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Markers of epistemic modality and their origins: Evidence from two unrelated sign languages

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Abstract

Native deaf signers express epistemic modality by different means: mental-state words, clause-internal particles, signs indicating hypothesis, and nonmanually. The data for this study come from two unrelated sign languages, Danish Sign Language and Japanese Sign Language. In dialogues the signers use both calques of majority-language words and signs that appear to have emerged in the sign languages only. Based on the multifunctionality of some word forms, the origin of the epistemic modal particles may be traced back to tags, interjections, and lexical signs, a route motivated by interaction and also found in unrelated spoken languages. Furthermore, in both sign languages, the first-person pronoun can be used, without a verb, as an epistemic “anchor” of a proposition, a construction that seems specific to languages in the gestural-visual modality. Another modality-specific feature is the possibility of transferring the expression of a marker of epistemic uncertainty from one articulator to another.

Key words: sign language, epistemic modality, cognitive motivation, functional motivation, gestural-visual modality
1. Introduction

Etymological studies show that markers of epistemic modality have their origins in a variety of semantic areas. Some originate from expressions of agent-oriented or root modality (e.g. Sweetser 1990; Bybee et al. 1994), which in turn may have a number of different origins: Danish kunne ‘be able to’ is derived from a verb meaning ‘know’, and skulle ‘have to’ from a word meaning ‘debt’ or ‘owe’ (*Ordbog over det danske Sprog*). Both modal verbs have root modal and epistemic modal uses. Complement-taking verbs of mental states and activities may grammaticalize as markers of epistemic modality (Thompson 2002), but are also used in their lexical form to express a speaker’s doubt or certainty about a proposition (Boye & Harder 2007). Adjectives and adverbs with epistemic modal meaning may be derived from diverse lexical sources of meaning. For example, the Danish adjective sikker ‘certain, sure’ is related to Latin se-curus from se- ‘without’ and cura ‘concern, worry’ (*Ordbog over det danske Sprog*). The semantic changes can be explained as cases of especially metaphorical, but also metonymic extensions (e.g. Sweetser 1990; Langacker 2013).

Most sign languages are minority languages in communities with one or more spoken languages whose speakers outnumber the speakers of the sign language. In industrialized countries with general school systems, deaf children are taught the majority spoken language at least in its written form. Thus, the vocabulary of a sign language may be influenced by a spoken language. Examples of this type of influence will appear below. But the possibility exists that the modality contrast between signed and spoken languages – the gestural-visual modality vs. the oral-aural modality – makes the expression of speaker (un)certainty fundamentally different in the two types of language, and that the origins of markers of epistemic modality in sign languages differ from the origins of spoken-language modal markers.

Many studies have focused on the effects of the articulatory means of sign languages. They have found influences on both the lexicon (e.g. Padden et al. 2015), the morphology (e.g. Cormier
et al. 2012) and the syntax (e.g. Meir et al. 2013; Sandler 2013; Brentari et al. 2015). All sign languages that have been studied to date use movements of the hands, head and body, gaze direction, and facial expressions for linguistic purposes. Many sign languages indicate, for instance, topicalization by special head positions and facial expressions which extend over the sequence of manual signs within their semantic scope (e.g. Dachkovsky & Sandler 2009; Sandler 2012). Based partly on Herrmann’s (2013) study of semantic modality in three European sign languages (see Section 3), Bross and Hole (2017) found that in German Sign Language (DGS), what they call high operators with semantic scope over the speech act or the proposition are expressed by nonmanual markers of the upper face (especially the eye brows). By contrast, event-internal operators with scope over the state-of-affairs (e.g. volition) are expressed by the hands. If this holds true of other sign languages, sign languages may be expected to express epistemic modality grammatically by nonmanual markers since epistemic modality has scope over the proposition. However, many studies of modality in sign languages and the data for this study show that speaker (un)certainty can indeed be expressed also by manual signs, i.e. the words of a sign language.

Most studies on modality in sign languages have focused on manual signs (with some notable exceptions: Cabeza-Pereiro & Iglesias-Lago 2015; Siyavoshi 2019). But there is no straightforward relation between the spoken language words expressing epistemic modality and the words of the sign languages. Interestingly, it has been found that some signs that are used to express epistemic modal meaning originate from other semantic sources than the spoken-language words whose meaning they share. In American Sign Language (ASL), which is historically related to French Sign Language (LSF) (Lane 1984), the sign POSSIBLE/CAN1,2 has both agent-oriented, root possibility,  

\footnote{1 Signs are usually notated by glosses in a spoken language (see Section 5). This practice presents a serious risk that readers – and researchers – are misled to think that the meaning and use of the sign is identical to the meaning and use of the spoken language word. In many sign languages, signs may}
deontic and epistemic modal uses like English *can* (Shaffer 2002; Janzen & Shaffer 2002). *Can* can
be traced back to the LSF sign *POUVOIR* meaning both ‘be able to’ and ‘power’ (Delaporte 2007)
like the French word *pouvoir*. In a sermon in ASL from 1913 the same form was used both in the
sense ‘strong’ and in the sense ‘can’ (Janzen & Shaffer 2002). Thus the modern ASL sign originates
from what may be a calque in old LSF of the French word *pouvoir* ‘be able to, power’, but this
origin contrasts with English *can*, which – like Danish *kunne* – is derived from a verb meaning
‘know’ (*Merriam-Webster*). Janzen and Shaffer analyse the form of the old LSF sign (two fists with
the palms facing down move down forcefully) as originating in a gesture that “nonsigners might use
to visually represent physical strength” (2002: 210). That is, although the ASL sign *CAN* as a modal
is polysemous in the same way as the English modal *can*, its form is derived from a gesture with a
different meaning (i.e. ‘strong’), and its polysemy is inherited from the LSF sign, but may of course
have developed further meanings by its coexistence with the polysemy of the English word *can*
(root modality and epistemic modality, but not ‘strong’).

The development of ASL *CAN* from a gesture that nonsigners might use in the sense of
‘physically strong’, over LSF *POUVOIR* to its modern meaning of epistemic modal possibility
demonstrates that signs in a sign language may undergo metaphorical and metonymic extensions in
the same way as words in a spoken language, in the case of LSF *POUVOIR* and ASL *CAN* under the

be used with silent mouthing imitating a spoken-language word or phrase (Boyes Braem 2001). But
even in such cases the sign and the word or phrase may differ in meaning.

2 S. Wilcox & P. Wilcox (1995) describe *CAN* and *POSSIBLE* as two different signs, whereas Shaffer
and Janzen (2016) describe them as articulatory variants of one form and point out that choosing an
English label for a sign can be misleading. They prefer glosses with a slash such as *MUST/SHOULD*
as a way of describing a “cluster around the various modal meanings” (2016: 454).
influence of the words of a spoken language. The question remains whether they can do so independently of a spoken language.

This study examines expressions of speaker (un)certainty in dialogues in two unrelated sign languages, Danish Sign Language (DTS) and Japanese Sign Language (JSL). The two sign languages are used in the contexts of two unrelated spoken languages, Danish and Japanese. The aim is to uncover how signers express their (un)certainty about a proposition and, to the extent possible, the sources of the epistemic modal expressions. By examining the strategies used in two unrelated sign languages surrounded by two unrelated spoken languages, the study may throw light on functional and cognitive processes in the development of markers of epistemic modality as well as sign-language specific strategies that can be attributed to the articulatory means of these languages.

Section 2 presents the notion of epistemic modality as used in this study. Section 3 gives an overview of earlier research on epistemic modality in sign languages, and Section 4 a brief introduction to the two sign languages, characteristics of their syntax, and the data used for the study. Section 5 gives a short introduction to the notation of sign language examples for readers who are not familiar with a sign language. Sections 6.1-6.4 present different types of expressions of epistemic modality in the data: signs about mental states and activities, clause-internal particles, equivalents of majority language markers in both sign languages, and nonmanual markers in DTS. Finally, in Section 7, the results are discussed in the light of the different factors that appear to have influenced the ways these two sign languages structure the semantic field of epistemic modality in the dialogues: the gestural-visual modality, the majority languages, and functional and cognitive factors.
2. Epistemic modality

It would by far exceed the limits of this paper to do justice to the literature on epistemic modality in spoken languages. Within the area of modality, this study focuses on epistemic possibility (uncertainty) and epistemic necessity (certainty and a high degree of probability) (Auvera & Plungian 1998). In a functional-cognitive framework, Boye (2012) proposes a cross-linguistic notional category *epistemicity*, which subsumes the two subcategories of evidentiality and epistemic modality. He defines *evidentiality* in terms of epistemic justification, i.e. any type of justification – inferential, reportive, sensory or other – for a speaker’s belief in a proposition, no matter whether it is expressed lexically or grammatically. That is, he sees the question whether a marker is lexical or grammatical as secondary to the characterization of it as an expression of epistemic justification. Boye defines *epistemic modality* as covering any type of epistemic support for a proposition – possibility, probability, and necessity. Thus markers of epistemic modality express the strength of the speaker’s certainty in relation to a proposition and have scope over the proposition. They do not justify the speaker’s conviction, as do markers of evidentiality, Boye claims. Markers of epistemic support may again be either lexical or grammatical in Boye’s classification. In this study I shall use this definition of epistemic modality as epistemic support and ignore expressions of epistemic justification.

In the framework of Cognitive Grammar, Langacker sees modality as a subfield within “the very general conception of a cyclic process involving the striving for control” (2013: 3). According to Langacker, a conceptualizer may strive for control of a process that the conceptualizer does not see as part of reality. For instance, in *She must be at the wedding* in the obligation sense of *must*, the conceptualizer attempts to influence what happens in the world, i.e. to obtain effective control of the event. Alternatively, the conceptualizer may strive to obtain knowledge – i.e. epistemic control – of an event as in *She must be at the wedding* in the necessity sense. Langacker sees effective
modals as having an epistemic component since an effective modal presupposes the conceptualizer’s epistemic assessment that the process is not – yet – part of reality. Thus, the difference between effective and epistemic control is “whether the force inheres solely in C’s [i.e. the conceptualizer’s] epistemic assessment, affecting only what C knows, or whether it also operates outside this realm, with the potential to influence what happens in the world” (Langacker 2013: 16). In the latter case, the modal has an effective sense besides the epistemic component, Langacker claims.

