



Research Article

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Formal and functional factors in classifier choice: Evidence from American Sign Language and Danish Sign Language

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Abstract: Traditionally so-called classifiers in productively formed verbs of motion and location in sign languages are said to reflect the semantic class of the moving or located entity. The verbs can include one of several different classifiers about humans and anthropomorphic beings. In this article, we examine phonological and semantic factors that influence the choice of classifier in elicited narratives in two sign languages, Danish Sign Language and American Sign Language. An analysis of classifiers expressed by handshapes of different phonological complexity shows quantitative differences between the two languages, but no influence on the choice of classifier depending on their phonological features. By contrast, a comparison of classifiers used about types of events in the languages reveals that the seemingly identical classifiers have language-specific meanings despite their iconicity. Nevertheless, they share features: hand-internal movement turns out to be statistically significantly correlated with voluntary actions in both languages. Two analyses of the verbs' sequential behavior, in serial verb constructions and in verb doubling, show no differences between the classifiers used in either language as well as many structural similarities between the languages. The clearest difference between the languages is found at the lexical (unpredictable) level.

Keywords: classifiers, ease of articulation, serial verb construction, verb doubling, ASL, Danish Sign Language

1 Introduction

For many decades, researchers have been investigating the iconic, stylistic, and grammatical functions of classifier constructions in sign languages. These structures are highly iconic. We acknowledge that both the gestural and formal nature of classifier components can co-exist and need not be in competition with one another.¹ The signs they occur in are considered predicative in nature, they have argument properties such as

¹ Supalla (1978, 1982) proposed a morphological analysis of a group of signs describing motion and location in American Sign Language (ASL), and in his thesis (1982), he suggested a parallel between classifiers in spoken languages (especially Allan 1977) and the handshapes of such signs. This parallel was later questioned by a number of sign linguists (for an overview of the debate, refer to Schembri 2003, Tang et al. 2021, Zwitserlood 2012). As an alternative approach, a number of sign linguists describe these signs as an integration of gesture into sign languages and talk about the signs as *depicting signs* (e.g., Liddell 2003; for a historical overview of the approach to sign languages as partly depiction, refer to Beukeleers and Vermeerbergen 2022). In this article, we will talk

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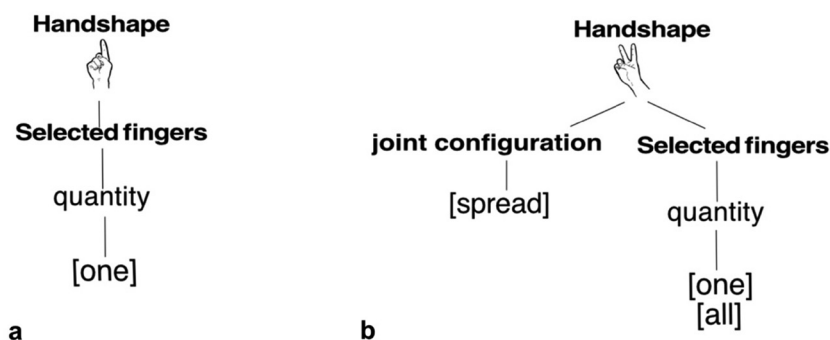


Figure 1: (a) Phonological feature trees in the Prosodic Model (Brentari 1998) for the 1-handshape (1-cl and 1-Parallel) and (b) for the 2-handshape (2-cl).

[±agentive] (Brentari *et al.* 2015), and also are important in perspective taking (narrator vs character viewpoint, e.g., Perniss 2007, Cormier *et al.* 2012). Many of these functions are expressed via the classifier, which is a morpheme of the verb in the sense that it has both a specific form (e.g., an index hand) and a specific meaning.

In this study, we will primarily be focusing on the classifiers of the verbs of motion and location expressed by the signs' handshapes, and less on the signs' movement. As a typology of classifiers, we will be using Engberg-Pedersen's (1993) system, subsequently used with some changes in Benedicto and Brentari (2004) and Zwitserlood (2012); see (1).

(1) Types of classifiers

- a. Whole entity (w/e) classifiers are those that are used for whole entities. Examples include semantic classifiers, which are used for classes of objects such as the classifiers focused in this article: 1-cl (Figure 2a and b), 1-Parallel (Figure 8a and b), and 2-cl (Figure 2c and d), as well as Instrumental classifiers (e.g., SAKS 'scissors' in *Ordbog over Dansk Tegnsprog* 2023) and Descriptive classifiers, which are used of objects defined primarily by their geometric shape, e.g., 'thin-object' (Figure 11, where the index finger of the hand that is not active is used to represent a tram wire).
- b. Limbs/BodyPart (BPCL) classifiers are those which represent a part of the body, e.g. legs, a head or animal paws (e.g., the second picture of Figure 15 and Figure 17b and c). Such classifiers are understood to be connected with the body of an animal or human and are thus dependent on the relation of the signers' hands and arms to their bodies. This is an extension of Engberg-Pedersen (1993), since her system includes only limbs in this category.
- c. Handling (hdlg) classifiers are those that represent an instrument or a hand that holds or manipulates objects or instruments (e.g., Figure 18). Some of these classifiers, especially the ones representing hands, could be seen as a subgroup of BPCL, but they are more independent of the depictive relationship with the signer's body than BPCLs.
- d. Extension-and-surface (ext) classifiers are those referring to the perimeter or extension of a surface (e.g., 'flat surface'), i.e., in signs with ext classifiers the sign's movement does not represent motion but contributes to depicting the perimeter or extension of something as when you use your hands to trace the shape of a vase.

The classifiers targeted in the current project are w/e classifiers that are used in verbs about anthropomorphic beings in specific events. More than one classifier can be used in verbs about the same entity, and what is focused in this article is exactly what factors influence the choice of classifier in signs about the same

about *classifiers* and *classifier verbs*, *classifier signs* or *classifier constructions*, however, without ascribing the term *root* to the movement and *affix* to the handshape.

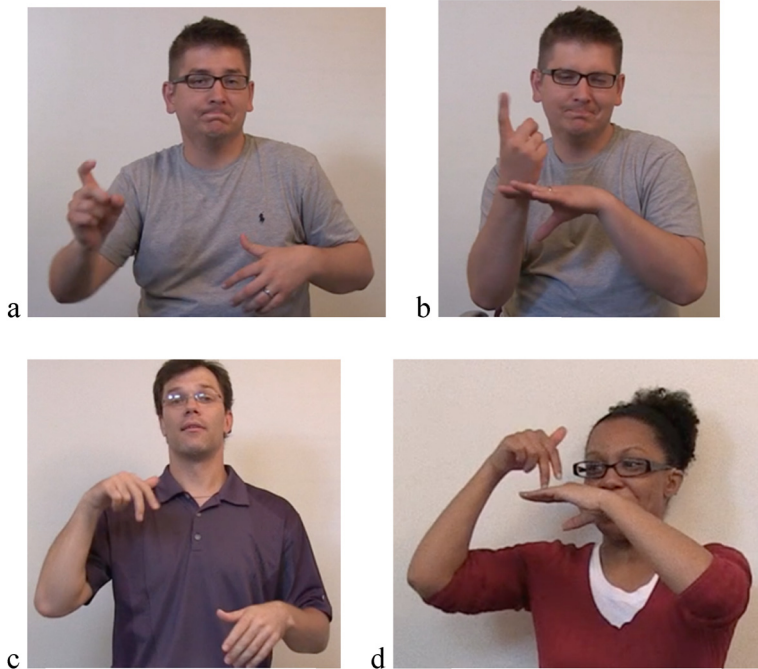


Figure 2: (a) An example of a Type 0-sign with 1-cl meaning ‘walk’; (b) an example of a Type 3-sign with 1-cl meaning ‘pace’; (c) an example of a Type 0-sign with 2-cl meaning ‘walk’; (d) an example of a Type 3-sign with 2-cl meaning ‘walk on wire’. All examples are from ASL.

beings in the same or different types of events. Both 1-cl and 2-cl can be used in verbs about anthropomorphic beings’ motion. Why do signers then prefer one over the other in a specific situation?

In this large-scale study, we keep the morphology and phonology levels of analysis separate from one another for clarity. Phonologically, we use the terms *1-handshape*, referring to the use of the index as a selected finger (Figure 1a), and *2-handshape* referring to the use of the middle and index finger (Figure 1b).² Morphologically, we use the terms *1-cl* for classifiers about stationary or moving human and anthropomorphic beings, *1-Parallel* for classifiers about both people and nonanthropomorphic entities such as trains and buses in motion, and *2-cl* for stationary or moving two-legged individuals. All phonological variants of 2-cl are treated as belonging to the same morpheme. As they differ in both form and meaning, 1-cl and 1-Parallel are treated as different morphemes in this analysis. Both 1-cl and 1-Parallel can be used in verbs of motion, 1-cl, but not 1-Parallel, also in a verb of location. 1-cl can be used in signs about human and anthropomorphic beings, 1-Parallel can be used in signs about both people and nonanthropomorphic entities such as trains and buses when they move. In 1-cl, the index finger is perpendicular to the plane of movement, and in 1-Parallel, the index finger is parallel to the plane of movement. That is, in descriptions of someone moving along the horizontal ground, the index finger in a sign with 1-cl is vertical, whereas the index finger in a sign with 1-Parallel is horizontal. As with other classifier signs, there is no citation form of a sign with 1-Parallel, and like other classifier signs, signs with 1-Parallel can include many different movements and directions to depict an entity’s motion (see further Section 5).

Some of the form variants of 2-cl have different meanings, e.g., a sign with 2-cl with straight index and middle finger and a short downward movement about a human being means ‘stand’, and a sign with 2-cl with bent index and middle fingers and a short downward movement about a human being means ‘sit’. The reason why we do not see these forms as manifestations of two different classifiers, but rather as one with depicting qualities, is that they are used for the same types of entities (e.g., human beings), but in different situations. By contrast, 1-cl and 1-Parallel are used for partially different types of entities (1-cl only about human and

² The selected fingers are those that contact the body or have hand-internal movement (bending, wiggling, etc.; Brentari 1998).

anthropomorphic beings, 1-Parallel about all types of entities that move intentionally). Moreover, both can be used in signs about human beings in the same type of situation: both 1-cl and 1-Parallel can be used in signs about human beings moving. 1-Parallel does not indicate that the individual is moving in a horizontal position, but the focus is on the route and possibly on speed. In Section 5, we give other examples of how signers use signs with different classifiers to describe the same scene in a cartoon: they choose to focus on different aspects of the protagonist's motion.

The purpose of the three first analyses of this article (Sections 4, 5, and 6) is to crosslinguistically investigate the form and meaning of these individual classifiers. We first examine the phonological properties of the 1-handshape of 1-cl and 1-Parallel, and the 2-handshape of 2-cl, when they occur in one-handed signs and when they occur in two-handed simultaneous combinations, in order to find possible motivations for the distribution of these handshapes as classifiers (Section 4). Second, we compare the distribution of 1-cl and 2-cl in verbs of motion and location to illuminate the semantic differences between them in the two languages (Section 5). Third, we analyze morphophonemic variation in the selection of 1-cl and 1-Parallel vs 2-cl based on the volitionality of the predicate (Section 6).

In the fourth analysis (Section 7), we describe how the verbs with the classifiers 1-cl, 2-cl, and 1-Parallel frequently occur with other verbs of motion that describe the same event, so-called same-event verbs, either in the same clause or in several clauses. Section 8 focuses on two constructions including verbs with the classifiers 1-cl, 2-cl, and 1-Parallel that contribute to the high ratio of same-event verbs in relation to solitary verbs, i.e., verbs that each constitute the only description of a particular event. The constructions are serial verbs of motion (a subtype of serial verb constructions) and verb doubling with a constituent in between the two tokens of a verb.

However, before these analytical sections, we will first discuss the possible genetic relationship between the two sign languages, American Sign Language (ASL) and Danish Sign Language (DTS, *dansk tegnsprog*) (Section 2), and present the method of data compilation and annotation (Section 3).

