (Morford & MacFarlane, 2003). The KK recordings analyzed here contain over 1,000 pointing signs, which have been transcribed in detail in terms of form and function by the author during fieldwork activities in 2006–2009 (de Vos, 2012). The functional analysis was based on translations of these recordings by a hearing community member who is a fluent KK signer, and on follow-up discussions with the author to clarify when necessary. Table 1 presents an overview of the functions identified together with the number of occurrences per function. Notably, almost one-fourth of the points are absolute points that are semantically underspecified with regard to the

Table 1
Functions of pointing signs in spontaneous Kata Kolok discourse

	Number of Points
Space	354 (29.2%)
Person	479 (39.5%)
First person pronoun	282 (23.2%)
Second person pronoun	125 (10.3%)
List buoy construction	1 (0.1%)
Demonstrative points	109 (9.0%)
Time	71 (5.9%)
Other	309 (30.9%)
Lexical color sign	2 (0.2%)
Body part term	8 (0.7%)
Undetermined	299 (24.6%)
	1,213 (100.0%)

distinction between pronominal or locative reference, even when the signed discourse was taken into account. Such a fundamental ambiguity between pronominal and locative reference is also reported for the Auslan Corpus, where such points represent 4% of pointing signs. One possible explanation for the differences between the two data sets is that relative to urban sign languages like Auslan, KK discourse is highly context dependent, structured around real-world locations in and around the village for person reference, too, thus allowing for more of these inherently ambiguous references (de Vos, 2012).

Each individual pointing sign was coded with respect to the following formal characteristics: articulator type, handshape, palm orientation, dominant versus non-dominant hand, fingertip orientation, type of movement, and whether or not the upper arm was additionally lifted. Additionally, a number of non-manual signals were coded for, including eye-gaze direction and various mouth movements. In the supplementary materials, details of the coding scheme are provided. In the sections below, I discuss the linguistic and non-linguistic cues that contribute to the meanings of various types of pointing in KK.

3.2. *Kata Kolok pointing types*

3.2.1. *Locative points and movement predicates*

As in many other sign languages, **proximal locatives** in KK are produced by a downward point in the neutral space in front the signer. Locations that are at a **lower elevation** than the current setting are marked out by the use of a bent index finger. KK has also developed a range of ways to differentiate the **distal locatives** from non-distal ones by using formal adjustments of the pointing sign itself as well as facial expressions. These distance markers, listed below, are commonly used in combination. Fig. 1 displays an example of a distal locative point that combines all of them and is supplemented by squinted eyes and pursed lips. These non-manual markers combine into a general intensifier which is used in the language more generally to indicate intensification of a quality, in this case distance (de Vos, 2012).

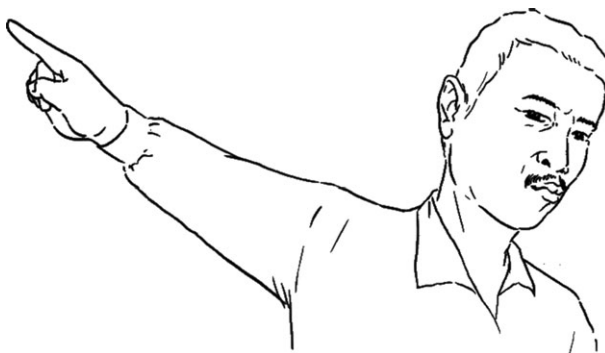


Fig. 1. Distal locative point.



Fig. 2. Movement predicate produced with completive aspect marker “pah.”

1. **Upward fingertip orientation:** the index finger points upward at a sharp angle to the back of the hand.
2. **Straight movement:** the pointing sign has a projecting movement from the wrist in the direction of the location at its maximum extension (apex).
3. **Lifted upper arm:** the upper arm is level with the signer’s shoulder.
4. **Vertical elevation:** the articulator is raised vertically such that distal locations are produced higher in the signing space than proximate locations.