Langacker further characterizes discourse as “an intersubjective process of striving for effective and epistemic control” (2013: 10), and he interprets the use of modal expressions as the interlocutor’s way of establishing “joint effective and epistemic control in regard to [the interlocutors’] current scope of awareness and the focus of attention within it” (2013: 10).

Both Boye (2012) and Langacker (2013) take a broad view of what epistemicity is, Boye by not distinguishing lexical from grammatical items in the first step, and Langacker by seeing epistemicity in the light of discourse as an intersubjective striving for control. Boye’s approach opens up for both lexical and grammatical markers, and Langacker’s approach permits motivating markers not only in cognition, but also in interaction. The aim of this study is to uncover epistemic modal means in two unrelated sign languages and the pathways that have led to the epistemic modal markers found in the data, an approach where it is preferable not to start by distinguishing grammatical and lexical means. Moreover, as the data for the study are conversations, where the interlocutors are encouraged to reach agreement on more or less unknown topics, the idea that the interlocutors strive for joint epistemic control of the topics is highly relevant.
3. Epistemic modality in sign languages

Linguists studying sign languages have found strong structural similarities among these languages in areas where sign languages can exploit visuospatial means to express visuospatial concepts such as location and physical or metaphorical movement or transfer (e.g. Sandler 2003, 2010; Slobin 2013; for overviews, see Meier 2012 and Pfau 2012, Section 3). Another structural similarity is a preference for simultaneous over sequential morphology, probably because of the gestural means of expression and the visual mode of perception. This is seen, for instance, in expressions of verbal aspect (Aronoff et al. 2005): repetition of the movement of a verb sign can reflect quantitative aspects of an action such as duration or distribution iconically. Simultaneity is also seen at the discourse level in unrelated sign languages: signers can use one hand to indicate the state or activity of one referent and the other hand to indicate the state or activity of another referent (e.g. Engberg-Pedersen 1993, 1994 for examples from DTS, and papers on simultaneous constructions in unrelated sign languages in Vermeerbergen, Lawson & Crasborn 2007, and especially the comparison with gesture and speech in Vermeerbergen & Demey 2007).

Perhaps because epistemic modality cannot be expressed visuospatially, little research was done in this area in sign languages in the early period of sign linguistics. But from 1990, there is an increasing number of studies of single signs and nonmanual markers that express epistemic modality in sign languages.

The earliest work is Ferreira Brito (1990) on signs with modal meanings in Brazilian Sign Language. One of the signs, OPTIONAL₁, appears to have both a deontic and an epistemic modal use. In a number of papers, P. Wilcox, S. Wilcox, Shaffer and Janzen focus on the grammaticalization of modals in ASL and their co-occurring nonmanual markers (P. Wilcox & S. Wilcox 1995; Janzen & Shaffer 2002; Shaffer 2002; S. Wilcox 2004; S. Wilcox & Shaffer 2006; Shaffer & Janzen 2016). Taking a notional view of epistemic modality, S. Wilcox and P. Wilcox (1995) found that speaker
uncertainty can be expressed by means of tags with the signs RIGHT and HUH with appropriate nonmanual markers as well as by nonmanual markers by themselves. They claim that the same nonmanual signals are seen in ASL marking of imperatives, obligation, and request for information and subsume these meanings under the heading *interpersonal transitivity*, i.e. “the grammatical expression of certainty, power, and politeness” (S. Wilcox & P. Wilcox 1995: 148-149). That is, they point out that the notions certainty and politeness are expressed by some of the same means in ASL. However, the link is rather between uncertainty and politeness as a request for information appears to be a consequence of uncertainty.

Shaffer (2002) points out that markers of modality in ASL are primarily free morphemes, but in a later paper (Shaffer 2004; see also Shaffer & Janzen 2016), she sees nonmanual marking as bound morphology and emphasizes an iconic relationship between articulatory intensity and epistemic modal commitment: the more intense the articulation manually and nonmanually, the stronger the commitment (see also P. Wilcox 1996 and Siyavoshi 2019). Shaffer (2004) also claims a parallel between scope and position in the clause: modals with scope only over the verb appear in preverbal position in ASL, whereas epistemic modals with scope over the proposition occur clause-finally or after a clause marked as a topic (i.e. [[clause]topic [modal]]). Finally, she mentions that **SHOULD** can be used with epistemic modal meaning.

Janzen and Shaffer (2002; see also S. Wilcox 2004) describe the route taken by ASL **MUST** from a gesture to a sign with modal meanings. In the case of **MUST**, the gesture was “a deictic pointing gesture indicating monetary debt” (Janzen & Shaffer 2002: 210) found as far back as classical antiquity. This gesture is also seen in a group of signs in LSF including **BESOIN** ‘need, necessity’ and **DEVOIR/FALLOIR** also expressing necessity as well as monetary debt (Delaporte 2012), just like the French verb **devoir** ‘have to, must’ and ‘owe’. The form of the gesture indicating monetary debt recurs in a sign meaning ‘owe’ in the ASL sermon from 1913 (Janzen & Shaffer
That is, the LSF origin of ASL **MUST** may be a calque of the spoken French verb *devoir* (Janzen & Shaffer 2002: 210) just as ASL **CAN** originates in the old LSF **POUVOIR**, which is probably a calque of French *pouvoir* ‘be able to’ and ‘power’.

Cabeza-Pereiro (2013) traces the origins of the Spanish Sign Language (LSE) sign **DEBER** ‘must’, which can be used with deontic and epistemic modal meaning. Like French *devoir*, Spanish *deber* ‘owe, must’ is derived from Latin *debeo* ‘owe, be obliged to’, but unlike LSF **DEVOIR/FALLOIR** and ASL **MUST** (Janzen & Shaffer 2002), Cabeza-Pereiro (2013) points out that the sign **DEBER** originates in a gesture described by Kendon (1995) as the Ring with a meaning of precision or specificity: the tips of the thumb and the index finger touch, the other fingers are spread out. The Ring is found in Spanish culture as an emblem (a conventional gesture, Kendon 1988) used to express agreement. Cabeza-Pereiro (2013) found the same handform in two signs in an LSE sign dictionary from 1851: **NECESARIO** ‘necessary’ and **CABAL** ‘exact, just’, as well as in signs of modern LSE meaning ‘same, invariable’ and ‘sure’. **CABAL** is made with two hands with the handform of the Ring held horizontally, the movement of the hands imitating the balancing of a scale. Cabeza-Pereiro sees the exact measuring of a scale as mapped metaphorically onto exact judgement and, further, metonymically into “something paradigmatically exact and, therefore, necessary in general terms” (Cabeza-Pereiro 2013: 11). Cabeza-Pereiro (2013) does not state so, but the sign **DEBER** may originate metonymically in the gesture expressing agreement and commitment in a situation of negotiating a business transaction, which may in its turn come from the meaning ‘exact’ as a response. By agreeing to a business transaction, you undertake a monetary debt, and that might explain the obligation meaning of **DEBER**. The further step to an epistemic modal meaning of **DEBER** might be a calque of the Spanish word *deber* ‘owe, must’: the first part of the route from ‘agreement’ to ‘monetary debt’ appears to be a metonymic extension that is special to LSE, but the last part from ‘monetary debt’ to deontic and epistemic modal meanings may be
calqued on the Spanish word *deber*. Cabeza-Pereiro (2013) further finds that modal necessity may be expressed in LSE solely by a facial marker, for deontic necessity brow furrow, for epistemic necessity brow furrow and pursed lips.

Also writing about LSE, Herrero-Blanco and Salazar-García (2010) point out that the LSE sign *PERHAPS* used of epistemic uncertainty is manually identical to the sign *BUT*. They see the similarity in form as manifesting a relatedness in meaning between *PERHAPS* and *BUT*: “the speaker utters a proposition and at the same time refuses a strong commitment to the truth of its content” (Herrero-Blanco and Salazar-García 2010: 34), I suppose by suggesting an alternative view after *BUT*.

S. Wilcox (2009) and S. Wilcox et al. (2010) describe in detail the development of the modal sign *IMPOSSIBLE(H-fff)* in Italian Sign Language (LIS). The sign is used to indicate “the signer’s subjective judgment on the impossibility of the event/action ever taking place” (S. Wilcox et al. 2010: 341). LIS signers see the gestural source of the sign as the benediction gesture made with a fist with the index finger and the middle finger extended, or with a fist with the thumb and the index and the middle fingers extended and slightly spread. For benedicitions, the hand traces a cross in neutral space. But the handform may come from a more general gesture of speech acts, S. Wilcox et al. (2010) claim. They found that in Southern Italy a gesture with this handform and a single, circular movement used by members of the hearing community means ‘dead’. The gesture has been incorporated into LIS with this meaning. They analyse the link from a speech act gesture to a gesture – and sign – meaning ‘death’ as metonymic: the gesture was used for benediction in speeches over dead persons. By metaphorical extension from the meaning ‘dead’ it came to signify also moral and political death and further despair. S. Wilcox et al. (2010) create the link between the gesture and the modal sign meaning ‘impossible’ by claiming that the feature ‘absence of future potential’ is shared by the meanings ‘dead’ and ‘despair’. They follow Langacker (1991) in seeing
the transition from root modal meaning to epistemic meaning as a process where the locus of the potency becomes less salient and less well-defined and the likelihood of reality evolving in a certain way more central: “Death, by eliminating the hope of any potential future reality, embodies the modal notion of epistemic impossibility” (S. Wilcox et al. 2010: 347).

Xavier and S. Wilcox (2014) base their analysis of the diachronic pathways of modal terms in Brazilian Sign Language (Libras) on synchronic polysemy and vagueness of meaning, i.e. internal reconstruction (cf. Pfau & Steinbach 2011). In their data there are no unambiguous examples of epistemic uses of the signs of modal necessity. The Libras signs MUST and PAY differ only by MUST having a shortened and reduplicated movement. Xavier and S. Wilcox (2014) claim that PAY appears to originate in the FSL sign ACHETER ‘buy’ (but see the discussion in Sapountzaki (2005: 207) on the origin of the Greek Sign Language sign MUST), which also in Libras creates a link between monetary transaction and obligation. Xavier and S. Wilcox (2014) also find that one of the Libras markers of modal possibility has the same phonological form as the sign WIN and point out that, in spoken languages, words meaning ‘successful completion’ may also give rise to modal markers. Xavier and S. Wilcox (2014) further find that another possibility marker in Libras appears to come from the LSF sign POUVOIR ‘can’, which in its turn comes from LSF FORT ‘strong’ and a hearing gesture for strength, i.e. the same origin and pathway as described for the ASL modal sign CAN (Shaffer 2002; Janzen & Shaffer 2002; see here Section 1).