2 The possible genetic relationship between ASL and DTS

Genetic relationships among sign languages are difficult to establish because of the iconic character of much of the languages' vocabulary and the influence of culturally defined gestures among hearing people. Therefore, claims about genetic relationships are usually based on what we know historically about the sign languages' emergence and spread (e.g., Padden 2010). The history of most sign languages does not go back more than 200–300 years, as is the case with both ASL and DTS. Both are of the type sometimes called urban sign languages. These are sign languages which, to the best of our knowledge, have emerged in the context of deaf education in schools for the deaf. We know little about what took place in North America and Denmark before deaf children came together in the schools, but from then on, they communicated by means of signs, and the two sign languages emerged and gained ground both inside and outside the schools.

The first school for the deaf in the United States was established in West Hartford, Connecticut, in 1817 by Thomas Gallaudet with the help of a deaf French teacher, Laurent Clerc. Clerc had been trained in France at the *Institution Nationale des Sourds-Muets* (National Institute for Deaf-Mutes) and was a signer of old French Sign Language (LSF). It is generally recognized that ASL and LSF are genetically related, and the historical changes have been studied especially at the lexical level (Frishberg 1975, Woodward 1976; see also Power and Meier 2023). As a linguistically competent adult, Clerc is likely to have been a role model at the school.

The situation in Denmark was not quite the same. The first school for the deaf was established in Copenhagen in 1805 by the medical doctor Peter Atke Castberg (Bergman and Engberg-Pedersen 2010). Castberg was inspired by the French playwright Jean-Nicholas Bouilly's piece *L'Abbé de l'Épée*, which was shown all over Europe in the early nineteenth century. Charles-Michel de l'Épée was a French priest who started teaching deaf children in his home in Paris in the 1760s. He based the visual language of instruction on the children's own means of communication, which may have been an earlier sign language or homesign systems (cf. Goldin-Meadow 2013). Castberg from Denmark spent 2 years studying deaf education in Germany and France and decided to use 'the French method' with sign language as the language of instruction. But in

contrast to the French educators, Castberg did not use any so-called methodical signs that were meant to visualize the grammatical categories of French. Moreover, there was no adult French signer in the Danish school to serve as a linguistic role model. Castberg wanted deaf people to construct new signs by taking advantage of iconic aspects, but he wished to let deaf people themselves construct new signs.

It is difficult to know exactly how much French Sign Language Castberg imported into the Danish school. But without a thorough comparative analysis of the vocabularies of old French Sign Language, ASL, and DTS based on all available dictionaries through the centuries, it seems premature to claim that ASL and DTS are genetically related in the sense of having common ancestry.

3 Method

3.1 Participants

The data for the current study are drawn from narrative retellings of the *Canary Row* cartoon. The DTS narratives were elicited in 2002 from five native signers. Three of the signers were in their late 20s and two in their 50s at the time of recording. They all have deaf-signing parents, two of them are a mother and her son. Data collection took place at the school for the Deaf in Copenhagen.

Narratives from 15 ASL signers were collected in 3 different data collection periods 2003, 2006, and 2013 (24–67 years of age at the time of recording). The data from 2003 and 2013 were collected in the Brentari lab, and the 2006 data were collected in the signers' homes. All of the signers were native signers with two Deaf parents, or early learners, who acquired ASL before age 5. Narratives from all 15 ASL signers are included in the analysis of volitionality, and from 9 of the signers elsewhere.

3.2 Procedure

Participants were shown the *Canary Row* cartoon in its entirety (6 min 21 s), and then again, episode by episode (8 episodes in total, between 24 s and 1 min 16 s per episode). Each episode has the narrative structure of the cat Sylvester figuring out a plan to try to get at the bird Tweety in its cage, Sylvester carries out the plan, but fails, and it has fatal consequences for Sylvester himself. The signers retold the narrative to another fluent signer, who was the experimenter and had also seen the cartoon.

3.3 Annotation

All verbs of motion and location in the data were annotated in ELAN, the classifier verbs according to a template established by the collaborative project (Kimmelman and Khristoforova 2025; the template is published at *OSF*, cf. the references). We also made the following additions.

Volitionality [\pm volitional]: Volitionality refers to the characteristic of a referent in a predicate, indicating whether the referent intended to perform the action or, in the case of stative classifier predicates, intended to be in a particular state or location. Sylvester climbing the inside of a drainpipe would be considered volitional, as this was his intended action; however, Sylvester falling down that same drainpipe would be considered non-volitional.

Sign type [T0, T1, T2, and T3]: Sign type refers to the categories as established by Battison (1978): **Type 0** signs are one-handed signs (e.g., ASL THINK and DTS TÆNKE 'think').³ **Type 1** signs are two-handed signs in which

³ DTS signs can be looked up in *Ordbog over Dansk Tegnsprog* (2023) by means of their gloss in Danish, and ASL signs in the study by Valli (2006).

the hands are identical in form, both hands are active, and they perform identical motor acts (ASL *MEET* and DTS *TRÆFFE* ‘meet’). **Type 2** signs are two-handed signs in which one hand is active and one hand is passive, but both hands have the same handshape (e.g., ASL *SIT* and DTS *ARBEJDE* ‘work’). **Type 3** signs are two-handed signs in which one hand moves (active) and one hand is static (passive), and the two hands have different handshapes (e.g., ASL *TOUCH* and DTS *VÆRDI* ‘expensive’). Battison established this system for lexical signs, and the constraints were extended to classifier signs for ASL, Swiss German Sign Language (DSGS), and Hong Kong Sign Language (HKSL) and found to also apply in such forms when handshapes were analyzed using phonological features (Eccarius and Brentari 2007).

Handshape of the nondominant hand: If a sign is two-handed, Battison (1978) proposed the Symmetry and Dominance Conditions, which (among other things) restrict the shape of the nondominant hand (NDH) to a set commonly known as BASCO15 for the handshapes of the letters of the ASL manual alphabet and the number signs *ONE* and *FIVE* (Battison 1978, 35). These handshapes were annotated according to the system developed by Eccarius and Brentari (2008).

Same or different event: We indicated whether or not a sign with a classifier described the same event as any other sign in the narrative (Section 7).

4 Phonological analysis

The purpose of the phonological analysis is to determine the phonological distribution of the two selected finger groups (1-handshape and 2-handshape) – on the dominant hand (DH) alone, and in combination with the NDH. Starting at the level of features, the two main classes of handshape features (Selected Finger and Joint Configuration) can be divided into low, medium, and high complexity forms (Brentari *et al.* 2012, 2017). By focusing on these two groups of selected fingers, the 1-handshape has a simple level of complexity and the 2-handshape a medium level of complexity. In addition to their simpler structural configurations, low-complexity handshapes are the most frequent handshapes crosslinguistically (Hara 2003, Eccarius and Brentari 2007) and are the earliest handshapes acquired by native signers (Boyes Braem 1981). The 1-handshape (Figure 1a) is a low-complexity selected finger group from a structural point of view because it has non-branching selected finger structures and employs the default *extended* joint configuration (not shown).⁴ The 2-handshape (Figure 1b) is a medium complexity handshape because it includes an extra finger (and an extra feature), and because the fingers are spread, adding a non-default feature for joint configuration. In addition to the primary features shown in Figure 1, each handshape variant was coded for an additional four parameters: whether the extended fingers were bent (*b*), extended (*t*), moving (*m*), or ‘stacked’ (*k*), the latter only applying to the 2-handshape. A [*-spread*] variant of the 2-handshape is annotated in the project as *N*.

We investigated the 1-handshape and 2-handshape structures in terms of their (i) overall frequency, (ii) range of joints, and (iii) distribution across the two types of signs described by Battison (1978) that were present in classifier signs in the data: **Type 0** signs are one-handed signs, and **Type 3** signs are two-handed signs in which one hand is moving (active) and one hand is static (passive), the two hands have different handshapes, and both hands are meaningful (see Section 3). Combinations with weak hand holds, where the weak hand has been carried over from the previous sign and is held motionless, were counted as Type 3 signs if the NDH was not neutral. Examples are provided in Figure 2 for the 1-handshape of 1-cl and the 2-handshape of 2-cl.

Based on previous work on the phonological structure of signs alone, we predict that because the structure of the 1-handshape is simpler, it would (i) be more frequent overall (Battison 1978, Eccarius 2002, Hara 2003, Rozelle 2003), (ii) have more subtypes in terms of joints and orientation (Brentari 1998), and (iii) occur more frequently in Type 3 signs (Eccarius and Brentari 2007). However, we know that classifier handshapes

⁴ Extended is the default joint configuration for a number of reasons; one important one is that if a handshape has only one joint configuration, among all possibilities available, it is most likely to have extended joints (see Brentari 1998 for further justification for this designation).

interface with the morphology, syntax, and discourse components of the grammar as well, and other factors besides phonology might influence the choice of handshape. We also know that languages differ in their handshape distribution (Eccarius 2008), and this too might influence the choice of handshape. By analyzing data from DTS and ASL we can examine the three predictions above. This analysis is particularly valuable because phonological analyses of handshape drawn from large amounts of naturalistic data are vanishingly rare in the literature, in part because it is such a daunting and labor-intensive task. By focusing on just two handshapes, we have a more manageable task. Also, by analyzing classifier handshapes that can represent the same entity, we can track many other aspects of the grammar that might affect the choice of a given signer to use one or the other of these handshapes.

In the following sections, we describe the distribution of the 1-handshape (of 1-cl and 1-Parallel) and the 2-handshape (of 2-cl) in classifier signs about humans and anthropomorphic beings in each of the two languages and make the relevant comparisons between DTS and ASL.

4.1 Phonological analysis: DTS

In the following comparisons, we ignore Type 1-signs and Type 2-signs as they had less than 5% of the total number of classifier signs. As Type 3-signs, we include all simultaneous combinations where at least one hand is used for 1-cl, 1-Parallel, or 2-cl, and the handshape of the other hand is meaningful (Figure 2b and d for examples). We find that DTS signers are more likely to use the 2-handshape (i.e., use 2-cl) than the 1-handshape (i.e., use 1-cl or 1-Parallel) in classifier signs, despite the increased complexity of the 2-handshape. Using a Mann–Whitney U test of ranked comparisons, we find that this difference is significant overall ($U = 0.05$; $z = -272$; $p = 0.05$). Note also that we find no significant differences between the proportion of the 1-handshape in two-handed (Type 3) signs vs overall proportions of use in the corpus (i.e., in all classifier signs in the DTS data irrespective of whether they are one-handed or two-handed). This suggests that the overall complexity of the two-handed form is not the main criterion for handshape selection.

Moreover, in terms of phonological sub-types, there is just one sub-type for each of the handshapes of 1-cl and 1-Parallel, while there are eight subtypes of the 2-handshape in 2-cl: 2, 2+mov, 2-stacked, 2-bent, 2-bent+mov, N, N-bent, and N-bent+mov. This indicates strongly that the purely phonological criteria are not very highly ranked when considering the distribution of these two classifier handshapes. Other factors must play a larger role in handshape selection. Figure 3 provides a breakdown from the DTS corpus of 1-handshape and 2-handshape forms across Type 0-signs, Type 3-signs, and overall.

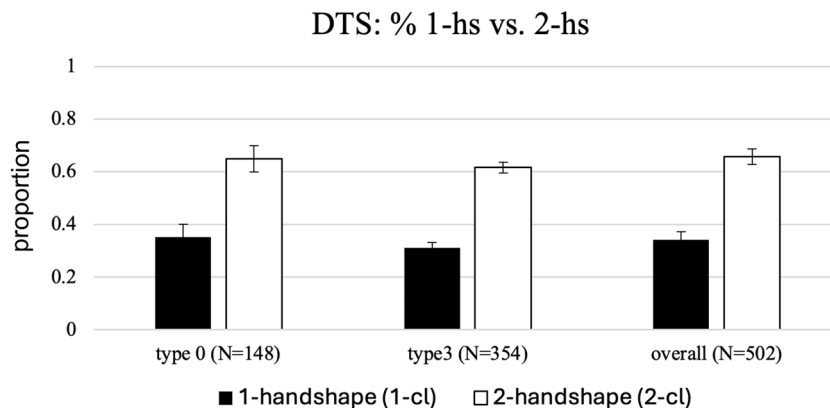


Figure 3: Proportion of DTS use of the 1-handshape (of 1-cl or 1-Parallel) vs the 2-handshape (of 2-cl) in Type 0 (one-handed signs), Type 3 signs (two-handed with one active hand with a classifier and one passive, but meaningful hand), and overall.