Locative pointing signs may be produced with a tracing movement along the horizon to signify a **movement predicate**. Example 1¹ illustrates such an instance of a tracing movement to indicate path. The signer is an 8-year-old deaf girl with deaf parents, who is telling a story about a ghost she saw the night before. She discusses how her neighbor, who is said to have supernatural powers, becomes a ghost at night. This ghost went down a path near to the signer’s current setting. She uses her non-dominant hand to indicate that path, tracing it along the horizon with her index finger. The pointing sign ends in the simultaneous use of a non-manual completive marker produced by smacking the lips and glossed as “pah.” While she holds that sign, she produces the sign GHOST with her dominant hand. She then indicates the location where the ghost stopped again by pointing at that location and producing the aspectual marker along with it. The production of the completive aspect marker “pah” and this final pointing sign is illustrated in Fig. 2. The fact that these pointing signs are produced with the completive marker indicates that they are treated as predicates parallel to other predicative signs that can be similarly marked in KK. From a linguistic point of view, they are as much integrated into the syntactic structure of the utterance as other lexical signs.

Example 1: Pointing sign combined with non-manual completive aspect marker

<http://hdl.handle.net/hdl:1839/00-0000-0000-0016-40D1-9>

↓ Figure 2

NM	<u>pah</u>	_____	<u>pah</u>
MG		GHOST	
ND	IX‘tracing path’		IX‘distal location’

“(It) went along that path, the ghost, and then it stopped there.”

3.2.2. Pointing for person reference

In KK, as is reported for many other sign languages, signers direct pointing signs at individuals who are present when referring to them. One of the most remarkable features of KK is that its users do not normally inscribe the neutral signing space in front of them with loci. When these individuals are not present in the conversational setting, the canonical way to refer to individuals in KK is by using a lexical expression, for example, a sign name, followed by a pointing sign that is directed toward a location frequented by the individual referred to—usually that person’s house, workplace, or patches of farmland. As a consequence, the language exhibits a structural ambiguity between third-person reference and place reference that is common to other sign languages as well.

Meier (1990) argues that pointing signs indicating first person have a grammatical status in American Sign Language (ASL), as reflected by their stable form: They are fixed in having contact between the finger and the trunk of the signer. This distinction between **first-person** and **non-first person** is also supported by the KK data, as first-person points also touch the chest as they do in American Sign Language. In KK, first-person reference is additionally distinguished from non-first-person reference by the use of the full hand rather than the index finger. The indexical nature of these pointing signs becomes particularly clear from the fact that their reference may shift in parallel to first-person pronouns in spoken languages, for instance when referring to the main character of a narrative from a first-person perspective. Similarly, KK signers may point at the fingertips of their non-dominant hand to localize third-person referents as well as in order to refer back to these referents in subsequent discourse. This strategy is also known as a **list buoy construction** (Liddell, Vogt-Svendsen, & Bergman, 2007).

3.2.3. Celestial pointing in temporal reference

Kata Kolok is the first reported case of a sign language to deploy a celestial timeline, where absolute pointing signs are recruited for temporal reference. Fig. 3 illustrates the concept of this celestial timeline diagrammatically. The black symbol represents a signer pointing toward the sky to indicate time by directing the point toward the locations of the

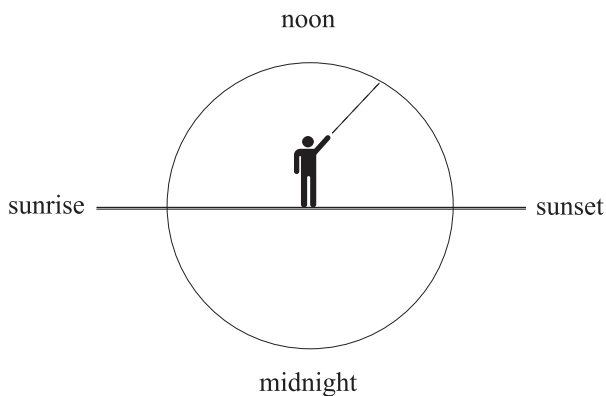


Fig. 3. Diagram of the absolute celestial timeline.

sun at the time of day along the axis of sunset and sunrise. Since Bali is close to the equator, sunrise is approximately at 6 am and sunset at 6 pm, without significant variation year-round. A pointing sign upward refers to “**noon**,” while the other times of day and night are presumably less exact.