One of the Libras signs of modal impossibility, IMPOSSIBLE-U, is identical to the LIS sign IMPOSSIBILE ‘impossible’

3, and, as mentioned, S. Wilcox et al. (2010) analyse the latter as originating from the Roman Catholic benediction gesture used in blessing the dead. There was a massive immigration of Italians to Brazil in the twentieth century, which Xavier and S. Wilcox (2014) see as an explanation for why the gestural origin of the LIS sign is relevant also for the

3 This sign appears to be the same sign as IMPOSSIBLE(H-fff) in S. Wilcox et al. (2010).
Libras sign IMPOSSIBLE-U. By contrast, the Libras sign IMPOSSIBLE-V is similar in form to the Libras sign meaning ‘busy’ except for the headshake accompanying IMPOSSIBLE-V. Xavier and S. Wilcox (2014) see BUSY as a sign indicating a more specific impossibility than IMPOSSIBLE-V. It is also phonologically related to an ASL sign meaning ‘stuck’, a fact that Xavier and S. Wilcox interpret as indicating a common source in Old LSF.4

In a study on head and body movements in Austrian Sign Language (ÖGS), Lackner (2017) analyses nonmanual expressions of modality. She identifies two types of head nods as indicating convinced assertion. As with many nonmanual markers in sign languages, they show isomorphism between their physical extension and their semantic scope. Head nod in ÖSG often occurs with intensification in the production of the manual signs and other nonmanual features such as furrowed brows and squint. A special kind of headshake is characterized as slow, small and tentative and is described as a deductive-assumptive marker, and a swaying movement of the upper part of the body from side to side as a speculative marker. Lackner also finds that signs meaning ‘maybe’ or ‘possible’ occur with head tilt in the two unrelated sign languages ÖSG and ASL. She relates head tilt to body sway or sideways movements as indicators of alternatives, thus pointing to a possible gestural origin. Lackner’s find goes against Bross and Hole’s (2017) hypothesis based on illocution operators in DGS that “high operators” (Bross & Hole 2017: 1) such as markers of epistemic modality are expressed nonmanually by the upper parts of the face.

4 It may be added here that DTS, which has borrowed signs from Old LSF as well (Bergman & Engberg-Pedersen 2010), has a sign with the same location, but with only one movement and a different, but phonologically related handform (a fist with the index finger and the thumb extended and slightly bent, i.e. a handform with some phonological similarity to the fist with extended index and middle fingers used in Libras IMPOSSIBLE-V). The latter sign means ‘be in difficulties, stuck’ (see Ordbog over Dansk Tegnsprog, 1-KNIBE~1).
To test whether sign languages are more similar than spoken languages due to the gestural-visual modality, Herrmann (2013) used primarily data elicited as translations from written sentences to compare the ways the meaning of the spoken-language modal particles were expressed in three sign languages, German Sign Language (DGS), Sign Language of the Netherlands (NGT), and Irish Sign Language (Irish SL). In her data epistemic modality is realized especially by nonmanual means, or by adverbs in DGS, not by modal verbs. The nonmanual means were used fairly consistently by different signers within each sign language, and the features were “quite similar in all of the three sign languages” (Herrmann 2013: 179). For instance, Herrmann found that squint was used in all three sign languages to express shared information (cf. Dachkovsky & Sandler 2009).

Pfau and Quer (2007) also compared two unrelated sign languages, DGS and Catalan Sign Language (LSC), focusing on negation and negative modals. Negative modals in the two sign languages are formed by cliticization, or they are suppletive forms. The cliticization consists of adding a horizontal (LSC) or alpha-shaped (DGS) movement of the hand to the affirmative modal sign, possibly with some additional phonological changes.

In a recent study of the expression of modality in Iranian Sign Language (ZEI), Siyavoshi (2019) found that epistemic modality is rarely expressed by manual signs in this language. Instead, epistemic modal possibility, probability, and necessity are expressed mainly by facial markers such as “horseshoe mouth” (lowered corners of the mouth), squinted eyes, and brow furrow, which she sees as signals of the signer’s subjective assessment. The signals are gradable and reflect the degree of the modal force. She explains the signals by pointing to the role of the facial gestures in physical exertion. By extension they can become signals of mental exertion to get epistemic control of a target event (Siyavoshi 2019, cf. Langacker 2013, and here Section 2).
In sum, it has been found that sign languages use both manual signs and nonmanual means to express epistemic modality. Although the manual signs often have similar meanings and uses – both deontic and epistemic modal uses – as the majority spoken language words, they may originate from gestures used in the society at large with slightly different meanings, e.g. LSE DEBER ‘must, owe’ from a gesture used to express agreement or exactness and metonymically extended to the meaning ‘owe’, and from that meaning metaphorically to ‘must’, possibly be calquing the Spanish word *deber*. The semantic origins of the manual signs of epistemic modality are very similar to the notions that have given rise to modals in spoken languages: monetary debt, power, strength, successful completion. From gesture to sign, the signs seem to undergo semantic metonymic and metaphorical changes that are well-known from spoken languages, sometimes identical to the semantic extension of the words of the majority language, but not necessarily so. As in spoken languages, the semantic changes are sometimes reflected in synchronic polysemy. Epistemic modality may be expressed by nonmanual markers, especially the upper parts of the face (brow furrow), but also by the lower parts of the face (pursed lips in LSE, lowered corners of the mouth in ZEI), and by sideways movements of the body (in ÖSG). The nonmanual means used to express epistemic modality are specific to signed languages, but as we shall see below, the swaying or side-to-side movements used to express alternatives in signed languages have a semantic parallel in expressions of alternatives used for indicating speaker uncertainty in some spoken languages. Some epistemic modal signals expressed on the face have been suggested to result from an extension of physical exertion to speakers’ mental exertion when they attempt to gain epistemic control of a process or event.
4. The two sign languages and the data

Danish Sign Language (DTS) and Japanese Sign Language (JSL) belong to the group of sign languages that are known to have been first used in schools for the deaf, and that are sometimes called urban sign languages. The first Danish school for the deaf was founded in 1807 and admitted, among its pupils, three pairs of deaf siblings. These deaf children may have introduced home signs (Goldin-Meadow 2013) or a rudimentary or a full-blown sign language into the school. But the language also borrowed signs from old LSF through the founder of the school, Peter Atke Castberg, who paid a visit to the French school for the deaf in Paris (Bergman & Engberg-Pedersen 2010). The first Japanese schools for the deaf were established in the late 1870s (Fischer & Gong 2010), and JSL emerged here without any contact with other sign languages. Today there are about 3,000 speakers of DTS and about 360,000 deaf persons in Japan (Fischer & Gong 2010), but it is not clear how many of these use JSL.

The two sign languages show some syntactic similarities that may be due to the visual modality (e.g. Fischer 2003). Both DTS and JSL have verbs that may show agreement with the major constituents of the clause, and verbs that cannot show agreement (Engberg-Pedersen 1993; Fischer 1996, 2003). Both languages also have predicate constructions of the type called classifier verbs (Schembri 2003) or depicting constructions (Cormier, Quinto-Pozos, Sevcikova & Schembri 2012) (Engberg-Pedersen 1993; Fischer 2003). A depicting construction is one simultaneous “bundle” of meaningful elements whose core is a handform representing a class of referents in a certain type of action, e.g. a human walking. The movement of the hand, its orientation, and its direction in the signing space around the signer is interpreted more or less iconically. A depicting construction may constitute a clause in itself.

Fischer (2003) claims that the preferred word order in JSL clauses is with the verb after the object as in Japanese, but Torigoe (1994) points out that in JSL, in contrast to Japanese, the verb
may be followed by a pronoun: BOOK BUY PTi ‘He buys a book’. Both the order with the most active constituent (A) followed by the verb and then the least active constituent (P), i.e. AVP, and the order with the verb at the end, i.e. APV, are found in DTS (Engberg-Pedersen 2002b) in contrast to the main pattern SVO in Danish. The order with the pronoun for the only or most active constituent following the verb, i.e. (P)VA_{pronoun} or VA/P_{pronoun}, is also found in DTS. Both languages frequently leave out nominal reference when it can be inferred from the context.

Torigoe (1994) describes clauses in JSL where the verb is repeated at the end of the sentence, either in a form inflected for continuous aspect or as an exact repetition of the first instance of the verb in an uninflected form. He gives an example where the verb without any inflection is repeated after a dependent clause:

“PTI VERY-MUCH BE-DISTRESSED INTERPRETER NONE BE-DISTRESSED

‘I was distressed greatly because of no interpreter.’” (Torigoe 1994: 190)

This type of verb repetition has not been studied in depth in DTS, but similar constructions are found in the language. Both sign languages also show repetition of a nominal constituent (a pronoun or a full noun) by means of a pronoun – or clitic (Torigoe 1994) – at the end of the clause (Engberg-Pedersen 2002b; Torigoe 1994). Examples of this are relevant to this study and will appear later in the text. In Danish a sentence can end with a nominal that is coreferential with a pronoun of the main clause, but it cannot end with a single pronoun as in DTS. Verb repetition and pronoun copies have been found in several sign languages and may have to do with ease of processing in the visual modality (Padden 1988; Fischer & Janis 1990) since repetition increases redundancy.
In both languages, constituents can be topicalized in the beginning of the sentence by being marked by a certain configuration of nonmanual features (e.g. brow raise) that is coextensive with the topicalized constituent (Engberg-Pedersen 1990; Fischer 2003). Such topicalized constituents may be “topics, Chinese style” as Chafe (1976: 50-51) calls them, i.e. the topic need not have any thematic role in relation to the verb; its role is “to limit the applicability of the main predication to a certain domain” (Chafe 1976: 50). Fischer (2003: 6) gives an example of a Chinese-style topic from ASL: FISH ME LIKE TUNA ‘Of fish, I like tuna’ where the marker, raised brow, extends over the production of FISH; she claims that an equivalent form can be used in JSL. Topicalization of a constituent that does not have grammatical relations with the verb like FISH in the example is also possible in Japanese (Fischer 2003) and in DTS (Engberg-Pedersen 1990), but only in very marked written constructions in Danish (for instance, newspaper headlines).