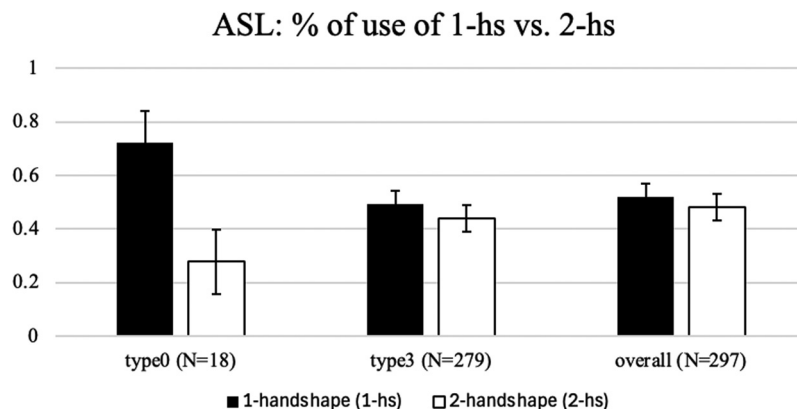


Figure 4: Proportion of ASL use of the 1-handshape (of 1-cl/1-Parallel) vs the 2-handshape (of 2-cl) in Type 0 (one-handed) signs, Type 3 (two-handed with one active hand with a classifier and one passive, but meaningful hand) signs, and overall.

4.2 Phonological analysis: ASL

We find that ASL signers are more equally balanced between their use of the 1-handshape (of 1-cl and 1-Parallel), and the 2-handshape (of 2-cl) at least in Type 3-signs, which make up 84% of all signs with the targeted classifiers in the ASL data. Using a Mann–Whitney U test of ranked comparisons we again (as in DTS) find no significant differences between the proportion of the 1-handshape or 2-handshape overall compared to their proportions in Type 3-signs (Figure 4). As in DTS, this suggests that the overall complexity of the two-handed form is not the main criterion for handshape selection.

The ASL signers are also more balanced than the DTS signers in the number of subtypes used in the handshapes of 1-cl, 1-Parallel, and 2-cl. In ASL there are a total of seven subtypes of the 1-handshape: for 1-cl there are four (1, 1+mov, 1-bent, and 1-bent+mov), and for 1-Parallel, there are two (1-parallel, 1-parallel+mov). There are nine subtypes of the 2-handshape: 2, 2+mov, 2-bent, 2-bent+mov, 2-stacked, 2-stacked-bent, 2-stacked-bent+mov, N, and N-bent.

The phonological profiles of the two languages demonstrate several important things. The 1-handshape is less complex than the 2-handshape, and we predicted that (i) the 1-handshape would be more frequent, (ii) have more subtypes, and (iii) appear more frequently in Type 3 signs. None of the three phonological predictions were confirmed. The 1-handshape is not more frequent, does not have more sub-types, and does not appear more often in Type 3-signs than the 2-handshape. The fact that the 1-handshape is simpler phonologically is not predictive of its use in the classifier system of either language.

We also see that there are crosslinguistic differences between the DTS signers' and the ASL signers' use of the targeted handshapes (Figure 5); there is a marginally significant difference between the use of the

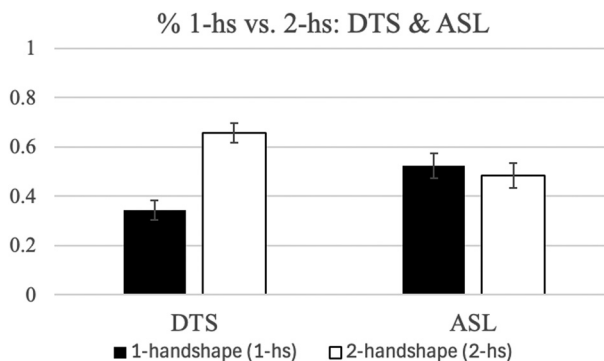


Figure 5: Differences between DTS and ASL in their overall proportion of use of the 1-handshape (of 1-cl and 1-Parallel) and the 2-handshape (of 2-cl).

Table 1: Summary of crosslinguistic similarities and differences between DTS and ASL

	Bending		Additional subtypes		Handpart facing the plane of the sign's movement
	DTS	ASL	DTS	ASL	
1-cl	No	Yes	No	Yes, 4	Finger perpendicular to plane
1-Parallel	No	Yes	No	Yes, 2	Finger parallel to plane
2-cl	Yes	Yes	Yes, 8	Yes, 9	Finger perpendicular or parallel to plane

1-handshape (of 1-cl and 1-Parallel) across the two languages (Mann–Whitney $U = 12$; $z = 1.53$; $p = 0.06$). Table 1 shows a summary of crosslinguistic similarities and differences between DTS and ASL, and for further analysis of the differences between the two languages, check Section 5.

5 Choice of 1-cl or 2-cl in signs about different types of events

If the choice of classifier was only influenced by the semantic class or shape of the designated entity in the event described, an obvious question would be why there is more than one classifier used in signs about human or anthropomorphic beings' motion and location. In this section, we will compare the classifiers 1-cl and 2-cl in the two languages by taking a closer look at their meanings as they appear from the signs used to describe selected episodes of the narratives. Thus, this section adds to the phonological analysis of Section 4 by examining the relationship between event type and classifier choice in the two languages.

5.1 An earlier analysis of the difference between 1-cl and 2-cl in DTS

Engberg-Pedersen (1993, 247–51) described the meaning of what she called Index-Pm (~1-cl) and V-Pm (~2-cl) (Pm for *polymorphic*) in DTS. For DTS, she observed that 1-cl is used in verbs about “an individual's approaching or passing the holder of the point of view” and “an individual's going away from the holder of the point of view” (Engberg-Pedersen 1993, 248–49) if the individual stays within the same area. It can also be used in signs about someone's motion toward a goal or along a predestined route such as in a stadium, but not complex routes like a maze. Finally, it is used about two people meeting each other, especially in a place not set out for a meeting, such as the street or a corridor, and in signs about their separating after having met. But it cannot be used when the manner of motion or location is focused, such as in stative signs with a focus on the manner ('sit', 'lie', and 'stand'), in signs about jumping or walking in contrast to bicycling or driving, walking backward (here a sign with the BPCL for legs would be used instead), or moving somewhere in a cumbersome way or on a difficult surface. In contrast to 2-cl, 1-cl is also not used if the sign mainly describes a change of location such as 'go into the kitchen to get something'.

In its use in signs about motion toward a goal or along a route, 1-cl overlaps with the use of 2-cl. The latter is a more obvious choice in signs about motion or location when the focus is on the being's walking or on someone's motion in a certain direction, to a goal, or within an area with no relation to a holder of the point of view. 2-cl is also used in signs about the manner of a stative verb. The selected fingers of 2-cl can be bent and move independently of each other.

5.2 The difference between 1-cl and 1-Parallel in the two languages

As mentioned in the overview of classifier types in Section 1, 1-cl differs from 1-Parallel in both form and meaning. The index finger of 1-cl does not bend in any joint in DTS in the current data or any other DTS data that the first author has ever seen, while the index finger of 1-Parallel can bend in all joints when it is moved

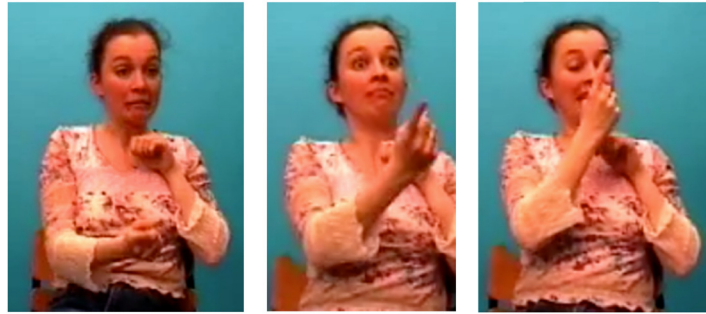


Figure 6: 1-cl in a sign about vertical motion (Sylvester climbing up to Tweety Bird on the outside of a pipe as seen from the latter's perspective). The finger of 1-cl is held horizontally and perpendicular to the plane of motion. The example is from DTS.



Figure 7: 1-cl in a sign about horizontal motion (Sylvester approaching Tweety Bird from behind). The finger is held vertically and perpendicular to the ground. The example is from DTS.

along a path with an angle of ninety degrees or in a curve. The finger of 1-cl is perpendicular to the plane of motion, i.e., it is held horizontally about someone moving up or down (Figure 6) and held vertically about someone moving horizontally (Figure 7). By contrast, the finger of 1-Parallel is held parallel to the plane of motion: in descriptions of someone moving up, the finger is held vertically (Figure 8a), and in descriptions of someone moving parallel to the ground, the finger is held horizontally (Figure 8b).

We are not aware of any widely accepted way of distinguishing 1-cl and 1-Parallel in linguistic descriptions of ASL. Besides the difference in orientation in relation to the plane of the articulator's movement in the signs (Table 1), a formal difference between what could be analyzed as signs with 1-cl and signs with 1-Parallel in ASL is that the articulators of the two types of signs show different forms of hand-internal movement in descriptions of someone moving along a path: the finger of 1-cl may bend repeatedly in the two outer joints as the articulator is moved (Figure 9). When what may be seen as 1-Parallel is used in ASL in a sign about horizontal motion along a path, the articulator may bend repeatedly in the knuckle joint during the movement (Figure 10). These types of hand-internal movements are not seen in 1-cl and 1-Parallel in DTS, and 1-cl seems to be a more comprehensive classifier for anthropomorphic beings' walking in ASL than in DTS.⁵

5.3 Comparison of 1-cl and 2-cl in DTS and ASL

The first event that we have picked out for comparison between the two languages is repeated in three episodes of the full cartoon. It shows Sylvester walking back and forth speculating about how to catch

⁵ In the analyses presented here, we do not include signs where 1-cl is held motionless in the nondominant hand in ASL as such signs do not focus the protagonists' motion or location.

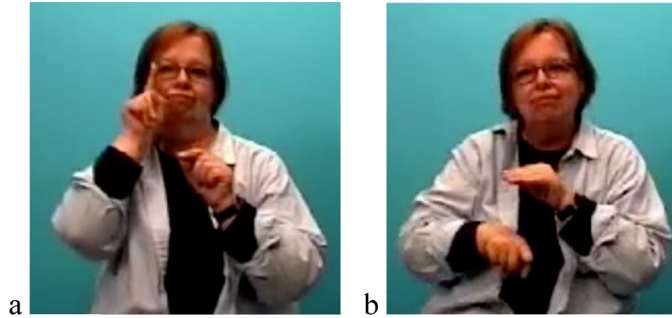


Figure 8: (a) 1-Parallel in a sign about a vertical motion (Sylvester climbing up to Tweety Bird). The finger is held vertically and parallel to the plane of motion. (b) 1-Parallel in a sign about horizontal motion (Sylvester crossing a street). The finger is held horizontally and parallel to the ground. The examples are from DTS.

Tweety Bird. This is an atelic event without a goal. Given the focus on walking and lack of a goal, we would expect the DTS signers to use signs with a variant of 2-cl for these clips, and so they do. They present Sylvester walking back and forth from the same perspective as seen in the cartoon, i.e., seen from an observer's viewpoint either from side to side or forward and backward, but in some cases, the signers have a facial expression indicating Sylvester's concentration. All five DTS signers mention Sylvester's walking back and forth in at least two narratives, and they do so one to three times per narrative. Out of the 14 scene descriptions, 13 include variants of 2-cl. One signer uses a sign with 2-cl and, after that, and in the same narrative, two signs with 1-cl, in the other two narratives she uses only signs with 2-cl.