The celestial timeline is fully operative for referring to the time of the day, even when inside a building, and in the case of KK the celestial time line has also been extended to refer to night-time. There are two ways in which celestial pointing can be used. In the **extended celestial pointing construction**, the temporal pointing signs are preceded by the lexical sign TIME and by a cardinal number sign. In these cases, the pointing sign thus provides some redundant information. Fig. 4 exemplifies such a construction using stills. In this recording, the signer is facing the South. Note that the lexical sign TIME in itself constitutes a lexicalized pointing sign to a **body-part**, the wrist, which by extension attains the meaning of “time.”

Pointing toward the usual position of the sun at that time of day can also function as a time indication in itself, without reference to cardinal numbers. Fig. 5 presents such a **non-redundant celestial pointing sign**, stemming from the utterance in Example 2. Note that in this recording, the signer is facing the West.

Example 2: Non-redundant celestial pointing sign

<http://hdl.handle.net/hdl:1839/00-0000-0000-0016-40E0-4>

↓ Figure 5

NM

MG IX‘sun at ~4 p.m.’ FIRE-WOOD DROP COOK IX‘kitchen’ COOK

ND

“Late in the afternoon, (she usually comes in and) puts the firewood in the kitchen for cooking.”

In KK, an arc-shaped movement of a pointing sign can also be used to indicate the **duration** of events during the daytime, and in this case, the pointing signs follow the

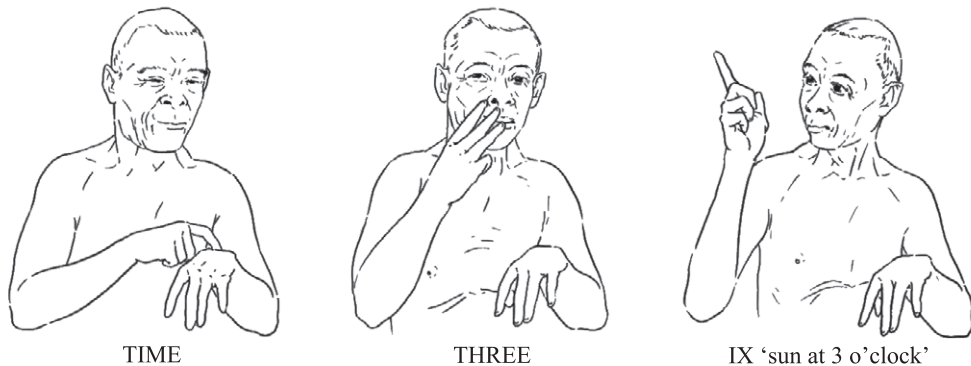


Fig. 4. Extended celestial pointing construction.



Fig. 5. Non-redundant celestial pointing sign.

trajectory of the sun from east to west but with a neutral, not bent, index finger. This is shown by Fig. 6, which illustrates a sign from the utterance in Example 3 below.

Example 3: IX'all day'

<http://hdl.handle.net/hdl:1839/00-0000-0000-0016-40D9-D>

↓ Figure 6

NM

MG IX'12 noon' RECENT-TIME **IX'all day'** SIX TEN-THOUSAND SIX

ND

"When (the motorbike is picked up) at noon, it costs 60,000 Rupiah for the whole day."