Epistemic modality has not been studied in DTS before. Matsuoka et al. (2016) identify ten modals in JSL and, based on native signer intuitions, they order them according to how likely it is that the event in the proposition will occur. Matsuoka et al. found that probability can be modified by nonmanual means (changes in gaze direction and head tilt). The ten modals fall into two groups depending on their syntactic environment, especially whether they can occur with a negation and with other modals.

The data for this project were collected in 2016 and consist of elicitations of discussions by pairs of deaf signers. All are native signers of their sign language, having acquired sign language from infancy from their deaf parents (see Table 1). The Japanese signers are signers of the Osaka dialect of JSL. The discussions were recorded at the University of Copenhagen, Copenhagen and at Minpaku – National Museum of Ethnology, Osaka. The signers were introduced to the task by native signers of DTS and of JSL, respectively, and no one but the two signers was present during the discussion. The discussions were recorded by three cameras, one on each signer and one on
them as a pair. Subsequently, the data were notated by the author and the deaf instructors in collaboration. The relevant sections of the JSL data were double-checked by a hearing native signer of JSL.

[Insert Table 1 approximately here]

The signers were asked to discuss a task that was presented to them on video in their native sign language by the two deaf instructors. During and right after the presentation of the task, the instructors were present so that the participants might ask questions in case they did not understand the task. In the video they were asked to imagine that they were in a decrepit life boat in the middle of the Pacific. Onboard there were fifteen objects (presented in pictures on cards), and their job was to decide the order in which they would throw the things overboard in case the boat threatened to sink, the order of course being dependent on the usefulness of each object for survival.

The DTS data include about 10 minutes from each of the four discussions; the JSL data comprise all of the discussions.

In what follows, I will not attempt to trace the origins of the forms of the signs back in time as was done in several of the studies mentioned in Sections 1 and 3, since I do not have access to such data for JSL and only to a limited extent for DTS. I will use Boye’s (2012) notional definition of epistemic modality and focus on constructions where the signers express their (un)certainty in relation to a proposition no matter the status of the expressions as grammatical or lexical. For some signs I will suggest semantic diachronic pathways based on the method of internal reconstruction (cf. Pfau & Steinbach 2011), i.e. I will show how the polysemy of the signs can throw light on their functional and cognitive basis. In doing this, I will include the same signs with other functions than
as markers of epistemic modality, e.g. as tags, and explain how these other functions are related to the function of the signs as markers of epistemic modality.

In a study of the grammaticalization of FINISH in Australian Sign Language, Johnston et al. (2015) warn against using the method of internal reconstruction without substantial quantitative data to back it up. As the present study is based on a very limited set of data, it can only point to areas of future research. But the findings will be backed up by examples of multifunctionality of words in other languages.

5. How to understand the sign language examples of this study

Crasborn (2015) distinguishes transcription systems and notation systems for sign languages. Transcription systems are based on what may be called a phonetic analysis of signs, i.e. an analysis of the sign form; notation systems make use of glosses from some spoken language for individual signs. Example (1) is an example of a notation of a sentence in JSL.

(1) JSL

\[
\begin{array}{c}
\text{bf} & \text{br} \\
\text{card} & + \\
\text{POINT}_{\text{card}} \text{ ISG NOT-NEED DIFFERENT POINT}_{\text{card}} / \text{SAME} / \\
\end{array}
\]

‘We probably don’t need that one, right?’

Only the signals that are relevant for the examples in context are notated. The central line includes the glosses in small capitals for manual signs, e.g. DIFFERENT, here using English words (see note 1). If more than one English word is needed for a gloss, the words are hyphenated, e.g. NOT-NEED. In the example the signer used only one hand. If a sign is made with both hands and this is relevant
in context, the glosses are repeated in the line just below the central line. Mouth movements bound to a single sign can be notated below the gloss for the sign.

If a sign is not used in its neutral form, but modified, this is annotated by an added word or abbreviation in small letters: POINT\text{card} means that the pointing sign is directed at one of the cards illustrating the objects in the task (see Section 4).

A slash, /, indicates a boundary marked prosodically (Sandler 2012) by one or more of the following signals: lengthening of the last sign before the boundary, lowering of the hand(s) of the last sign, a change in gaze direction, a change in body or head position, relaxation of facial muscles before the boundary and/or tightening of the muscles after the boundary.

The lines above the line with the glosses indicate nonmanual signals, especially signals made on the face. Some of these are configurations with identified meanings, e.g. topicalization in DTS (Engberg-Pedersen 1990). They can be notated either by their form (e.g. \textit{br} for brow raise) or their function (e.g. \textit{t} for topicalization). The semantic scope of the nonmanual signals is identical to their formal scope, i.e. in (1) \textit{bf} (brow furrow) has scope over the clause from the beginning to the first boundary: POINT\text{card} 1SG NOT-NEED DIFFERENT POINT\text{card}.

Gaze direction is highly relevant in sign languages: it is indicated in the line just above the line with the glosses for manual signs. In (1) \textit{card} means that the signer is looking at the cards used in the task, and + indicates that the signer’s gaze is directed at the interlocutor’s face. A specific gaze direction lasts until a new gaze direction is indicated except that the previous direction continues after an eye blink (indicated by V) unless some new direction is indicated. For further details about the notation, see the Appendix.
6. Expressions of epistemic modality in the data

In this section I present the different means of expressing speaker uncertainty that occurred in the DTS and JSL data. The first subsection focuses on signs that denote mental states and activities and that appear to have a verb-like status since they may occur with a first-person pronoun. It turned out that the pronoun may also be used to express epistemic modality when it is used by itself in the beginning or at the end of the proposition. The next subsection, Section 6.2, describes signs that are used with different functions in the two sign languages and suggests diachronic pathways based on internal reconstruction. Section 6.3 gives examples of signs that appear to be calques of words with an epistemic modal meaning in Danish and Japanese. And finally, in Section 6.4 I present some of the means of expressing speaker uncertainty by nonmanual means in DTS.

6.1 Signs about mental states and activities

Both sign languages make use of signs which have meaning of mental states and activities to express speaker uncertainty. In the JSL data these signs are THINK, KNOW-NOT, IMAGINE, and CONCEPTUALIZE. In DTS the most frequent sign indicating mental activity is THINK (SYNES). Other signs used epistemically with a propositional complement are KNOW (VED), KNOW-NOT (VED-IKKE, one-handed), DOUBT (TVIVLE), and IMAGINE (TANKEBOBLE). Although all signs have been glossed by means of verbs, it is not obvious that they are all verbs in JSL (cf. the gloss /MAYBE-IMAGINE/ used by Matsuoko et al. 2016).

---

5 CONCEPTUALIZE appears to have the same form as one of the modals mentioned by Matsuoka et al. (2016) as /MAYBE-IMAGINE/ ‘could be’, indicating low probability.

6 The word in parentheses after the gloss is the Danish gloss used in the online dictionary Ordbog over Dansk Tegnsprog, where the signs can be seen on videos.
It may be argued that a proposition embedded under words meaning ‘think’ are not necessarily epistemically weakened in spoken languages. In the literature a distinction is generally made between, on the one hand, instances where I think constitutes the main clause and its complement is subordinate and, on the other, a parenthetical use where I think is a modifier of the proposition expressed in the clause (e.g. Boye & Harder 2007). Pragmatic studies of large English corpora have revealed a number of disparate functions of parenthetical I think such as lack of commitment (a shielding function) and speaker assertion (Kaltenböck 2010). Studying I think in context, Kaltenböck (2010) found that, besides differences in prosodic realisation,

“the interpretation of I think depends on the type of proposition in its scope: if the proposition is verifiable or falsifiable, as in I think John is in London, I think assumes the function of ‘belief/insufficient evidence/probability-based opinion’.” (Kaltenböck 2010: 257-258)

A proposition which is not objectively verifiable will trigger a meaning of subjective evaluation. Kaltenböck further suggests an abstract core meaning, ‘speaker cogitation’, from which the different interpretations arise in interaction with the verbal co-text and the situational context. The shield function, which Kaltenböck characterizes as “[d]istance from a proposition, lack of commitment, epistemic qualification” (2010: 259), is derived via an opposition of speaker cogitation and objective truth which gives a distancing effect.

In studying expressions of speaker uncertainty in DTS and JSL, I have focused on all expressions that may be interpreted as signs of speaker (un)certainty. As examples of verbs of mental states and activities have given rise to expressions of speaker uncertainty in spoken languages, and since the task of deciding what is useful for survival in a decrepit boat encourages
speakers to make proposals that can be evaluated objectively, I have included mental-state signs in the study.

In both sign languages the signs about mental states and activities may precede or follow the proposition that they modify, they may appear in both positions as in (2) and in only one position as in (3).

(2) JSL – a mental-state sign both preceding and following the complement

IMAGINE ROT NOTHING STILL-GOOD THINK IMAGINE /7

‘It may not be rotten, but still good.’

(3) JSL – a mental-state sign before the proposition

THINK POINT_card NEED-NOT POINT_card /

‘We probably don’t need that one.’

In JSL the mental-state signs may occur with or without a first-person pronoun, in both (2) and (3) there is no pronoun with the sign. In DTS signers appear to prefer to place the mental-state sign before the proposition, and in this position the signs may occur by themselves or with a first-person pronoun as in (4).

7 In this example THINK is accompanied by the mouthing of kanji ‘feeling, sense, impression’. In most other examples it is accompanied by omou ‘think’, which is used in spoken Japanese to express uncertainty (Matsui et al. 2006). The mouthing of kanji may point to a more evidential meaning.
(4) DTS – a first-person pronoun and a mental-state sign before the clause

1SG [hesitates] 1SG THINK AGREE POINTcards /

‘I uh I think I agree on those two.’

Among the few examples of a mental-state sign following the clause in DTS, e.g. (5), there are no examples without a first-person pronoun except when the same sign appears with a first-person pronoun before the clause. Since the mental-state signs almost always occur with a first-person pronoun in DTS, they may be classified as verbs.