In the ASL data, Sylvester's walking back and forth gives rise to more variation between signers, but not within signers. Altogether, they describe 18 of these scenes with variants of either 1-cl (eleven scenes) or 2-cl (seven scenes), also from an observer's viewpoint as Sylvester's walking is seen in the cartoons. Four signers



Figure 9: Bending of the articulator at the Distal joint in a sign with 1-cl in ASL, the two extreme positions.



Figure 10: Bending of the articulator at the Proximal joint in a sign with 1-Parallel in ASL, the two extreme positions.

use only signs with 1-cl, and three only signs with 2-cl, and no one uses both signs with 1-cl and signs with 2-cl. In both languages, almost all variants are made with hand-internal movement (in ASL both 1-cl and 2-cl, in DTS only 2-cl), consistent with the fact that Sylvester here moves voluntarily (Section 6).

In the next set of scenes, the protagonists go to a specific goal, all in the horizontal plane: (1) Tweety Bird goes to get a bowling ball, (2) and (3) Sylvester goes outside twice to get two objects for a seesaw, (4) he goes to hide behind a corner, (5) a monkey joins him there, (6) he appears onstage from behind the corner, (7) he goes to specific places in the apartment to search for Tweety Bird, (8) he goes into an apartment to get some pieces of luggage, and (9) a bellboy goes to pick up a phone, altogether nine scenes. All the actions are telic. Altogether the 9 ASL signers contribute 39 scene descriptions of these events. Here, the ASL signers are more consistent than the DTS signers. Five ASL signers use only signs with variants of 1-cl to describe these scenes, and three use both variants of 1-cl and variants of 2-cl. One signer describes only one of the scenes and here uses a sign with a variant of 2-cl. In 34 descriptions, the ASL signers use signs with variants of 1-cl, in descriptions of three scenes they use signs with variants of 2-cl, and in descriptions of two scenes, one signer uses only signs with 1-Parallel.

The 5 DTS signers contribute 33 descriptions of the scenes and use 8 signs with 1-cl and 15 signs with variants of 2-cl. All four signers who describe the monkey's approaching Sylvester use signs with 1-cl, as we would expect since Sylvester is the holder of the point of view here. In one case, the event involves boundary crossing, i.e., Sylvester entering the apartment. Here, three DTS signers use a variant of 2-cl, one ASL signer uses a sign with 1-cl, and all others who describe the scene find alternative solutions.

In two narratives Sylvester moves on a surface that makes motion difficult or awkward: he climbs (1) into a pipe and then (2) upwards on its inside, and he (3) walks, and later (4) runs and (5) jumps, on an electric wire above the street, altogether five events with focus on legs. The DTS signers here contribute 23 scene descriptions. They all use signs with some variant of 2-cl about Sylvester walking and running on the wire; three also use signs with 2-cl about his climbing into the pipe and about his climbing up inside the pipe. The three signers who mention his jumping on the wire also use signs with variants of 2-cl about jumping. Otherwise, they use signs with 1-Parallel, especially about his climbing into (horizontal index finger) and up inside (vertical index finger) the pipe. One signer uses signs with variants of 2-cl as well as one sign with 1-cl about his running on the wire; this is the same signer as the only one who used 1-cl about Sylvester's atelic walking back and forth.

To sum up, the classifier uses descriptions of motion on the difficult ground in DTS:

- In 19 out of 23 scene descriptions (83%), the DTS signers used a sign with a variant of 2-cl.
- In 9 out of 23 scenes, the DTS signers used a sign with 1-Parallel.
- In 1 scene out of 23 scenes, a DTS signer used a sign with 1-cl.

The widespread use of signs with variants of 2-cl complies with the description of 2-cl as being used about difficult motion by means of the legs and feet in DTS (Section 5.1 and Engberg-Pedersen 1993).

The 9 ASL signers contribute altogether 33 scene descriptions. In 20 out of the 33 scene descriptions (62%), the signers use signs with variants of 2-cl. Specifically in the descriptions of Sylvester's walking, running, and jumping on the electric wire, the ASL signers use signs with variants of 2-cl in 13 out of 17 scene descriptions (76%), and signs with variants of 1-cl in 8 scene descriptions (47%). Four of the nine signers use both signs with 1-cl and signs with 2-cl, four use only signs with variants of 2-cl, and one uses only signs with variants of 1-cl.

5.4 Discussion of the uses of 1-cl and 2-cl in the two languages

In spite of the obvious iconicity of 1-cl and 2-cl, we see some similarities and clear differences between their uses and thus their meanings in the two languages. 1-cl has variants with hand-internal movements in ASL, but not in DTS in the data. By contrast, there do not appear to be differences in form between the variants of 2-cl in the two languages: the index and middle fingers may be bent or extended, and in both cases, the fingers may change their relative position (Section 4).

The analysis of which classifier is used in descriptions of the groups of scenes reveals semantic differences. For the atelic events (Sylvester's walking back and forth) the DTS signers use almost exclusively signs with 2-cl, the ASL signers sign with both classifiers. For the telic events (someone going somewhere) the ASL signers use primarily signs with 1-cl, the DTS signers sign with either one or the other classifier with a preference for 2-cl. Finally, for the events with difficult motion, the DTS signers are more unanimous in preferring signs with 2-cl than the ASL signers, who nevertheless use relatively more instances of 2-cl than for the other two types of events. Specifically for describing Sylvester's walking, running, and jumping on the wire, the ASL signers describe 76% of the scenes by means of signs with 2-cl, but still also describe almost half (47%) of these scenes by means of signs with 1-cl. That is, one and the same signer may use a sign with 1-cl and a sign with 2-cl about the same scene (Figure 11).

Judged from these cartoon descriptions, there is a preference for 2-cl in DTS and a preference for 1-cl in ASL. But the choice between them is not arbitrary: atelic motion or motion on difficult ground draws the DTS signers toward 2-cl, with telic motion leaving room for more variation; telic motion draws the ASL signers towards 1-cl, whereas atelic motion and, to a higher degree, motion on difficult ground make them use also 2-cl. Moreover, the ASL signers appear somewhat more consistent within themselves than the DTS signers.

An explanation for the ASL preference for 1-cl and the DTS preference for 2-cl may be that 1-cl has variants in ASL, not in DTS (Section 4). The form variants in ASL indicate differences in meaning. For example, the ASL signer who only used signs with 1-cl to describe Sylvester's behavior on the wire describes his walking awkwardly and trying to keep his balance by a rocking movement to the sides of the index finger of 1-cl. The alternating bending and extension of the outer joints of the finger of 1-cl in verbs about someone going somewhere probably indicates determinate walking (Section 6) and thus allows the signers to indicate this type of walking. By contrast, the index finger of 1-cl in DTS does not bend at any joint during the course of the sign. The only possible variation is a movement up and down of the whole hand to indicate determinate walking, a form not seen in the cartoon descriptions, however. Other data from DTS show how 1-cl is used to describe someone bumping into someone else and falling, where the articulator changes its orientation, but otherwise, the index hand of 1-cl is used with no variation from the rigid orientation perpendicular to the plane of motion.

Whether or not ASL and DTS inherited the classifiers 1-cl and 2-cl from a common ancestor or they are iconic inventions in historically separate situations, they have different meanings in the current states of the two languages, differences that are reflected in their use in signs about events with different characteristics. In this sense, the classifiers have unpredictable, lexicalized, meanings.

6 Volitionality

Early work by Dowty (1979) provided a foundational analysis for understanding volitionality within the broader framework of aspect as *aktionsart*. Dowty's analysis positioned volitionality as a factor in the



Figure 11: ASL signer using a sign with 2-cl about Sylvester standing on the tram wire and a sign with 1-cl about Sylvester balancing on the wire (represented by the index hand).

classification of verb types, influencing the way predicates are structured in language. Building on this foundation, subsequent studies have expanded on this by examining how volitionality interacts with syntactic and morphological elements in different languages. For instance, DeLancey (1981) investigated the role of volitionality in Tibetan, demonstrating how it affects case marking and verb agreement, thus highlighting its significance in the grammar of ergative languages. Talmy (1985) examined how spoken languages vary in how they express the volitionality of actions in their verb systems, for example, through morphological markers expressing intent. Talmy's analysis proposes that volition is a fundamental semantic component that can be encoded in a variety of ways across languages, either explicitly through dedicated morphemes or implicitly through context and the selection of particular verbs. This framework has influenced subsequent studies in cognitive linguistics, where volitionality is considered a core element in conceptualizing and categorizing events. Similarly, in typological studies, researchers such as Givón (1994) have investigated the impact of volitionality on syntactic structures across languages, affecting phenomena such as subject selection, voice alternation, and clause linkage.

In the context of sign languages, Supalla (1990) analyzed how semantic properties, such as volition, shape the classifier selection in ASL. Kegl (1990) also investigated how predicate-argument structures in ASL are organized around semantic concepts, particularly in verb class organization. Similarly, Benedicto and Brentari (2004) found that agency, as a function of argument structure, impacted classifier choice (but see also Kimmelman *et al.* 2020 for a discussion of agency in relation to classifiers in Russian Sign Language [RSL]). Brentari (2011) went on to emphasize that even when iconicity is prominent, abstract semantic factors such as volitionality are crucial in shaping linguistic expression. In this section, we analyze specific details about the handshape features associated with the 1-cl and 2-cl classifiers, specifically selected fingers (henceforth referred to as *handshape*) and hand-internal movement. Figure 12 shows two examples with signs with 1-cl from ASL. The first (Figure 12a) describes Sylvester sliding down a wall, a non-volitional motion, and the second (Figure 12b) describes Sylvester walking back and forth, a volitional motion.

6.1 Volitionality, hand-internal movement, and handshape – statistical results

The following computational resources were used for statistical processing and analysis of the role of volition and its interaction with 1-cl and 2-cl: the R packages *dplyr* (Wickham *et al.* 2023), *tidyverse* (Wickham *et al.* 2019), *readr* (Wickham *et al.* 2024), *esquisse* (Meyer and Perrier 2024), *report* (Makowski *et al.* 2023), and *ggplot2* (Wickham 2016). The Large Language Model ChatGPT (OpenAI 2024) was used to debug and simplify code throughout. The output revealed that the pairs of features demonstrating statistically significant correlations were similar between ASL and DTS, suggesting that both DTS and ASL share underlying patterns concerning hand-internal movement and volitionality (Table 2).

A statistically significant relationship between Volitionality and Handshape (1-cl and 2-cl) was not found in either ASL or DTS. As seen in Table 2, Fisher's exact test confirmed a *p*-value of 0.6483 for the relationship

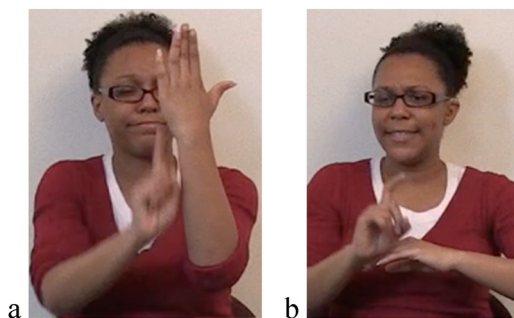


Figure 12: An ASL signer describing (a) Sylvester sliding down a wall (non-volitional, no hand-internal movement), and (b) Sylvester walking back and forth (volitional, with hand-internal movement).

Table 2: Statistical results of non-volitional and volitional classifiers and their interaction with hand-internal movement

	Non-Volitional signs with classifiers (%)	Volition and Handshape	Volition and Hand-internal Movement	Handshape and Hand-internal Movement
ASL	15.82	$p = 0.6483$	$***p = 1.493 \times 10^{-8}$	$***p = 4.496 \times 10^{-7}$
DTS	13.18	$p = 0.1098$	$**p = 0.004361$	$***p = 3.737 \times 10^{-14}$

between Volitionality and Handshape in ASL, and a p -value of 0.1098 for that of DTS. A statistically significant relationship was found between Volitionality and Hand-internal Movement and between Hand-internal Movement and Handshape. A Fisher’s exact test confirmed a $***p$ -value of 1.493×10^{-8} for the relationship between Volitionality and Hand-internal Movement in ASL, and a $***p$ -value of 0.004361 for that of DTS. For the relationship between Hand-internal Movement and Handshape, again using a Fisher’s exact test, a $***p$ -value of 4.496×10^{-7} was confirmed for ASL, and a $***p$ -value of 3.737×10^{-14} was confirmed for DTS (Table 2).