3.2.4. Color points

Kata Kolok has four conventionalized signs to refer to black, white, red, and colors covering the blue-green domain (de Vos, 2011). In addition to these lexical color signs, signers may also label objects or use pointing for color description and specification. In a structured elicitation session in which eight signers were asked to describe 80 color chips, all strategies were used by all participants. In spontaneous discourse, KK signers often point at an object in the vicinity to either substitute or specify a lexical color sign. This pointing may also take the form of touching an object. In some cases, signers manipulate a piece of clothing, for example, their *sarong* to present a color. In Example 4 below, pointing for color is illustrated by an example taken from a narrative about a deaf ghost the signer has met at the village cemetery.



Fig. 6. Durational adverb: All day.

Example 4: Pointing as color description

<http://hdl.handle.net/hdl:1839/00-0000-0000-0016-7EEF-0>

NM *[searching behavior]*
 MG GHOST HAIR SAME IX‘M’s trousers’ BODY-COVER
 ND

“The ghost had hair like M’s trousers (dark blue in color), all over his body.”

The example above is typical of the behavior that cues an index finger point as a color description. That is, the pointing sign is preceded by ostensive searching behavior, that is, the signer moves and acts as if actively searching for a color. This active searching behavior even happens when it does not seem required from the signer’s own perspective, for instance in subsequent points to the same object in the same location within the elicitation session. The use of ostensive searching behavior has thus become indicative of color descriptions, but not other types of description (Nonaka, 2004). As an alternative to the use of ostensive searching behavior, some signers also used the lexical sign PAINT before pointing to an object. To conclude, there are strong constructional cues to the interpretation of a pointing sign as a **non-lexical color point**: either ostensive searching behavior or the lexical sign PAINT.

4. Pointing: From gesture to language

While the literature on grammaticalization in spoken languages holds a variety of views regarding this diachronic process, it is generally taken to involve the transition of a

lexical morpheme to a grammatical class, accompanied by phonological reduction and semantic bleaching (Hopper & Traugott, 1993). The literature on sign language grammaticalization includes similar studies on the grammaticalization of signs, but it is also concerned with the question of how manual and non-manual gestures are conventionalized to express grammatical meanings (Pfau & Steinbach, 2006; Shaffer & Janzen, 2012; Wilcox, 2004). In this latter sense, the grammaticalization of gestures is essentially different from processes of grammaticalization in spoken languages. That is to say, the input and output of grammaticalization in spoken languages always concerns a morpheme, whereas the grammaticalization of gestures does not always build directly on such established form-meaning mappings. Moreover, these gestures are not normally considered to have a grammatical function to begin with. This paper, therefore, provides an account of the KK pointing system based on two notions that are orthogonal to grammaticalization proper. First, morphemization describes the degree to which the meaning of the pointing sign can be retrieved outside the situational context, based on its formal characteristics alone. Second, syntactic integration concerns the degree to which the distributional properties of pointing signs reflect grammatical rules of usage. Based on the description of the various KK pointing types above, I show how different types of pointing meet the criteria for morphemization and syntactic integration to varying degrees.

4.1. Morphemization of Kata Kolok pointing signs

In the case of sign languages, new words may arise from manual gestures, a process which will be referred to here as *morphemization*. This term is similar to the notion of morph formation as used by McNeill and Sowa (2011) to describe conventional form-meaning pairings of gestures that form sets of syntagmatic oppositions. Morphemization of gesture is a unique word formation process to sign languages, and sign language users may deploy signs that are morphemic to varying degrees (Johnston, 2013b). Following Okrent (2002), I consider the formal aspects of pointing signs that map onto their meaning in gradient ways as gestural, while those components that are stable across instances are regarded linguistic.