(5) DTS – a mental-state sign and a first-person pronoun following the clause

IMPORTANT THINK 1SG PALM-UP /

‘That is important, I think, isn’t it?’

In spoken Japanese, complement clauses precede verbs of mental states and activities, whereas spoken Danish has both orders: verb with a first-person subject plus clause, and clause plus verb with a first-person subject. Moreover, in Danish the order [subject + verb] + clause + [verb + subject] is possible, especially in news media or if the verb and the pronoun at the end are added after a brief pause for emphasis. However, it is possible that neither JSL nor DTS is influenced by any spoken language as repetition of other signs at the end of sentences occurs in both languages (see Section 4).

The data from both sign languages show a pattern that is not found in either of the spoken languages, namely a first-person pronoun without any mental-state sign preceding or following the clause as in (6) and (7). Native signers interpret the examples as a way of expressing one’s uncertainty by connecting the proposition explicitly to oneself. The pronoun does not have a
thematic role in relation to the verb of the clause, but there is no nonmanually marked boundary that separates the pronoun from the clause as is otherwise found with topicalized constituents (see Section 4). Moreover, first-person pronouns with this function are not accompanied by any nonmanual signals that express hesitation or doubt; it is prosodically fully integrated into the clause. The pronoun’s only function is to express speaker uncertainty.

(6) DTS – a first-person pronoun with no mental-state sign at the end of the clause

NORTH WATER IS COLD / IF SHARK DIFFICULT A-BIT DIE 1 SG /

‘The water to the north is cold. If there are sharks, it’ll be a bit hard for them and they’ll die, I think.’

(7) JSL – a first-person pronoun before the verb (DRINK CAN), a mental-state sign (THINK) with a first-person pronoun following a clause, and a final first-person pronoun after a clause

attention POINT_card 1 SG DRINK attention DRINK CAN / PEOPLE HAPPY THINK 1 SG / DRINK

DIFFICULT EIGHTY PERCENT DIFFICULT 1 SG /

‘Hey, that one, I think you can drink – hey – you can drink it. People become happy, I think. But being 80%, it is difficult to drink, probably.’

In (7) the first-person pronoun 1 SG before DRINK is not interpreted by native signers as the agent of DRINK, but as an epistemic modal anchoring of the proposition of DRINK CAN. In the following example a JSL signer uses mouthing corresponding to omou ‘think’ with the first-person pronoun, but such mouthing does not occur with the pronoun in all cases.
(8) JSL – a first-person pronoun with mouthing corresponding to omou ‘think’ in the beginning of the clause

```
POINt_card [hesitates] 1SG  DISCARD DIFFERENT /
    omou
```

‘That one, uh I think we can throw it out.’

The facts about the two main types of constructions – with a mental-state sign or with a first-person pronoun only – are summarized in Table 2.

[Insert Table 2 approximately here]

It appears from Table 2 that the two sign languages share constructions with mental-state signs that are not found in Japanese and only in very special circumstances in Danish. A quotation may be introduced by only a noun phrase, a name or a pronoun – and when the quoted speaker is known from context, by nothing. The quotation is then only signalled as such by changes in gaze direction and/or facial expression and body and/or head orientation. A similar construction with no verb is seen in sequences of constructed action (Metzger 1995), where a signer takes on an agent’s, a recipient’s, or a patient’s role and produces a sequence of signs that reproduce one or more actions performed by an agent referent or towards a recipient or patient referent represented by the signer (Engberg-Pedersen 1995, 2015). In such sequences signers usually break off eye contact with their addressees to signal that the proposition should not be seen as part of what they as speakers are responsible for; it should be attributed to whoever the signers represent in the sequence of constructed action. In the examples above, there are no nonmanually marked boundaries that separate the pronoun from the proposition, that is, the pronouns as markers of speaker uncertainty.
are more integrated into the clauses than the indications of quoted speaker in relation to quotations or of actor in relation to constructed action. Moreover, the signers have eye contact with the addressees during most of the clause, which makes sense since they use 1SG to link the propositional content to themselves as speakers of the utterance and as responsible for the propositional content.

Example (8) demonstrates a further feature found in the data from both sign languages, namely the possibility of having a topicalized pronoun, in (8) POINT_card, before the first-person pronoun, 1SG. Besides prosodic integration, topicalized constituents before a clause and pronoun copies after a clause can be used to test whether an expression of epistemic modality is integrated into the clause.

6.2 Multifunctional particles in the data

In the data from both sign languages a number of signs occur with more than one function, including the function of expressing speaker uncertainty. Thus it is possible to apply internal reconstruction to the data, especially if similar semantic extensions can be found in other languages (but see the warning in Johnston et al. 2015).

The signs DIFFERENT, SAME and SENSE in JSL are two-handed signs, but, except for one example of SAME, they are only used in one-handed versions in the data (see Figures 1, 2, and 3).  

Matsuoka et al. (2016) notate a two-handed version of SENSE as MODAL-3/MEN/ ‘meant to’ and rank it as the third modal (out of ten modals) from the end indicating ‘highly probable’ on their continuum of epistemic modals. They notate the one-handed version of DIFFERENT as MODAL-7/WRONG/ and translate it as ‘isn’t it’. DIFFERENT is ranked as number seven from the ‘highly probable’ end of their scale. SAME does not occur in their list and is less frequently integrated into the clause in the data of the present study than the other two signs.
SENSE includes the mouthing of the Japanese word *imi* ‘meaning’, which is a noun in Japanese. DIFFERENT and SENSE are used as full lexemes in (9) in the data.

[Insert Figures 1a, 1b; 2a, 2b; and 3a, 3b approximately here]

(9a) JSL – SENSE used as a lexeme

SENSE NOTHING /

‘It [drinking some alcohol] isn’t meaningful.’

(9b) JSL – DIFFERENT used as a lexeme

non-firstEXPLAINfirst DIFFERENT /

‘She explained it differently to us.’

DIFFERENT is also used with a first-person pronoun to express disagreement, and SENSE and especially SAME are used again and again to express agreement.

(10a) JSL – SENSE used to express agreement

nod

SENSE / GOOD /

‘That makes sense, good!’

(10b) JSL – DIFFERENT used to express disagreement

DIFFERENT 1SG /

‘I don’t think so.’
The three signs are also used in the position of a tag to appeal to the addressee after a clause, separated from it by nonmanual marking. In this position the signs occur with eye contact with the addressee and, in (11a) and (11c), with a questioning facial expression (raised brows and eye contact in both, widened eyes in (11c)).

(11a) JSL – SAME used with the function of a tag

<table>
<thead>
<tr>
<th>bf</th>
<th>br</th>
</tr>
</thead>
<tbody>
<tr>
<td>card</td>
<td>+</td>
</tr>
</tbody>
</table>

POIntcard 1 SG NOT-NEED DIFFERENT POIntcard / SAME /

‘We probably don’t need that one, right?’

(11b) JSL – SENSE used with the function of a tag

<table>
<thead>
<tr>
<th>card +</th>
<th>- V + card</th>
</tr>
</thead>
</table>

NOW POIntnon-first POIntaddressee TWOfirst DISCUSS WHAT NEED WHAT / SENSE /

‘Now she told the two of us to discuss what is needed, right?’

(11c) JSL – DIFFERENT used with the function of a tag

<table>
<thead>
<tr>
<th>nod</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>br</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ew</th>
</tr>
</thead>
</table>

MEDICINE INSTEAD-OF / DIFFERENT /

‘We can use it instead of medicine, right?’
In the dialogues the addressees often respond by repeating SAME or the verb just used by the other signer (e.g. NEED-NOT ‘Right, we won’t need it.’) or by means of the sign I-SEE ‘ok’, another sign expressing agreement. I have translated all the tags in (11a-c) as right as further studies must reveal the nuances in meaning.

DIFFERENT may include the mouthing of the Japanese word chigau ‘no, wrong’, and this word can be used to correct oneself or somebody else and as a tag in the Osaka dialect of Japanese (Rie Obe – personal communication). Thus, the use of DIFFERENT in responses and as a tag in JSL may be inspired by the Japanese use of chigau. An equivalent of SAME, onaji, cannot be used with these two functions in Japanese, but they are two of the functions of SAME in JSL, possibly formed by analogy with DIFFERENT.

All three signs, SAME, SENSE, and DIFFERENT, also appear clause-finally, prosodically integrated into the clause and in some cases followed by a pronoun copy or a copy of some other sign from the clause.

(12a) JSL – SAME integrated into the clause

Context: The interlocutor has just suggested throwing a specific object overboard.

nod  

__________ ?  _______bf 

V-  +  V card  V  

LEAVE ESCAPE BOAT-SINK POINT\textsuperscript{card} NEED-NOT POINT\textsuperscript{card}------ NEED-NOT SAME  

‘If we leave the sinking boat, won’t we need it? … we may not need it.’
In (12a) the signer first questions the other signer’s suggestion that they throw something overboard. After further argumentation from the other signer (at the point of the three dots in the translation), she expresses agreement by signing NEED-NOT SAME with some scepticism (furrow). She looks down while signing NEED-NOT SAME, which makes it less obvious that SAME should be a tag compared with (11a). In (12b-c) there is a pronoun after SENSE and DIFFERENT, and in both cases the signer looks down at the cards when signing SENSE and DIFFERENT, not at the interlocutor. That is, the signs do not occur at the end of the clause with eye contact, so they do not invite the interlocutor to respond.
In sum, the three signs SENSE, DIFFERENT, and SAME, are used with the functions of lexemes, interjections, tags, and particles of epistemic modality inside the clause. As suggested above, the use of DIFFERENT to respond negatively to a suggestion or a claim made by somebody else and to use it as a tag may be calqued on the spoken Japanese use of the word chigau, but may also reflect a general semantic extension from the concept of difference to a lack of agreement seen, for instance, in the English phrase I beg to differ. The use of SAME as a tag and to confirm a claim may be formed in analogy with DIFFERENT. The use of SENSE to express agreement is again a well-known extension of the use of words with this meaning, cf. That makes sense.