These statistical connections lend support to several points raised in this article. Hand-internal movement was observed at a much higher rate in volitional classifier predicates than in non-volitional ones. This provides strong statistical support for the semantic notion of volition being linked to the handshape-internal motion of a classifier predicate. Additionally, movement, in general, was observed at a significantly higher rate in 2-cl than 1-cl handshapes. This may be due to the increased mechanical possibilities in 2-cl vs 1-cl (e.g., stacking and spreading). The results are illustrated in Figure 13.

Figure 14 shows a statistical preference from signers of both languages, with DTS signers avoiding all hand-internal movement in classifier predicates with 1-cl.

6.2 Discussion of volitionality, hand-internal movement, and handshape

The findings of this study offer insights into the relationship between volitionality, hand-internal movement, and classifier handshape in ASL and DTS, lending support to the notion that meaning can play an important role in determining classifier form.

First, the Canary Row narratives provide ample opportunity to produce an abundance of both volitional and non-volitional classifier predicates. Interestingly, the relationship between volitionality and handshape did not show statistical significance in either language.

Second, despite the absence of an apparent genetic relationship between the two languages, signers of both languages exhibit parallel tendencies in how volitionality, hand-internal movement, and handshape interact – that is, an increase in hand-internal movement associated with volitionality (for a discussion of the relationship between control of the motion and hand-internal movement in what corresponds to 2-cl in

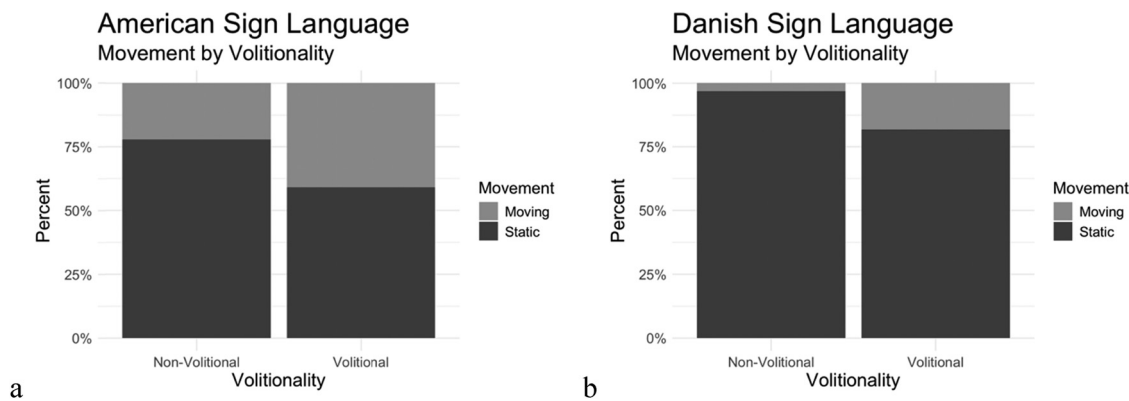


Figure 13: Percentage of volitional and non-volitional signs incorporating movement in (a) ASL and (b) DTS.

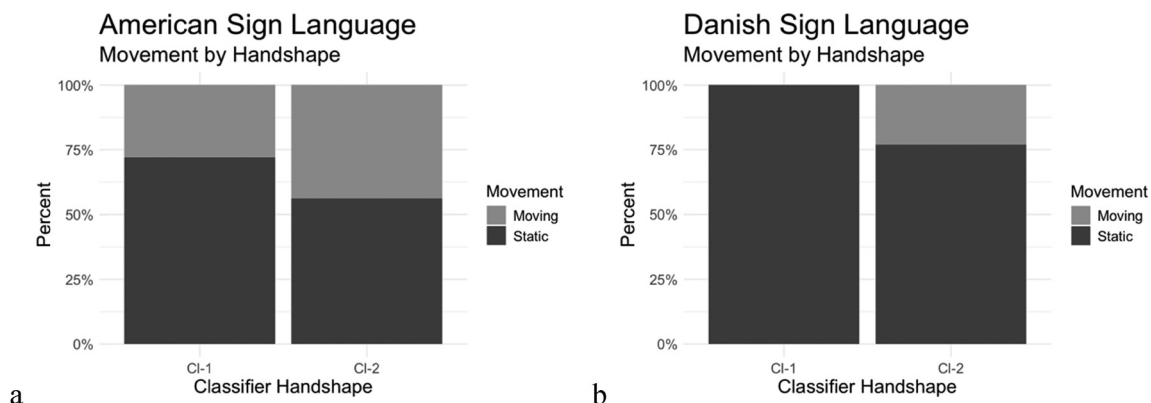


Figure 14: Percentage of 1-cl- and 2-cl-type signs incorporating movement in (a) ASL and (b) DTS.

RSL, refer to Kimmelman *et al.* 2020). This suggests that there may be underlying modality-level preferences influencing the organization of classifier systems, as well as common cognitive or linguistic strategies for encoding actions and intentions within their classifier systems. These results reinforce the idea that it is not only iconicity but volitionality, along with other semantic notions, that play a meaningful role in how actions are depicted through classifiers.

Third, a similar statistically significant relationship was found between hand-internal movement and classifier handshape. The increased number of selected fingers in the 2-handshape compared to the 1-handshape supports a greater range of possible configurations for those fingers. It is likely that this mechanical reality would lead to a similar link between movement and selected fingers in other sign languages. ASL signers were willing to produce hand-internal movement in 1-cl when it suited their communicative needs. This distinction between the two languages suggests a possible language-specific setting, which warrants further exploration in additional sign languages.

7 Same-event verbs

In this section, we include all verbs of motion or location that were used to describe the same event in the cartoons as another verb with one of the target classifiers (1-cl, 1-Parallel, and 2-cl), no matter whether they occurred in the same clause as the targeted verb or not. Thus, additional verbs included are lexical verbs of motion and location, verbs with body part classifiers (BPCLs), and a few verbs with handling classifiers that describe someone moving while carrying something. We also include those lexical verbs of motion and



Figure 15: Two verbs about one event by an ASL signer: (a) a verb with 2-cl, and (b) a verb with a classifier for feet, both about Sylvester walking on a tram wire. These two verb tokens are categorized as same-event verbs.



Figure 16: The only verb, a verb with 2-cl, made by an ASL signer about Sylvester walking on a tram wire. This verb token is categorized as a solitary verb.

location that are not used to describe the same event as a verb with one of the target classifiers in a particular instance, but are used in that way in other instances.

With classifier signs there may be a problem of distinguishing what is one sign and what is a series of signs with no disruption. Such problems are met especially when signers use the same handshape in a sequence with changes in the quality of the movement or in its direction. For this study changes in handshape, other than hand-internal movements, and changes in the direction of the articulator's movement if there is a clear break, qualify to divide a sequence into several signs. Changes in facial expression or in the quality of the movement (e.g., speed) as well as hand-internal movements (e.g., stopping finger movements or changing the selected fingers' position from bent to extended) were not used to split up a sequence into several signs.

The lexical verbs included in the analysis of the DTS data are: FORTSÆTTE with the meaning 'roll', FØLGE 'follow', IND 'into, out of', KASTE 'throw' (with two hands), LØBE(S) (with two fists) 'run', LØBE(5) (with two 5-hands), FLYGTE 'escape', which looks like IND, but does not involve or imply a specific location, TAGE-AFSTED 'go off', and UD 'out of'.⁶ In the ASL data, the following lexical verbs are included: CHASE, CLIMB, ESCAPE, INSIDE, INTO (the form that is described as 'old ASL' by handspeak.com), ROLL, OUT, CHASE (made with two A hands with extended thumbs), RUN (bc) (made with two bc hands), RUN(S) (made with two fists), and THROW (two-handed sign).⁷

Many verbs describe the same motion event with different details. For example, one verb may include a w/e classifier and describe the motion's path, another verb may have a BPCL and describe the manner of motion (Figure 15). But they describe the same event and will be categorized here as *same-event verbs*. Two verbs may also describe part of the same event, for instance, one denotes someone moving, and another describes the same motion, but also its coming to a stop. In such cases, they will also be categorized as same-event verbs. All verbs that constitute the only description of an event are called *solitary verbs*. Thus, what matters is not whether the verbs are identical in form, but whether they describe the same, or parts of the same, event in the cartoons (check Figure 15 for an example of two different verbs about an event by one signer and Figure 16 for one verb about the same event by a different signer).

Table 3 shows the distribution of same-event verbs and solitary verbs in the stories from each of the five signers in the DTS data. In all, there are 703 verbs in the DTS data (Table 3). Out of these, 18 were unclassifiable, either because they were broken off or the signers hesitated and appeared to restart, or because it was unclear whether they indicated direction only rather than motion in a direction. In the ASL data, there were altogether 791 verbs with 17 unclassifiable verbs (Table 4).

Table 3 shows that the DTS signers' same-event verbs vary between 58% and 73% of all their individual verbs of motion and location. For instance, DTS signer HE uses altogether 124 classifiable verbs of motion or location, 91 (73%) of those describe the same event as at least one other verb, whereas each one of 33 verbs

⁶ All verbs except for LØBE(5) 'run' made with 5-hands can be seen in *Ordbog over Dansk Tegnsprog* (2023).

⁷ OUT can be seen here: <https://www.signingsavvy.com/sign/OUT/663/1>. All other verbs except for RUN made with two fists and THROW made with two hands can be seen here: <https://www.handspeak.com>.

Table 3: Distribution of same-event verbs and solitary verbs describing the motion or location of an individual in the DTS narratives

Signers	Same-event verbs	Solitary verbs	Unclassifiable	Total classifiable
HE	91 (73%)	33 (27%)	3	124
HO	87 (65%)	46 (35%)	2	133
NE	98 (74%)	35 (26%)	4	133
PE	101 (70%)	44 (30%)	2	145
AA	87 (58%)	63 (42%)	7	150
Total	464 (68%)	221 (32%)	18	685

Table 4: Distribution of same-event verbs and solitary verbs describing the motion or location of an individual in the ASL narratives

Signers	Same-event verbs	Solitary verbs	Unclassifiable	Total classifiable
DR	41 (46%)	48 (54%)	6	89
GA	29 (36%)	52 (64%)	1	81
HM	49 (60%)	33 (40%)	2	82
KG	20 (40%)	30 (60%)	0	50
KN	78 (64%)	44 (36%)	3	122
LC	72 (63%)	43 (37%)	0	115
MK	18 (33%)	37 (67%)	2	55
WA	56 (56%)	44 (44%)	2	100
WB	46 (57.5%)	34 (42.5%)	1	80
Total	409 (53%)	365 (47%)	17	774

(27%) is the only verb about a specific event. The same-event verbs may occur immediately after each other (as in Figure 15), or with intervening signs. This means that it is not possible to deduce anything about the number of clauses from Tables 3 and 4. The main point here is to demonstrate that signers frequently use several verbs to describe a specific event. In Sections 8.1 and 8.2, we characterize two sequential constructions that throw light on the numerical facts.

Altogether more than two-thirds (68%) of the verbs of motion and location in the DTS corpus are same-event verbs, a little less than one-third (32%) are solitary verbs that describe an event of motion or location by themselves. In Table 4, we see that the ASL signers' same-event verbs vary between 33% and 64%, that is, the proportion of same-event verbs is somewhat lower than in the DTS data, altogether 53% vs 68%. What is striking is that in both languages and in this genre, it is quite common to describe an event of motion or location by means of more than one verb. But there is clearly room for individual choice as we see from the choices made by the two signers in Figures 15 and 16. Nevertheless, the question is what makes signers describe the same event several times, using up to eight (in DTS) or seven (in ASL) verbs about the same event.