The pointing signs were classified further to determine the extent to which each pointing type may be considered morphemic, based on the coding described in Section 3.1. Non-morphemic signs are those which map onto their meaning in gradient ways, as is the case with the spatial realization of most pointing gestures. Semi-morphemic signs are signs in which at least one formal parameter is stable across instances of use, although aspects of its form may still vary according to the (spatial) discourse. Fully morphemic signs are those that have a distinct phonological form; that is, they are recognizable as a token of a type outside a discourse context. As a result, the sign's meaning, however abstract, is apparent in isolation.

The KK pointing system includes fully morphemic signs across all functional domains. All these signs have stable spatial form, which can be described phonologically, with reference to the signer's body. Proximal locatives, for instance, always constitute a downward point in the space in front of the signer. Similarly, while KK's celestial timeline has

gradient characteristics, the upward pointing sign designating NOON is recognizable as such without specific lexical construction needed. In the domain of person reference, first-person references and points known as list buoys should be considered fully morphemic as their meaning can be identified outside the discourse context. This class further includes the lexical pointing signs used to indicate body parts and lexical color signs. Some of these morphemic pointing signs can attain deferred meanings based on the signed context; for example, the pointing sign meaning “teeth” can also refer to “white” and “tuak,” a white local beverage.

A subset of KK pointing signs appears to be semi-morphemic. That is to say, while their spatial instantiations are variable, they retain stable form-meaning mappings through other parameters such as articulator type, handshape, and movement. In the case of KK, this class includes distal locative points, which are formally marked by an upward fingertip orientation, straight movement, and a lifted upper arm; lower elevation points, which are marked out by the use of a bent index finger point; movement predicates, which include horizontal movement that describes a path; and durational adverbs, which trace across the sky.

Finally, a number of KK pointing signs should be considered non-morphemic. This remaining category includes demonstrative references to objects and persons, whether they are addressees or non-addressees, the points to the sky whose reference cannot be identified as temporal or otherwise outside the signed context, and non-morphemic color indications that indicate objects in the vicinity. While these pointing signs do not have a morphemic status, they attain specific meanings based on the spatial context and signed discourse in which they are produced.

4.2. *Syntactic integration of Kata Kolok pointing signs*

In order to further evaluate their grammatical status, the notion of syntactic integration was applied to individual KK pointing types (Kendon, 2004). The discussion below adopts the following language-internal considerations for capturing this notion. First, does the manual form retain a grammatical meaning? Second, to what extent do the distributional properties of pointing signs reflect grammatical rules of usage? The latter analysis is presented around the notions of language-specific sequential and simultaneous slots, that is, positions in the utterance that these pointing types may inhabit.

A minimal level of syntactic integration is found in pointing signs for which no clear restrictions on their distribution can be defined. This category traditionally includes demonstrative pointing gestures, but in the case of KK these also include non-redundant celestial pointing signs and second-person points. These points may attain specific syntactic functions within the sequential or simultaneous context of the utterance and are part of the expressive inventory of signers as such. However, the fact that they cannot be identified as tokens of a type prevents generalizations on their distributional properties. Most pointing gestures that accompany speech are presumably of this type (cf. Enfield, 2009).

The intermediate level of syntactic integration includes three types of pointing signs: (a) points that are cued by a specific sequential slot, (b) points that may be co-produced with grammatical non-manual markers, and (c) points that may clearly not occur in these sequential or simultaneous constructions. The first group of sequentially cued pointing signs concerns the extended celestial pointing constructions, which are preceded by the sign TIME and/or a cardinal numeral and non-lexicalized color indications which are preceded by the lexical sign PAINT, or ostensive searching behavior. While these pointing signs are not formally marked themselves, they occur in specific sequential slots that cue their full meanings. The second group concerns pointing signs that may be combined with specific grammatical non-manual markers. Movement predicates and distal locatives, for instance, may be co-produced with a lip smack used to indicate completive aspect, and lexical color signs, but not non-lexical color points, may be combined with the general intensifier—pursed lips and squinted eyes. The third and final group constitutes morphemic and semi-morphemic signs that may not occur in the sequential and simultaneous slots described above. In the case of KK, these include durational adverbs, lower elevation points, body part terms, and the lexical celestial point NOON.