There is no doubt that the lexical function of SAME and DIFFERENT precedes their function as interjections. Their forms iconically reflect identity and difference respectively, and as interjections, they express a more specific meaning than as lexemes, namely identity or difference of opinion between the two parties in a conversation. The function as tag may be derived from their functions as interjections: after a clause, the speaker may appeal to the interlocutor’s confirmation by suggesting the interjection in a question. That is seen in spoken languages, where words used in responses to confirm or reject a proposition are also used as tags. English right and German ja are examples.

The next step in the hypothesized path from a lexeme to a particle of epistemic modality for SENSE, SAME and DIFFERENT is the prosodic integration of the tag into the clause. The path from interjection to epistemic modal particle was taken by the Danish word jo, which is used to express disagreement with a negative statement (A: Er de ikke rejst ‘haven’t they left’, B: Jo, de tog af sted i morges ‘yes, they left this morning’) (Hansen & Heltoft 2011). In modern Danish, jo is a grammatical modal particle which forms part of a set of particles that can occur integrated into the
clause just after the finite form of the verb (Hansen & Heltoft 2011). As a modal particle *jo* signals shared knowledge, the speaker expects the propositional content to be a fact that the addressee is also familiar with, that is, it has both an epistemic modal and a dialogic nature (for a treatment of the functions of *jo* in a Conversation Analysis framework, see Heinemann et al. 2011).

I do not know of an intermediary stage where *jo* was used as a tag in Danish. But one of the other particles in the Danish set of modal particles, *vel*, is used both as a tag after the clause and as a particle of epistemic modality integrated into the clause. In Chinese (Hsin 2016), epistemic modals also take a clausal complement and can occur both as tags and in responses:

(13) a. *Keneng* used as a modal

    *Xiaojie keneng tou-qian*

    Xiaojie likely steal-money

    ‘Xiaojie is likely to steal money.’

b. *Keneng* used in a tag

    *Xiaojie tou-qian, keneng-bu-keneng*

    Xiaojie steal-money likely-not-likely

    ‘Xiaojie stole money, is it possible?’

c. A: *Xiaojie tou-qian*

    Xiaojie steal-money

    ‘Xiaojie stole money.’

---

9 The Danish particles are characteristic of informal and conversational language. Probably for that reason, they do not have any translations in DTS.
Further evidence of the functional link between interjections, tags and markers of epistemic modal meaning comes from Mohawk. Mithun (2012) claims that tags in general have a dual function of indicating reduced certainty of the proposition on the part of the speaker, and serving an addressee-oriented, interactive function. As evidence, she shows how the Mohawk particle wáhi’ is used as a tag expressing reduced speaker certainty and appeal for confirmation, and in separate intonation units as part of a fixed phrase of confirmation, né:ki’ wáhi’ ‘that’s right, isn’t it’, which does not solicit a response, but simply confirms what somebody else has said. Finally, in ASL, similar nonmanual markings are used in imperatives and requests for information, i.e. addressee-oriented speech acts, and to express modal epistemic probability in the tag position (S. Wilcox & P. Wilcox 1995, see here Section 3).

If we now turn to signs with more than one function in DTS, we see that signers of DTS use extensively the gesture that I called the presentation gesture for this language in an earlier paper (Engberg-Pedersen 2002a), but which is now often called PALM-UP in gesture studies and the sign linguistics literature. It consists of one or two loose hands held palm(s) up in neutral space, often with a preceding rotation of the lower arm to this orientation, but there is a lot of variation in its form (for form variation of PALM-UP in French-Belgian Sign Language (LSFB), see Gabarró-López 2017). The gesture has been studied intensively in research on gestures used with spoken languages (see especially Kendon 2004 and Müller 2004 and, for its interactive role in dialogues, Bavelas et
al. 1992 and Bavelas et al. 1995). In sign linguistics, PALM-UP has been identified in many Western sign languages and in Turkish Sign Language (for a recent overview, see Gabarró-López 2017). To the best of my knowledge, it has not been described in relation to JSL, and except for a few examples of indexical uses directed at one of the cards with the objects or at the interlocutor, PALM-UP occurs in only one example in the JSL data used for this study (see example (20)).

In the sign languages where it has been studied, PALM-UP is a very frequent sign – or gesture – used for many purposes, typically to express indefiniteness, provide backchannel signals, signal transitions to a conclusion or the focus of the clause, and to express hesitation or speaker uncertainty (Conlin et al. 2002; Engberg-Pedersen 2002a; McKee & Wallingford 2011; Mesch 2016). In her comparative study of elicited sentences with a modal meaning in DGS, NGT and Irish SL, Herrmann (2013) exemplifies many instances of sentences ending with what she describes as the gesture g-pu. They occur with “uncertain facial expressions” (Herrmann 2013: 133), i.e. nonmanual signals of speaker uncertainty, and appear to serve a tag function. Correspondingly, Lackner (2017) describes nonmanual markings expressing scepticism in some instances with what she notates as PU, i.e. PALM-UP, in her study of modality in ÖSG. Gabarró-López, who analyses examples of PALM-UP that have the function of discourse markers, suggests that “[t]he meaning of PALM-UP will be conveyed by context, nonmanual marking and position” (2017: 180). In sum, the sign linguistics literature suggests that PALM-UP may be used as a carrier of nonmanual signals of speaker uncertainty.

In the DTS data for this study, PALM-UP is used to respond to the interlocutor’s suggestions or claims. In (14a-b) the signer responds to his interlocutor’s suggestions by means of one-handed versions of PALM-UP.
(14) DTS – PALM-UP used in responses

a. PALM-UP_{repeated-rotation} (Fig. 4a)
   ‘Maybe!’

b. PALM-UP (Fig. 4b)
   ‘Indeed!’

In (14a, Fig. 4a) the signer shows his uncertainty by transferring a side-to-side movement of his body to his hand. Side-to-side movements are otherwise used in descriptions of alternatives and to express doubt (see example (16), Lackner 2017, and here Section 3). When this signer’s interlocutor suggests that they eat fish, he responds with PALM-UP without the rocking movement and a completely different facial expression (Fig. 4b). Both gestures are used to confirm what the interlocutor has just said, but with different degrees of conviction.

[Insert Figures 4a and 4b approximately here]

PALM-UP is also used in the data in the position of a tag as in (15) from a different dialogue.

(15) DTS – PALM-UP used in a tag

A suggests that they can catch fish with the fishing gear and eat them. B is somewhat sceptical, and A says:

A: RAW PALM-UP SUSHI SAME PALM-UP
   PALM-UP SUSHI SAME PALM-UP--
   ‘(We can eat them) raw, right? Just like sushi, right?’
B: YES
‘Yes’
A: shrug __ smile

RAW PALM-UP--------
----- PALM-UP--------
‘Raw, so what?’

The moment A starts smiling at the end of the example, B mouthes *ja* (‘yes’) and looks down. What we see here is the use of PALM-UP to persuade B to accept A’s claim that they can use the fishing gear. The examples show how PALM-UP with appropriate nonmanual marking is used to align the signers’ stance in the dialogues.

In (16) PALM-UP is used with a first-person pronoun and appropriate nonmanual marking to express the speaker’s uncertainty.

(16) DTS – PALM-UP integrated into the clause

________ t side-to-side

POINT+card A-LITTLE PALM-UP--- 1SG PALM-UP

‘As for that one, I am a little in doubt.’

The signer looks down at the cards all through this example; he is not focused on aligning his own and his interlocutor’s viewpoints, but expresses his uncertainty. PALM-UP in combination with the nonmanual marking has an epistemic modal meaning in (16) and may even be said to take the position of a verb (cf. the first-person pronoun).
In all the examples with PALM-UP, the specific meaning must be interpreted from the nonmanual signals, in one case the rocking movement of the hand transferred from the signer’s body to his hand.

Müller describes the function of the gesture she calls *Palm Up Open Hand* as presenting “an abstract discursive object as an inspectable one – an object which is concrete, manipulable, and visible – and it invites participants to take on a shared perspective of this object” (2004: 233). This is an accurate description of the function of PALM-UP when it is used in a tag: it invites the addressee to share the speaker’s perspective on a claim. When it is used in responses to express more or less whole-hearted agreement with one’s interlocutor, it mirrors the invitation made by the first speaker by means of PALM-UP in its tag function. As a substitute for a verb with epistemic modal meaning, it reflects its origin in a gesture which presents “an abstract discursive object as an inspectable one” (Müller 2004: 233), but the invitation aspect is suppressed. Thus PALM-UP with various nonmanual markings demonstrate the same close link between expressions of epistemic modality and alignment of speaker and addressee stances in interaction as the JSL signs *SENSE*, *SAME*, and *DIFFERENT* and epistemic modal words in spoken languages (English *right*, Danish *jo* and *vel*, Mohawk *wáhi*).

In sum, in the data used for this study, JSL and DTS demonstrate the same types of semantic extensions that we see in spoken languages. Words used as interjections to reject or confirm propositions are also used in tags and as epistemic modal markers integrated into the clause and thereby provide evidence for the strong link between epistemic modality and negotiation of common ground in interaction (cf. Langacker’s characterization of discourse as “an intersubjective process of striving for effective and epistemic control” (2013: 10), here Section 2). For these signs derived from interactive means, the two sign languages are only influenced by their majority spoken languages to a very limited extent. JSL may have calqued the use of the Japanese word *chigau*
‘different’ as a tag and an interjection to reject a proposition. The DTS use of PALM-UP may be derived from a gesture otherwise used with spoken Danish. However, the further developments of the signs to serve as markers of epistemic modality or carriers of nonmanual signals of speaker (un)certainty appear to have happened independently of the majority languages, but they reflect developments seen in other languages.

6.3 Calques of markers of epistemic modality in the majority languages
Besides some of the signs of mental states or activity (see Section 6.1), the signers of both sign languages use signs that appear to be semantic, if not necessarily syntactic, calques of nouns, modal verbs, adverbs, and conjunctions in the majority spoken languages. In many cases the signs occur with mouthing of the spoken language words. The Danish signers use the modal verbs CAN (mouthing kan, Ordbog over Dansk Tegnsprog: KAN) and MUST (mouthing må, Ordbog over Dansk Tegnsprog: BURDE) with epistemic modal functions in a few cases. The Danish modal verbs kunne ‘be able to’ (present tense kan) and måtte ‘have to’ (present tense må) are used with the same function.

(17) DTS – epistemic use of MUST

TALK ABOUT [hesitates] PIRATE / MUST WARM AREA /

‘She talked about uh pirates, so it must be a warm area.’