To get a better understanding of why there are so many same-event verbs in narrative signing in the two languages, and especially of how verbs with one of the three focused classifiers 1-cl, 2-cl, and 1-Parallel interact sequentially with other verbs, we will examine two types of constructions which involve same-event verbs. The constructions are serial verbs of motion (a subtype of serial verb constructions) and verb doubling of two kinds. In verb doubling, the verbs are either identical or share semantic features to such an extent that they can be used about the same event. Both constructions are found in both sign languages.

Although these constructions contribute to increasing the number of same-event verbs in the narratives in DTS and ASL, they do not give the full explanation. It would be interesting to expand the investigation of the ratios between same-event verbs and solitary verbs to other genres, other sign languages, and narratives in spoken languages to see what factors influence this feature.

8 Complex predicates

In this section, we examine two constructions that contribute to the large number of same-event verbs in the narratives from the two sign languages, serial verbs of motion and verb doubling.

8.1 Serial verbs of motion

Typologically, Aikhenvald (2018) defines serial verb constructions as constructions with two or more verbs with no overt marker of dependency; the verbs together conceptualize a single event. They tend to share subjects and objects. The verbs cannot be questioned or negated separately, and each verb can function as the main verb of a clause by itself. Generally, a serial verb construction falls within one clausal intonation contour.

One type of sequence of same-event verbs was first described by Supalla (1990) for ASL as ‘serial verbs of motion’. Supalla distinguishes manner of locomotion from manner of motion along the path. Manner of locomotion may be, for instance, limping, running, or coasting a toy wagon with one leg. He illustrates these different manners of locomotion by means of verbs with a BPCL for legs, i.e., two index hands. If a path is added as in the representation of, for instance, limping in a circle, the path will be described by means of a separate sign, the drawing of a circle in space. The two signs – one representing the limping manner of locomotion, the other the path – constitute the serial verb construction. According to Supalla, they occur in the order manner followed by path with no intervening signs.

Since Supalla’s description of manner and path verbs of motion, several researchers have used his framework for similar constructions in other sign languages. Slobin and Hoiting (1994) found serial manner and path verbs in Sign Language of the Netherlands (NGT) and linked the construction with Talmy’s (1985) theory about verb-framed and satellite-framed languages and with Aske’s (1989) theory about two types of path phrases: ‘locative’ path phrases and ‘telic’ path phrases. Slobin and Hoiting (1994) find that the significant difference between the two types of path phrases is whether the path involves boundary crossing or not. If a path involves the crossing of a boundary (‘enter’, ‘exit’, and ‘cross’), it is telic, and the verb describing the path cannot also include manner description in verb-framed languages such as NGT, they claim.

In an article originally from 1996, Bos (2016) compares a construction from NGT, which she calls *double-verb construction*, with serial-verb constructions in spoken languages. Although these constructions may include the verb *go*, they are not serial verbs of motion. Couvee and Pfau (2018) describe *go* in these constructions as a generic verb that does not give detailed information about a path and does not include a w/e classifier.

Benedicto et al. (2008) compare sequences of classifier verbs in ASL, Catalan Sign Language (LSC), and Argentinian Sign Language (LSA) and find that LSA follows the order constraint of ASL, i.e., manner before path, but LSC accepts both orders. Moreover, both LSA and LSC have the order manner–path–manner, and LSC also the order path–manner–path. Clark (2017) describes serial verb constructions with the order manner–path in Sivia Sign Language (LSSiv), a sign language of Peru. Serial verb constructions with the order manner–path are described as Motion-Directional SVCs by Lau (2010) for HKSL. In her data from Korean Sign Language, Hong (2003) finds that manner verbs with a BPCL precede other verbs in only 57% of the serial verb sequences. But she also finds sequences of manner–path–manner verbs as in LSA and LSC and sequences of up to seven classifier verbs. Nyst (2007) describes serial-verb constructions in the village sign language Adamorobe Sign Language (AdaSL) of Ghana, a sign language in which w/e classifiers are rare. In retellings of the Canary Row cartoons, the signers did not use a single example of a sign with 2-cl. In descriptions of Sylvester walking back and forth, the AdaSL signers used a sign with a BPCL for the whole body, leaning the body alternately to the left and the right. In serial verb constructions, they used so-called directionals with very general meanings after manner verbs with BPCLs or handling classifiers. Thus, there may be a preference for the order manner before path in sign languages, but it is not universal. (See also Davis and Brentari, this volume.)

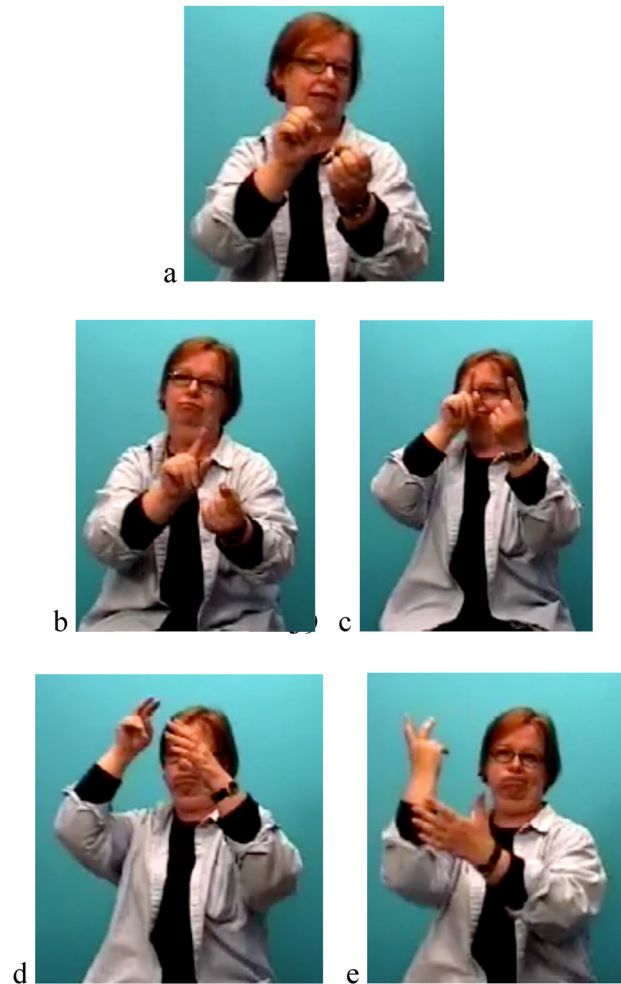


Figure 17: A DTS signer's description of Sylvester being thrown out of a building: (a) the sign *KASTE* 'throw' based on a sign with a handling classifier, (b–c) a sign with the BPCL for legs, and (d–e) a sign with the w/e classifier 2-cl.

8.2 Serial verbs of motion in DTS and ASL

In the analysis of serial verb constructions of motion verbs in DTS and ASL, we have chosen to categorize verbs with one of the w/e classifiers 1-cl, 2-cl, or 1-Parallel as path verbs, and verbs with BPCLs as manner verbs. The criterion for the distinction is that verbs of motion with w/e classifiers can show details of a path such as whether it is straight or meandering, while signs with BPCLs cannot describe details of a path. Signs with one type of BPCLs, i.e., legs classifiers (two index hands with the fingers representing an anthropomorphic being's legs), can in fact indicate at least some details of the path in DTS: one of the DTS signers describes Sylvester's being thrown out of a building by means of the legs classifier, one fingertip upwards and the other to the side, the hands moving in an arc from the signer's left towards her right (Figure 17). At the top of the arc outside her forehead, she changes the classifier to 2-cl in the dominant hand.

Some signs with handling classifiers may also show path to some extent. Before the description of how Sylvester flies through the air in Figure 17, the DTS signer uses the sign *KASTE* 'throw', which is based on a sign with a handling classifier: the hands open from fists to open hands as they bend in the wrists. The signer places her hands at her left side and opens them in the rightwards direction. The orientation of the hands and the direction of their movement comply with the direction of movement of the sign with the BPCL (Figure 17) following *KASTE*. In data elicited to test minimal pairs from RSL, Kimmelman *et al.* (2020) found that Russian signers might use a verb with a handling classifier even to describe complex paths. In our data, we do not see



Figure 18: An ASL signer describes how Sylvester swings on a rope from one building to another.



Figure 19: A verb with 2-cl followed by the beginning and end positions of a verb with a handling classifier about Sylvester's floating down while holding the bird.

any examples of complex path descriptions in verbs with handling classifiers, but in another episode from the *Canary Row* cartoon, Sylvester swings on a rope from one building to another. Here, two ASL signers use a verb with a handling classifier (holding the rope) and an arc movement out from their body (Figure 18), one of them also a verb with the w/e classifier 2-cl. The other seven ASL signers use either a similar verb with a handling classifier and a short forward movement and then switch to a verb with a w/e classifier (1-cl or 2-cl), or they use only a verb with 1-cl or 2-cl. Of the DTS signers, one uses a verb with a handling classifier and a full arc movement followed by a verb with 2-cl and the same arc movement, the other four signers all start with a sign with the handling classifier and a very short movement and then switch to a verb with 2-cl and a full arc movement. Thus, it seems that, at least in these data, most signers hesitate to use a verb with the handling classifier and a full path movement, although not all. However, several signers use a verb with a handling classifier and a full path movement to describe how Sylvester floats down to the ground while holding the bird in his hands (Figure 19).

Despite these complications, the main distinction here is between verbs with w/e classifiers, which may describe details of a path, and verbs with BPCL (especially the legs classifier) or with handling classifiers, which primarily describe manners of motion.

8.2.1 Serial verbs of motion in DTS

All the lexical verbs used by the DTS signers can indicate the direction of motion, but only *FØLGE* 'follow' can indicate details about the path, e.g., 'follow in a meandering pattern'. *FØLGE* is based on a sign with two w/e classifiers (expressed by A handshapes). *LØBE(S)* and *LØBE(5)* 'run' are two-handed and based on signs with BPCLs, namely hands, and they can indicate the direction of motion by the orientation of the signer's head, body, and hands. *IND* 'into, out of' and *FLYGTE* 'escape' are identical in form: the dominant index hand moves

underneath a flat hand, both hands with the same palm orientation. They can indicate the direction of motion independently of the signer’s orientation, but they cannot indicate details of the path.

Making the dependence on the signer’s orientation for indicating the direction of motion a main criterion, we get two categories of predicates of motion. We base the categorization of the lexical signs on how they are used in the data.

(2) Categories of lexical signs regarding manner and path in DTS

A. *Manner of motion verbs*: signs with BPCLs, including handling classifiers, plus the signs GYNGE ‘swing on a swing’, LØBE(S) ‘run’, LØBE(5), RULLE ‘roll’, and KASTE ‘throw’

B. *Path of motion verbs*: signs with w/e classifiers and the lexical signs IND ‘into, out of’, FØLGE ‘follow’, FLYGTE ‘escape’, TAGE-AFSTED ‘go off’, and UD ‘out of’

In the DTS data, there are altogether 60 sequences of two or more verbs that fulfill most of Aikhenvald’s (2018) criteria for serial verb constructions and include at least one token of a sign with 1-cl, 2-cl, or 1-Parallel. They occur within one clausal intonation contour, and they are not linked by any marker of dependency. They share one argument. It is the only argument of a verb with a w/e classifier or a BPCL, and, with a verb with a handling classifier, it may be either the agent argument as in the example in Figure 19 (example 3) or the patient argument as in the example in Figure 17 where a DTS signer describes Sylvester being thrown out by means of KASTE ‘throw’ followed by a verb with a BPCL and a verb with a w/e classifier (see also the discussion of argument structure with classifier verbs in Kimmelman *et al.* 2020). Furthermore, in accordance with Aikhenvald’s (2018) criteria, the verbs conceptualize a single event by describing different aspects of it. All 60 tokens of verb sequences occur in positive clauses that function as statements, but based on the closed class of data, we cannot say whether the verbs might be questioned or negated individually.