The maximal level of syntactic integration concerns those pointing signs that retain a grammatical meaning in their form. In the spatial domain, these include the distal and proximal locatives that mark the deictic distinction between proximal and distal reference. First-person pronouns and list buoy points function similarly to spoken language pronouns in KK, in the sense that they refer to the grammatical categories of first- and third-person referents and have stable forms. Some of the pointing signs in this class also feature in sequential and simultaneous slots, but their grammatical interpretation does not rely on it. While the analysis below provides a synchronic evaluation of the grammatical behavior of KK pointing signs, these criteria could be adopted to evaluate the grammatical nature of Balinese co-speech points as well as pointing signs as used by various generations of KK signers to chart the various stages of grammaticalization from gesture to sign as well.

With regard to the grammatical pronominal points, one might think of their forms as being phonologically reduced, that is, closer to the signer's body, compared to other pointing types, which is a characteristic of grammaticalization. However, these stable forms arise instantaneously as a consequence of the fact that they are directed at the body, rather than originating from a process of phonological change. Similarly, the syntactic integration of pointing signs, as evidenced by language-specific sequential or simultaneous slots, may be considered instantaneous as well. To determine whether these various types of grammaticality result from processes of conventionalization, one needs to compare the system at various stages of its development (Coppola & Senghas, 2010).

Table 2 presents an overview of the various pointing types and their degrees of morphemization and syntactic integration as well as cross-references to the relevant sections describing each pointing type. The degrees of syntactic integration and morphemization are to an extent independent indicators of the grammatical status of a pointing sign. That is, pointing types at all levels of morphemization, whether morphemic, non-morphemic, or semi-morphemic, may fill sequential or simultaneous slots. Importantly, however, non-

Table 2
Morphemization and syntactic integration of Kata Kolok pointing signs

	Morphemization			Syntactic Integration		
	Morphemic	Semi-Morphemic	Non-Morphemic	Maximal	Intermediate	Minimal
Space (Section 3.2.1)						
Proximal locative “here”	X			X		
Distal locative “there” (Fig. 1)		X		X		
Movement predicates “path” (Example 1, Fig. 2)		X			X	
Lower elevation points “down there”		X			X	
Person (Section 3.2.2)						
First-person pronoun “me”	X			X		
List buoy point “he/she/it”	X			X		
Second person			X			X
Demonstrative points			X			X
Time (Section 3.2.3)						
Lexical celestial point “noon” (Example 3)	X				X	
Durational adverb (Example 3, Fig. 6)		X			X	
Extended celestial pointing construction (Fig. 4)			X		X	
Non-redundant celestial point (Example 2, Fig. 5)			X			X
Other						
Body part term, e.g. “wrist/time” (Fig. 4, Section 3.2.3)	X				X	
Lexical color sign, e.g. “teeth/white/tuak” (Section 3.2.4)	X				X	
Non-lexical color point (Example 4, Section 3.2.4)		X			X	

morphemic points cannot be identified as tokens of a type, and they can therefore not be assessed for their distributional properties.

5. The grammatical status of pointing in Kata Kolok

This study is one of few studies that has adopted a corpus-based approach to identify the level of morphemization, as instantiated by stable form-meaning mappings, of various types of pointing signs. It has supplemented these corpus-based analyses by a description of the distributional characteristics of the morphemic and semi-morphemic pointing types, in particular. The identification of various sequential and simultaneous slots that these types of points may fill and the restrictions on such co-occurrences appears crucial in demonstrating the syntactic integration of these pointing signs in KK. As such, this paper addresses the grammaticality of KK pointing signs based on language-internal considerations, rather than by comparing them to spoken language pronouns (cf. Cormier et al., 2013; Johnston, 2013a).