The sign MUST (BURDE) looks like a one-handed version of the Old LSF sign POUVOIR ‘be able to’ (Delaporte 2007), but may also be derived from the Danish Mouth-Hand System, a way of rendering the consonants of spoken language words by means of the hands; it can only be used with a meaning of necessity and especially epistemic modal necessity. The other modal sign used
epistemically, CAN (KAN), is derived from spelling the Danish word kan by means of the hand alphabet. The signs used of deontic permission (‘may’, Ordbog over Dansk Tegnsprog: TILLADE), deontic obligation (‘must’, Ordbog over Dansk Tegnsprog: SKAL), and prohibition (‘must not’, Ordbog over Dansk Tegnsprog: MÅ-IKKE) are all different from MUST (BURDE, except one-handed). DTS BURDE ‘must, ought to’ can be used to express a milder form of deontic necessity than SKAL, besides its function as a marker of epistemic modal necessity.

The DTS signers also use the sign MAYBE which is made with two index hands and an alternating vertical movement (Ordbog over Dansk Tegnsprog: MÅSKE). It appears to be a close semantic equivalent of the Danish word måske ‘maybe’. The alternating movement of the sign is found in LSF signs as far back as the 19th century (Delaporte 2007) and in ASL MAYBE. Out of 33 signs meaning ‘maybe’ from as many different sign languages (Spread the Sign), 17 languages have a sign with a repeated alternating movement of the two hands, and 9 have a repeated rotating movement of one hand. Not all of these sign languages are related, which indicates that the form of the signs may be motivated by something other than genetic relatedness. An alternating movement of both hands and a rotating movement of one hand brings each hand or each side of the hand into focus alternatingly. Alternation is related to the concept of choice: someone who contemplates a choice between alternatives may lean towards one or the other option. When signers present alternatives, they may lean alternatingly to the right and the left (cf. Sections 6.2 and 6.4 and Lackner 2017). In example (14a) we saw how a repeated rotating movement of PALM-UP expressed guarded acceptance, suggesting an alternative, and in (16) the signer made a side-to-side movement of the body to express uncertainty. Presenting alternatives in the form of questions is used as an

10 To avoid the special letter å, the sign can be found by looking up sandsynligvis ’likely’ in Ordbog over Dansk Tegnsprog.
interactive strategy to express speaker uncertainty in the dialogues (see also the use of *keneng-bu-keneng* ‘likely-not-likely’ as a tag in Chinese in (13b)).

(18) DTS – a question with alternatives

```
POINT_card BOTTLE EMPTY POINT_card [hesitates] FULL /
```

‘Is the bottle empty, or is it full?’

The notion of possible alternatives in the concept of ‘maybe’ motivates signs with alternating or rotating movements (cf. the quote on LSE *PERHAPS* from Herrero-Blanco & Salazar-García (2010) in Section 3). However, it might be the case that almost all signs were made with repeated alternating or rotating movements. To emphasise speaker certainty, the DTS signers use *DEFINITELY* (*Ordbog over Dansk Tegnsprog*: BESTEMT) and *CORRECT* (*Ordbog over Dansk Tegnsprog*: RIGTIG).

*CORRECT* is made with a single horizontal movement, and *DEFINITELY* with a short downward movement of one hand. Half of the twenty signs meaning ‘definitely’ from twenty different sign languages on *Spread the Sign* are made with one movement of one or two hands. In the rest of the signs, if both hands move, they move simultaneously, they do not alternate. Thus uncertainty or wavering is associated with alternation, certainty with a single movement or similar movements of the hands. Interestingly, the sign *CABAL* ‘just, exact’ in LSE expressing speaker certainty is derived from the sign *BALANZA* ‘scale, weight’ with an alternating movement of the hands, but the movement is brought to an abrupt stop where the hands remain fixed (Cabeza-Pereiro 2013); *CABAL* implies an end to wavering.

The DTS signers use a number of different signs combined with special facial expressions as conditional markers. The signs occur in the beginning of the conditional clauses like the Danish
conjunction *hvis* ‘if’. However, an analysis of the differences between the conditional markers in DTS is outside the scope of this paper.

To describe a potential situation the JSL signers use the sign *WHEN* with mouthing of the Japanese word *toki*. In Japanese *toki* is a noun meaning ‘time’, which can be used with a preceding modifying clause. Correspondingly, in the JSL dialogues *WHEN* is used at the end of a clause as in (19).

(19) JSL – a potential situation expressed by clause-final *WHEN*

```
POINTcard BREAK   WHEN / non-firstHELP first POINTcard /

  toki

‘Given that it can be torn, it can indeed help us.’
```

Here the first clause indicates a backgrounded potential situation.

The JSL signers use the sign *IF* sometimes with the mouthing of *moshi*, but mostly with a neutral mouth. Japanese *moshi* is an adverb that occurs in the beginning of a conditional hypothetical or counterfactual clause. Like *moshi IF* occurs in the beginning of the clause, in (20) in a clause indicating a hypothetical, not a counterfactual, situation.
(20) JSL – a hypothetical situation expressed by clause-initial IF (mouthing moshi)

CA: group in boat  CA: rescue people

BOAT-MOVE-------------------------------- HOW / DP: throw-fishing-line-and-haul

IF BOAT-MOVE WAVE FINE WHAT HOW DP: throw-fishing-line-and-haul--

DP: boat-move_{first-to-non-first} DP: role-up-line_{non-first} DP: boat-move_{first-to-non-first} --------

------------------------------------------------------------------- PALM-UP /11

‘If there is a ship nearby and we signal to them and succeed and they look around to see what it is, then we can throw the line to them and they can roll up the line and thereby haul us up to them, just like that.’

The first sign IF indicates that everything up to after HOW is hypothetical. After HOW the signer marks the boundary by a blink and a brief nod before he continues. The difference in position – WHEN clause-finally and IF clause-initially – and the mouthing of the Japanese words demonstrate the influence from a majority language on a sign language.

6.4 Nonmanual markers of speaker uncertainty in DTS12

In the preceding sections I have mentioned nonmanual means of expressing speaker (un)certainty sporadically. Example (16) showed that side-to-side movement of the body may express speaker uncertainty. Almost all the signers of DTS use this type of movement to express uncertainty. In (16) the scope of the side-to-side movement was PALM-UP taking the place of a verb. In all the examples

11 The example includes one of the rare instances of PALM-UP in the JSL data. It is here used with a downward movement as if to emphasize the argument.

12 This section is only about DTS because of my greater familiarity with this language.
in the data the movement from side to side occurs with PALM-UP or a point, in most cases at the end of or after a sentence as in (21).

(21) DTS – movement from side to side with POINT

\[
\text{side-to-side}
\]

\[
\text{card} \quad \text{V+}
\]

[picks up a card] SEE WHAT POINT\text{card}------------------------

‘Let me see what it is…. well, I don’t know.’

After having scrutinized the picture on the card, the signer looks up at her interlocutor and makes the side-to-side movement only as a rocking sideways movement of her head. At the same time she contracts the muscles of her chin (see Fig. 5), a signal of speaker scepticism (cf. Siyavoshi 2019 on “horseshoe mouth”). This facial expression may also occur with PALM-UP in tag position and with interjections in responses.

[Insert Fig. 5 approximately here]

As side-to-side movements and the signal seen in Fig. 5 have epistemic modal meaning, they modify propositions. After the clause, the proposition is pragmatically retained by the indexical elements in PALM-UP and pointing signs. In (21) the implicit proposition is ‘Should this one be included’. In Fig. 4a and Fig. 4b, the signer’s different facial expressions with PALM-UP were interpreted as evidence of differences in his degree of approval of his interlocutor’s suggestions. The stronger consent seen in Fig. 4b is expressed by eye contact, smiling, eye widening, and
lowering of the head in the interlocutor’s direction. Such features may be more affective than the raised chin of Fig. 5 and side-to-side movements.

7. Discussion

As the amount of data used for this study is very limited, it cannot form the basis of any definitive conclusions as to the similarities and differences between signed and spoken languages in the area of epistemic modality. It takes a broad view of how epistemic modality understood as speaker (un)certainty with respect to a proposition is expressed in two unrelated sign languages in semi-naturalistic discussions between native signers, not data elicited to test specific hypotheses or equivalents of spoken language expressions of epistemic modality. The study shows that, like spoken languages, the two unrelated sign languages use a variety of means to express speaker (un)certainty: signs indicating mental states or activities, particles which also function as lexemes, interjections, and tags, signs with only epistemic-modal meaning, and nonmanual means that can be compared to prosody in spoken languages.

It is obvious that the two sign languages are influenced by the majority languages that are used around them. The signers have been to schools where they have learned to read and write the spoken language, and they are surrounded by spoken and written Danish or Japanese in their everyday lives. We see traces of the influence both at the lexical and at the syntactic levels. Both sign languages use signs that are more or less close semantic and syntactic equivalents of words in the majority languages: JSL WHEN/toki/ and IF/moshi/ and equivalents of the Danish conditional conjunction hvis ‘if’ in DTS. These signs are used clause-initially or clause-finally in accordance with the equivalent words in the majority languages.

But we also see syntactic constructions that are not found in the spoken languages. Both sign languages use constructions with a word of mental state or activity with or without a first-person
pronoun both before and after its complement although this type of construction is not found in Japanese and is restricted to certain styles in Danish. Moreover, both sign languages use a construction with a first-person pronoun and no verb to anchor a proposition in the speaker’s beliefs. A close parallel in a spoken language would be something like *As for me they are real twins, at least I have not found any drastic differences between them*, meaning ‘in my opinion’. But *as for me* is polysemous in a way that the first-person pronoun used in the constructions in JSL and DTS is not, and *as for me* is much less frequent. Rather than being calqued on any such construction in the spoken languages, it is more likely that the construction in both sign languages is an analogy of quotations and constructed action (Metzger 1995) in sign languages. Such constructions may consist of a nominal introducing a speaker or event-internal participant followed by one or more sentences in which the signer takes on the role of the quoted speaker or an event participant. When the first-person pronoun is used to express epistemic modality, it is prosodically integrated into the clause in a way that the nominal introducing a speaker or event-internal participant is not before quotations or constructed action. This makes sense given that there is no change of role when signers anchor a proposition to themselves by means of the first-person pronoun. Furthermore, the first-person pronoun may occur both in the beginning and at the end of the clause. Future research must show how widespread this way of indicating epistemic modality is in sign languages, and whether it is indeed a sign-language specific strategy that may find its *raison d’être* in the gestural-visual modality, which encourages clause-final repetition, probably to increase redundancy.