Aikhenvald’s (2018) definition also requires each of the verbs to be able to occur as the sole verb of a clause. This criterion is not unproblematic for the DTS data of this study. There are altogether 221 solitary verbs in the data (Table 3). Almost all the solitary signs are verbs with w/e classifiers, which may describe paths, or lexical verbs such as the sign LØBE(5) ‘run’, which is based on a BPCL for hands, and the sign GYNGE ‘swing on a swing’, which is based on a handling classifier. A few manner verbs with the legs classifier or with a handling classifier occur as the sole verb of a clause in the DTS data if they include a path.

Since the signers in these data use many same-event verbs, the lack of clear examples of signs with BPCLs and handling classifiers as the sole verbs of clauses may be a consequence of the narrative genre. It is worthwhile to find out in future studies to what extent verbs with classifiers that only describe manner with no path information can be the only verb of a full sentence in DTS. If they cannot, the serial verb constructions with manner verbs in DTS should be discussed in the light of symmetry in serial verb constructions (cf. Costello 2016, Aikhenvald 2018). For now, we will accept, as serial verb constructions, sequences of same-event verbs of motion that occur within one clausal intonation contour with no intervening constituents.

Out of the 60 such constructions, 33 sequences consist of a manner verb followed by a path verb with one of the classifiers 1-cl, 2-cl, or 1-Parallel as in (3) with a verb describing someone walking on a tightrope, followed by a verb with a variant of 2-cl (Figure 20).

(3) DTS AA, Episode 8, ‘balance on wire’⁸

DH: hands(B)+at-side-to-keep-balance 2-cl+straight-forwards/

NDH: hands(B)+at-side-to-keep-balance Index+as-tram-wire

“He walks on the tram wire as if on a tightrope.”

Toward the end of the manner-path construction, the signer establishes eye contact with the addressee, then she looks back down at her hands and repeats the sequence in a form of clause doubling (Section 8.3).

⁸ The annotation conventions are explained in the Appendix.

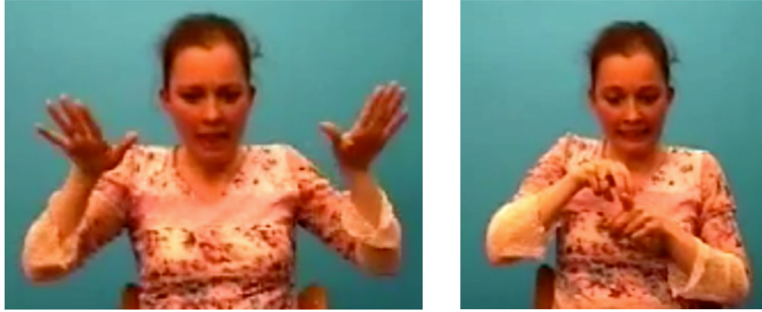


Figure 20: The two verbs of example (3).

Thus the example agrees with the criterion mentioned by Aikhenvald (2018) that serial verb constructions may be repeated in the same sequence.

In some instances of manner-path constructions, the signers use either more than one path verb after the manner verb or more than one manner verb before the path verb. For instance, one signer uses a variant of the sign *LØBE(5)* ‘run’ followed by a sequence with first a verb with 2-cl describing how Sylvester runs down a spiral staircase, then a verb with 1-Parallel describing the same descent with a straight downward movement, and lastly a verb with 1-Parallel in a straight movement forwards about his running across the street. Here, all the path verbs do not strictly speaking describe the same motion event, but contribute parts of the total event, and the manner verb *LØBE(5)* ‘run’ covers them all.

In the manner-path sequences, the path verb may be followed by a locative phrase about a goal, which could not follow directly after the manner verb. An example of a locative phrase after a path verb is the manner verb *RULLE* ‘roll’ followed by the path verb 1-Parallel+arching-forwards and then the phrase *BOWLING HOUSE IXforwards*, i.e., ‘rolls into a bowling hall’, which is the goal.

Slobin and Hoiting (1994) point to the importance of boundary-crossing in the motion scenario: if the path involves boundary-crossing, the verb describing the path cannot include a manner description in verb-framed languages, they claim. This generalization can be expanded to another case of telic path descriptions (cf. Aske 1989): if the path involves arrival at a point, a path verb is needed. In DTS mainly path verbs can describe arrival somewhere by means of an abrupt stop of the hand’s movement. That can be seen in examples where the signers describe how Sylvester climbs a pipe to Tweety Bird’s window: a manner verb with a BPCL (hands describing climbing) followed by a path verb with 1-Parallel or a w/e classifier (2-cl), the latter ending with an emphatic stop that indicates arrival. In cases of boundary-crossing, the signers use both the lexical path verbs *IND* ‘into, out of’ and *OUT* ‘out of’ and signs with a w/e classifier and a straight movement and especially the fairly neutral 1-Parallel or 2-cl, i.e., path verbs with no further specifications of manner or details of the path. By contrast, the signers do combine atelic manner verbs with locative phrases about the location, as, for instance, in a sequence with the manner verb meaning ‘climb’ followed by *PIPE* and then a repetition of the manner verb: ‘Sylvester climbs the pipe’ (Section 8.3).

Besides the 33 sequences with manner before path, there are 9 examples with the path verb before the manner verb. Six of these are atelic, which makes it possible to end with a manner verb. Two of the telic path-manner constructions are descriptions of falls with a path verb with 2-cl followed by a manner verb with flat hands lifted to the sides and a forward movement of the body (Figure 21) (similar signs in ASL are described as gestures by Emmorey 1999). Here telecity is expressed in the path verbs and implied by the manner verb, but the manner verb is not followed by a locative phrase. The last telic path-manner construction describes Sylvester’s swinging into a wall, again with a manner verb with the BPCL for two hands. The path verb with 2-cl is clearly telic as it includes the NDH about the ground and there is contact between the articulator of 2-cl and the NDH; the manner verb is not followed by a locative phrase, but by a new path verb with 2-cl about Sylvester’s sliding down the wall. The last verb is not a same-event verb and is thus excluded from the analysis here. But it occurs within the same prosodic unit as the other two verbs and may be part of a different type of serial verb construction with verbs that describe temporal sequences.

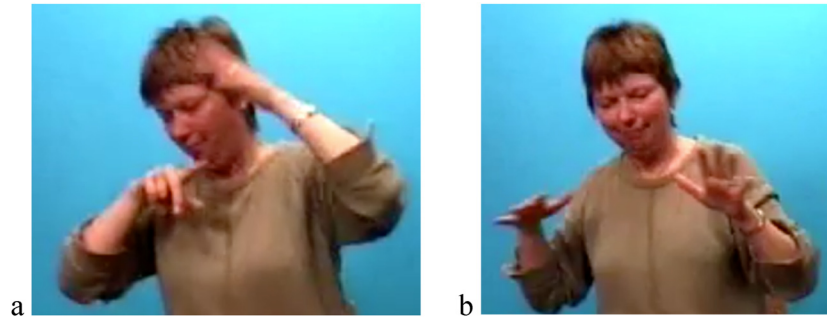


Figure 21: A path-manner sequence: (a) falling described by a verb with 2-cl in the DH (and the NDH preparing for the following sign), and (b) a verb with two BPCLs about hands in a description of falling forwards.

Benedicto *et al.* (2008) found that LSC has both orders manner–path and path–manner and also both sequences of three verbs: manner–path–manner and path–manner–path. In the DTS data, there are no examples of manner–path–manner involving one of the classifiers 1-cl, 2-cl, or 1-Parallel. But there are 13 examples of path–manner–path sequences and 5 sequences with more than 3 verbs (up to 6) ending in either a path or a manner verb. An example of a path–manner–path sequence is a signer’s description of Sylvester’s climbing a pipe: the signer uses first a verb with 2-cl and an upward movement of the articulator, then a verb meaning ‘climb’ with a BPCL, and at the end, a less elaborate version of the first path verb with 2-cl.

In sum, we find that many of the sequences of motion verbs in the DTS data can be categorized as serial verb constructions.⁹ They tend to order the manner verbs before the path verbs, but we also find the orders path-manner and path-manner-path. In these data, there are no manner-path-manner sequences with the path verb including either 1-cl, 2-cl, or 1-parallel. But there are examples of longer sequences ending with either a manner or a path verb. The analysis shows that verbs with BPCLs may code path information in DTS, and verbs with w/e classifiers are preferred if the motion involves boundary-crossing or arrival somewhere.

8.2.2 Serial verbs of motion in ASL

As in the DTS data, we here include not only signs with the three w/e classifiers, but also some lexical verbs of motion and location, namely, CHASE, CLIMB, ESCAPE, INSIDE, INTO, ROLL, OUT, CHASE (two A handshapes), RUN(bC) (two bC hands), RUN(S) (two fists), and THROW, but only if, somewhere in the data, they are same-event verbs with a verb with one of the classifiers 1-cl, 2-cl, or 1-Parallel. We base the categorization of the lexical signs on how they are used in the data (4).

(4) Categories of lexical signs regarding manner and path in ASL

A. *Manner of motion verbs:* signs with BPCLs, including handling classifiers, and the lexical signs CLIMB, INSIDE, RUN(S), ROLL, and THROW

B. *Path of motion verbs:* signs with w/e classifiers and the lexical signs CHASE, ESCAPE, INTO, OFF, OUT, and RUN(bC)

In the ASL data as in the DTS data, we see that verbs making up their own clause are mainly of the w/e type or lexical path verbs. But, in the ASL data, some lexical manner verbs (e.g., ROLL and CLIMB) as well as manner signs with classifiers also occur as the sole verb of the clause (cf. Aikhenvald’s 2018 definition of serial verb

⁹ One of the reviewers asked whether those sequences of same-event verbs that could not be categorized as serial verb constructions were instances where the two verbs occurred in different clauses. We did not make an exhaustive categorization of all the same-event verbs (Section 7), but some of those that did not occur in serial verb constructions are cases of verb doubling (see Section 8.3).



Figure 22: The three verbs of example (5). The first two are same-event verbs and constitute a manner–path sequence.

constructions). For instance, one signer describes Sylvester’s running away with his catch by means of a manner verb with the BPCL legs classifier: the signer’s body represents Sylvester, and the index fingers making alternating circles at the signer’s sides represent his legs, there is no path verb.

We know from Supalla (1990) that ASL has serial verb constructions of the manner–path type. That analysis is confirmed by the data in this study. There are altogether 33 manner–path sequences in the data, including a few with either two manner verbs in the first position or two path verbs in the second position. By contrast, there are only two path–manner constructions. An example of a manner–path sequence is seen in (6) with a description of how Sylvester climbs a pipe and gets to Tweety Bird’s windowsill (Figure 22).

(5) ASL DR, Episode 2, ‘Sylvester climbs up pipe’

DH: CLIMB 2-cl+straight-up-on-NDH 2-cl+straight-down-onto-NDH /

NDH: CLIMB flat-hand-vertical+hold----flat-hand-horizontal+hold-----

“(Sylvester) climbs (the pipe) and places himself on (Tweety Bird’s windowsill).”

The manner verb CLIMB is made with two claw-like hands. The signer places alternately one hand a little above the other, which gives the impression that Sylvester is climbing upward. But the verb does not show details of the path. By contrast, the following verb with 2-cl can show such details independently of the signer’s body, in the example the path is a straight line upward on a vertical surface (see the second picture in Figure 22) and onto the NDH representing the windowsill. The first two verbs are same-event verbs and constitute a serial verb construction, but the last verb adds further details about the path and does not belong to the serial verb construction.

The proportion between manner–path sequences and path–manner sequences is more in favor of manner–path sequences in ASL than in DTS. In DTS there were nine path–manner sequences to 33 manner–path sequences. In the ASL data, there are two path–manner examples to 33 manner–path sequences. The two path–manner sequences are made by two different ASL signers. One of the signers describes Sylvester’s climbing a pole, this time in the opposite order of example (5): first a path verb with 2-cl (without arrival) and then CLIMB. The other signer describes Tweety Bird’s going offstage by means of a path sign with 1-cl followed by a manner sign with a BPCL representing wings. In the latter sign, the signer orientates his body to the left. Both sequences are atelic. There are also a few instances of three verbs: both manner–path–manner and path–manner–path sequences, with the second verb a repetition of the first (Section 8.3).