What can be said in favor of the grammatical status of the different types of KK pointing signs? Grammaticality can be contrasted with the notion of ungrammaticality based on the intuition that the instantiation of a particular form violates the conventions of use specific to that language (Emmorey, 1999). Such a violation could happen when an incorrect form occurs in an otherwise valid slot, or conversely, when a valid form occurs in an incorrect constructional slot. Consider the use of the extensive searching behavior, which was identified as a strong sequential cue for color indication. Now imagine this searching behavior followed by a pointing sign that traces along the east–west axis in the sky. This kind of combination cannot be interpreted as a color description, nor is it a well-formed temporal adverbial. Another example comes from the general intensifier: While non-lexical color indications cannot co-occur with it, lexical color signs and many other signs can. In other words, there are indications that the morphemic and semi-morphemic pointing signs conform to the grammatical rules of the language more generally.

A second indication that the KK pointing system is grammatical is that the system exhibits the same types of syntagmatic oppositions also found in spoken languages (McNeill & Sowa, 2011). That is, the KK pointing signs that are maximally syntactically integrated formally mark grammatical categories. For example, the distinction between first-person and non-first person is marked by the use of the full hand for first-person reference. Moreover, KK signers formally distinguish distal and proximal locative points, which is a frequent distinction made in spatial deixis across languages. Granting this, there are some classic distinctions that are not systematically marked in KK. For instance, similar to other sign languages, KK lacks a formal distinction between non-distal location indications and non-first-person indications (Ahlgren, 1990; Engberg-Pedersen, 1993:119), and both functions essentially constitute demonstrative references, that is, points that are resolved based on the physical context of the signed discourse. Notwithstanding this finding, KK signers construct coherent discourse without distinguishing between both types of meanings.

Another aspect of grammaticality to consider is the fact that at least some of the form-meaning mappings described above are specific to this signing community (Okrent,

2002). The comparison with other sign languages, and the dominance of absolute pointing in particular, shows that this is indeed the case (de Vos, 2012; Marsaja, 2008; Perniss & Zeshan, 2008). The KK pointing system also shows overlap with Balinese pointing gestures: Balinese speakers also prefer absolute pointing (Perniss & Zeshan, 2008), and they also adopt the celestial timeline (Dasen & Mishra, 2010). This study has not systematically compared the use of pointing signs in KK to pointing gestures in Balinese conversations. Notwithstanding this shortcoming, the KK pointing system appears to be more complex compared to the co-speech points used alongside spoken Balinese, given the widespread use of grammatical non-manual markers with pointing signs, as well as the use of pointing signs for specific functions such as color indication.

The corpus analysis combined data from 10 deaf KK signers who are primarily from the fourth biological generation of signers, and this study has not looked into inter-generational or inter-signer variability as such (cf. Coppola & Senghas, 2010). A portion of the formal regularities that have been described might thus not be conventional in the sense that they are shared by the whole signing community. If KK's pointing system has become conventionalized over time, however, we would expect the observed regularities to be more systematic in later generations of KK signers. In the absence of hallmark features of grammaticalization, such as phonological reduction and semantic bleaching, this paper has argued that this diachronic process may be governed by two independent mechanisms: morphemization and syntactic integration. When similar criteria for these two clines are applied to co-speech pointing gestures, some highly systematized pointing systems of speaking communities may to a degree be considered grammatical as well (cf. Cormier et al., 2013; Enfield, 2009; Johnston, 2013a). If such a contrastive analysis is focused on indigenous co-speech gesture systems, such an enterprise could lead to a deeper understanding of the semiotic seeds and mechanisms that lead to the emergence of rural signing varieties such as KK.

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Note

1. Please note that unless otherwise stated, all Kata Kolok examples and accompanying figures stem from de Vos (2012). All examples can be viewed online at a stable handle net link. A complete overview of transcription conventions is available as supplementary material.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1: Pointing coding scheme

Appendix S2: Transcription conventions