At the word level some signs with epistemic modal meaning in a number of sign languages appear to share the polysemy of equivalents in the spoken languages. In some cases, it is possible to

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trace their origin back to gestures used in the societies at large. Wilcox (2004) describes two different routes that gestures may take into the grammars of sign languages. The first route begins with an emblem or an improvised gesture that is integrated as a lexical entity into a sign language and then grammaticalized in the sign language. ASL can used as a marker of epistemic modality (see Section 1) started as an improvised gesture, “enacting some actual or metaphorical object, characteristic, or concept” (Wilcox 2004: 55), in this case strength. It became a lexical sign meaning ‘strong’ and a modal verb or particle meaning ‘can, possible’. What we do not know is the extent to which this process was influenced – through old LSF – by French pouvoir ‘be able to, power’. That is, we do not have evidence for an independent semantic extension in this case.

In JSL there are examples of signs that appear to have changed from lexical sources to epistemic modal markers without the influence of a spoken language, namely sense, different and same. The three signs have the lexical meanings ‘mean, meaning’, ‘different’ and ‘same, identical’, but they are also used as markers of epistemic modality with propositions in their scope. Different used in responses and as a tag may, as mentioned, be a calque of the use of chigau ‘different’ in the Osaka dialect of Japanese, and same may have got the same functions by analogy. The use of interjections as tags is seen also in spoken languages (Mithun 2012), but not in spoken languages that could have influenced JSL. The same is true of the relationship between tags and clause-internal particles of epistemic modality (cf. Danish vel). If grammatical is defined as an element in the clause that cannot be focused (Boye & Harder 2012), it is not possible to decide, based on the data, whether the signs are truly grammatical in their function as epistemic modal markers. But we see a change in their function from semantic predicates to particles with semantic scope over propositions.

The forms of different and same appear motivated as “improvised gestures” (Wilcox 2004: 55). Different (Fig. 1) is made with a change in orientation where alternating sides of the hands
point upwards (cf. the rotating movement of the hands meaning ‘maybe’ in Section 6.3). The sign form can be said to reflect the notion of ‘opposition’ found both in the meaning DIFFERENT and in ‘maybe’. By contrast, in SAME (Fig. 2) the two hands have the same orientation, and the tips of the index fingers and the thumbs are brought together twice simultaneously in the two hands. The form of this sign mirrors the notions of ‘togetherness’ and ‘identity’. That is, the sign forms appear to have been motivated by their meanings when they were first made as “improvised gestures”, and it is likely that they only later took the route from gesture into the grammar as markers of epistemic modal meaning.

Wilcox’ (2004) second route into the grammars of sign languages begins with a schematic gesture that is not conventional and depends on another, more autonomous, component. Wilcox exemplifies this route with changes in the manner of movement of manual signs, which modifies the meanings of the signs. He also mentions facial gestures that depend on and modify the meaning of the manual signs. Pfau and Steinbach (2011) exemplify this route with side-to-side headshakes integrated into many sign languages as a marker of negation. In the data from DTS we saw an example of a gesture that appeared to be used systematically, i.e. the side-to-side movement of the body to signal speaker uncertainty. This body movement has also been described for other sign languages with the same meaning (e.g. ÖGS, Lackner 2017). Interestingly, the movement can be transferred from the body (example (16)) to the head (Fig. 5) and to the hand (example (14a)) in DTS. It is not at this state clear whether the gesture should be seen as part of the grammar (see Sandler (2012) for a critical view of characterizing prosodic features of sign languages as grammatical). Side-to-side movements can be seen as having the same cognitive motivation as the alternating and rotating movements seen in signs meaning ‘maybe’; they reflect the speaker’s wavering between alternatives. Interactionally, this wavering is seen in the signers asking
contrastive questions (example (18)) and using tags to include the interlocutors in considering alternatives.

Raising the chin by contracting the muscles of the chin is another nonmanual indicator of speaker uncertainty in DTS (cf. Cabeza-Pereiro (2013) on LSE (pursed lips) and Siyavoshi (2019) on Zei (lowered corners of the mouth), here Section 3). Interestingly, side-to-side movement and raised chin typically occur with PALM-UP and points, i.e. with signs that depend on the context for their interpretation. The speaker’s uncertainty concerns whatever PALM-UP or the points index, and these manual signs appear as much to be carriers of the nonmanual marking as to be autonomous components. However, PALM-UP and points can occur in the same positions without the side-to-side movement, apparently not vice versa. Raised chin may be an example of a nonmanual marker that has taken Wilcox’ (2004) first route into the sign languages: at least in popular writings about body language, raised chin is described as a sign of disagreement (e.g. PsychMechanics, there described as \textit{lips pursing} or \textit{puckering}).

The path from a lexical entity to a grammatical entity is of course well-known in spoken languages (e.g. Heine & Kuteva 2002). There are also instances of sound imitations becoming lexical words (e.g. \textit{a bowwow}) and of ideophones whose form can be seen as partially motivated. But such words do not generally grammaticalize as the partially motivated signs \textsc{different} and \textsc{same} appear to have done. The closest parallel in spoken languages to the side-to-side movement becoming conventionalized appears to be intonation as its form is motivated, it is suprasegmental, and its physical extension correlates with its semantic scope. But the possibility of transferring the signal from one articulator (the body) to other articulators (the head or the hand) is unique to sign languages.

A further point emphasized by the analysis of markers of epistemic modality in the dialogues from the two sign languages is how much expressions of speaker uncertainty depend on interaction.
Langacker (2013) stressed the relationship between interaction and epistemic modality: discourse is “an intersubjective process of striving for effective and epistemic control” (Langacker 2013: 10).

This is clear from especially the pathways suggested for DIFFERENT, SAME and SENSE in JSL and the use of PALM-UP and the nonmanual signals chin raising and side-to-side movements in DTS. They are used to express speaker uncertainty, but also in interactive functions as or with interjections and tags. They invite the interlocutor to take part in the mutual striving for epistemic control.

The comparison of the two sign languages has shown that sign languages are as much shaped by cognitive and functional – communicative – factors as spoken languages, but has also pointed to areas in both syntax, lexicon, and suprasegmental features where sign languages may be more similar to each other than spoken languages because of the gestural-visual modality.

Acknowledgements
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participants who approached the task with humour and enthusiasm. All errors and shortcomings are mine, of course.

Appendix

The notations follow the conventions developed for sign languages, not the Leipzig Glossing Rules, which are not adapted to sign languages. Not all information is given for all examples, only what is deemed relevant to understanding the examples in context.

Sign languages make use of many different articulators simultaneously. A full notation consists of several lines with glosses for the manual signs as the core (see here Section 5 and Crasborn 2015). When the use of one or two hands is irrelevant, the signs are notated by one gloss. When the use of two-hands is relevant, the signs are notated by identical glosses one above the other. If one hand lingers in the position of a sign while the other one produces more signs, the gloss for the first sign is followed by a broken line.

POINTnon-first Modifications of signs are indicated in subscripts.

DP:move-around DP stands for depicting construction, which is a complex predicate of movement or location (Cormier et al. 2012). The specific nature of these signs is irrelevant to the topic of the paper.

1sg A pronoun with first-person reference.

attention Attention indicates that the signer tries to get the interlocutor’s attention, for instance, by waving their hand.

omou A word below the gloss for a sign indicates silent (partial) mouthing of the word. In the text mouthing of a word with a manual sign is written between slashes if it is important for the discussion: THINK/omou/.
Activities of the eyes are notated in the line above the line with the glosses for manual signs:

+ The signer looks at the interlocutor’s face.

V Blink.

- The signer looks away in no specific direction.

card The signer looks at the picture cards for the tasks.

Activities of the face, head, and body are notated in the line above the line with notations for the eyes:

_____t The sign or phrase below the line is topicalized. The length of the line indicates the physical extension of the signals, which is also their semantic scope.

_____? Facial expression indicating a question.

_____hs Headshake.

_____bf Brow furrow.

_____br Brow raise.

_____ew Widening of the eyes.

CA:[text] CA stands for constructed action (Metzger 1995). Constructed action is a way of taking on the role of someone or something and produce a series of signs as seen from that perspective. Constructed action is indicated by gaze direction, head and body orientation, and facial expression.

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Markers of epistemic modality and their origins: Evidence from two unrelated sign languages

Table 1. The signers of the study, their gender and age distribution, and the amount of data. All the participants were native signers.

<table>
<thead>
<tr>
<th></th>
<th>Danish Sign Language (DTS)</th>
<th>Japanese Sign Language (JSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of signers</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Age range</td>
<td>26-69</td>
<td>37-44</td>
</tr>
<tr>
<td>Amount of analysed data</td>
<td>40 minutes</td>
<td>26 minutes</td>
</tr>
</tbody>
</table>
Table 2. The order of a mental-state sign/a first-person pronoun and a clause found in the data for the two sign languages compared with the two spoken languages. The mental-state sign occurs in the data with or without a first-person pronoun in JSL in both positions, and without a pronoun only in first position in DTS.

<table>
<thead>
<tr>
<th></th>
<th>DTS</th>
<th>JSL</th>
<th>spoken Danish</th>
<th>spoken Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>mental-state sign + clause</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>clause + mental-state sign</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>mental-state sign + clause +</td>
<td>+</td>
<td>+</td>
<td>(+)</td>
<td>-</td>
</tr>
<tr>
<td>mental-state sign</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>first-person pronoun + clause</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>clause + first-person pronoun</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Fig. 1a DIFFERENT, initial position.

Fig. 1b DIFFERENT, final position.

Fig. 2a SAME, initial position.

Fig. 2b SAME, final position, the movement is repeated.

Fig. 3a SENSE, initial position.

Fig. 3b SENSE, final position.
Fig. 4a. PALM-UP with a rotating movement and a facial expression of scepticism

Fig. 4b. PALM-UP with a facial expression of approval

Fig. 5 Raised chin as a nonmanual marker of speaker scepticism