Although there are differences in the proportions of the types of sequences in the two languages, the languages are very similar with respect to serial verb constructions of motion and location. They both prefer manner–path constructions to path–manner constructions, possibly here reflecting a universal trend towards the manner-before-path order (cf. Slobin and Hoiting 1994). Another explanation may be that the occurrence of final path signs makes it possible to express telic motion, either boundary crossing or arrival somewhere. Manner signs in general express atelic motion unless they are accompanied by a path sign. In sequences of three verbs both languages prefer path–manner–path series, which again makes it possible to end with a sign

that can express boundary crossing and arrival and can be followed by a locative phrase about the boundary or the goal. Thus, rather than describing the orders as influenced by a universal preference for manner before path, we might describe the order as a preference for path last, which reflects order iconicity: the boundary crossing or arrival comes toward or at the end of the motion. The two examples of path–manner in ASL are atelic, and of the nine examples in DTS, six are atelic. The last three path–manner sequences in DTS are made telic by the path verb preceding the manner verb, and they are not followed by any locative phrase. Moreover, the manner verb with raised flat hands about falling seems to imply telecity.

The examples of manner–path–manner and path–manner–path constructions that are described here as serial verb constructions are symptomatic of another shared feature of many sign languages, namely, the trend towards repetitions, which contributes to the large proportion of same-event verbs in the data from both languages. We will turn to examples of these constructions in the next section on verb doubling.

8.3 Verb doubling

Fischer and Janis (1990) described a type of repetition of verbs in ASL as *verb sandwiches*, i.e., constructions where two tokens of the same lexical verb share a subject, the last token has different inflections than the first one, for instance, continuous aspect or plural, and between the two tokens the object and/or an adjunct can occur. Fischer and Janis suggest that the reason for the construction is “a general constraint on the amount of information that can be carried by a single verb” (1990, 285), and, in that respect, they see a parallel between verb sandwiches and serial verb constructions: serial verb constructions avoid informational heaviness by splitting up manner and path on two verbs, verb sandwiches avoid heaviness by splitting up verb plus object or adjunct and verb plus inflections – or rather verb plus different inflections since both verbs may be inflected, as pointed out in a footnote by Fischer and Janis (1990, 282).

Liddell (2003, 64) provides further support for the explanation by pointing out that a verb inflected for aspect cannot occur with an overt object in ASL. But there is a general tendency to repeat signs in ASL and other sign languages even when the two versions of a sign do not contribute different information, as we already saw in the path–manner–path and manner–path–manner sequences of serial verb constructions where the first and the last verb may be identical (Section 8.2). Moreover, it is well-known that many sign languages repeat question words and/or pronouns (e.g., RSL, NGT [Kimmelman 2012, 2019], and Flemish Sign Language [VGT] [Vermeerbergen and Engberg-Pedersen 2024]). Fischer and Janis’ (1990) own article includes several examples of repetitions of identical forms, e.g., repetition of a negative modal and a pronoun in ME WON’T USE NEXT TIME, WON’T, ME ‘she swears not to use it again’, and repetition of FINISH in H-A-R-R-I-E-T FINISH WASH-CLOTHING FINISH... ‘When Harriet is done with the wash, [...]’

Pinsonneault (1994) found as many repetitions of the same form of the verb as verb sandwiches proper in her data from *Langue des signes québécoise* (LSQ); she uses the term *verb echo* as a superordinate term for both types. Analyzing elicited data with single sentences from Croatian Sign Language, Milković *et al.* (2006) distinguish verb sandwiches and what they call *verb echoes*. They characterize verb sandwiches as constructions where the second verb is informationally richer than the first verb. In verb echo constructions, the two verbs are identical in form. In a study on word order in RSL, Kimmelman (2019) uses *verb doubling* as the superordinate term and distinguishes verb sandwiches and verb echoes in the same way as Milković *et al.* (2006). Kimmelman finds both verb echoes and verb sandwiches in RSL. In the verb sandwiches the second verb is always the one that is more marked in his data. Proske (2020) also finds both instances of identical verbs and instances where one verb is more marked than the other in German Sign Language (DGS); in contrast to Kimmelman’s results, the marked one is not necessarily the last one in DGS. In an appendix to a study on word order in Libras (Brazilian Sign Language), Napoli *et al.* (2017) mention one more instance of doubling: SVOV constructions where “the two Vs in the construction share (part of) their sense” (Napoli *et al.* 2017, 664). An example from Libras would be a verb meaning ‘build’ followed by a verb meaning ‘build with bricks’. They call the Fischer-Janis type of verb sandwich *type-same* and the last one *type-different*.

Koenders (2024) raises the possibility that the prominence of doubling of heads and phrases of all sorts in HKSL indicates that HKSL is a focus-prominent language. Like Kimmelman (2019) she distinguishes clause-

internal doubling from other types of doubling such as index doubling. What is relevant in the context of this article is primarily clause-internal doubling of verbs. Clause-internal doubling is the most frequent type in Koender's data from HKSL. The doubled constituent “must refer to the same referent or event/action/state and must be essentially the same lexical word, though either of the two copies may show morphological/phonetic modification” (Koenders 2024, 141). However, modifications are infrequent in her data, and as in DGS, the modified constituent may be either first or last. In by far most cases of clause-internal doubling the pattern is *XYX*. All sorts of elements may be doubled clause-internally in HKSL, but the most frequent group of elements are predicative adjectives, verbs, and verb phrases, i.e., constituents in predicate function like the ones we focus on in this article.

Kimmelman (2019) discusses clause-internal doubling in RSL and NGT, where also any type of constituent can be doubled, and as in HKSL, doubling can be continuous (a *XX* pattern) or discontinuous with something in between (a *XYX* pattern). The most frequent type of doubling in RSL is verb doubling, and in NGT it is clause doubling. In both languages the most frequent pattern is doubling with identical forms in the two positions except for possible differences in phonetic weight; the first occurrence is usually stronger than the copy. Kimmelman (2019) points out that since the two forms are morphologically identical in most cases, Fischer and Janis' (1990) explanation for verb sandwiches – that the information is spread out over several signs – does not work for most of the cases of doubling in the data from RSL and NGT. Instead, Kimmelman suggests that the main function of doubling the *XYX* type is to foreground the doubled element and background the element in between.

As this short overview makes clear, verb doubling of several types may be part of a larger pattern of constituent repetition in sign languages. Moreover, doubling is seen in sign languages that are not historically related such as ASL and DGS. In what follows, we will examine how signs with the classifiers 1-cl, 2-cl, and 1-Parallel behave in such constructions; i.e., we include all examples of doubling of verbs with 1-cl, 2-cl, or 1-Parallel in the data from first DTS and then ASL. The constructions all include another constituent than a verb of motion or location between the two same-event verbs, i.e., examples of path-manner-path and manner-path-manner sequences are excluded here although they could also be seen as examples of verb doubling.

8.3.1 Verb doubling in DTS

The DTS signers use altogether fifty-three examples of verb doubling with signs with the same classifier – either 1-cl, 2-cl, or 1-Parallel – and the same movement on each side of a constituent (between eight and sixteen examples per signer). An example is seen in (6), which follows a description of how Sylvester flies up from a seesaw.

- (6) DTS HE, Episode 6, ‘catapult’
 DH: ...2-cl+arc+loc WINDOW BOARD 2-cl+arc+loc /
 NDH: Flat-surface+hold WINDOW BOARD-----

“and lands on the windowsill.”

The prosody with a clear head nod at the end shows that the sentence finishes after the second version of the verb. There is a smaller nod on the first token of 2-cl+arc+loc; it is simultaneous with the verb and underlines +loc about getting to a stop. The constituent WINDOW BOARD is the goal. In (6), the two versions of the verb are not totally identical: in the first combination of the dominant and the NDH, the handshape of the NDH represents the wall that Sylvester was passing on his way up from the catapult, i.e., a vertical wall, in the second combination, the handshape of the NDH represents the horizontal windowsill.

In (7), the middle constituent THINK describes the topical argument's simultaneous activity.

- (7) DTS AA, Episode 3, ‘Sylvester climbs up pipe’
 DH: 2-cl+straight-back-and-forth THINK 2-cl+straight-back-and-forth /
 NDH: ... Flat-surface+hold-----

“(Sylvester) goes back and forth thinking (about how to catch Tweety Bird).”



Figure 23: The two verbs of example (8): CLIMB and the verb with 1-Parallel, first position and a later position.

Based on a comparable corpus of retellings of the *Canary Row* cartoon, Kimmelman (2019, 190–1) describes similar examples from RSL and NGT as cases of clause doubling. Whether such examples are instances of clause-internal verb doubling or clause-doubling depends on which features are defined as constituting clause boundaries. In (7), simultaneously with the verbs with classifiers, the signer looks at her hands, and while signing THINK she looks up left in a direction that represents Tweety Bird’s window. But these changes in gaze direction are motivated by the content of the verbs and cannot be seen as arguments for separating the three verbs into three clauses. Moreover, the NDH, which represents the ground, was established before the sequence and is maintained when the three verb signs are made. We are inclined to see this as a case of clause-internal doubling.

The sequences may include three identical verbs; in one case, the signer mentions a simultaneous activity (THINK) between the first and the second version of a verb with 2-cl, and between the second and the third version, she mentions the location (IX CORNER ‘at the corner’). In the data, the location is particularly frequent between the two verbs as in example (6), but also the topical argument, a verb about a simultaneous activity as in example (7), a clause about the content of the referent’s thinking, and a clause about the reason why the event takes place (with an explanation of fifteen signs) occur between the two verbs. When there are clearly clause boundaries between the two instances of the verb, the doubling is of the clause-doubling type. A reason for the repetition of the sign in such constructions may be that it allows the signer to get back to talking about a sequence of events involving a specific referent in the continuation after the second verb.

The above examples are all of the echo type in that the second verb is made with the same classifier and the same movement as the first verb. There are no examples of verb sandwiches with different aspectual inflections on the two verbs in the data, but there are a few instances where the second verb repeats the movement of the first verb, but then stops, either abruptly to indicate that the protagonist has stopped the motion, or the movement of the hand stops as the focus shifts to the signer’s facial expression, indicating that the protagonist realizes something. Here the event described by the last verb is backgrounded, and the protagonist’s emotions as expressed by the signer’s face are foregrounded (cf. Engberg-Pedersen 2011).

In the DTS data, there are altogether eight examples where the two verbs describe the same event with a constituent in between, but with verbs that are not identical. One or both verbs include either 1-cl, 2-cl, or 1-Parallel, but the other may be a lexical verb of motion or location or a motion verb with a handling classifier. We will use *semantic doubling* about this phenomenon as the verbs share the semantic feature motion, but otherwise differ in meaning.

In (8) the first verb is a manner verb, CLIMB, formed with a BPCL, the second verb is a path verb with 1-Parallel (Figure 23).

(8) DTS HE, Episode 8, ‘electric wires’

DH: CLIMB PIPE PIPE 1-Parallel+straight-up LINE_{up} ...
 NDH: CLIMB PIPE PIPE point-buoy----- LINE_{up}

“He climbs a pipe up to wires [...]”

The path verb allows the signer to go on to describe the wires for the tram as the goal. In between the two verbs, the signer mentions the location of the climbing, the pipe. Thus, (8) is a construction with a manner–path sequence with the location inserted between the two verbs. We have not classified this as a serial verb construction although such constructions may include a constituent between the two verbs. It is indeed an area where semantic doubling overlaps with serial motion verbs. It is clearly a manner–path sequence. The example also shows that the atelic manner verb CLIMB can combine with a location constituent in contrast to the goal LINE_{up} in the same example which occurs after the path verb 1+Parallel+straight-up.

In (9) the signer uses two path verbs, one lexical (IND) before the noun indicating the location and one with 2-cl after the noun.¹⁰

(9) DTS HO, Episode 1, ‘dogs and cats not allowed’

DH: IND DOOR 2-cl+straight-forwards /
 NDH: IND DOOR-----

“He enters through the door.”

Signers may also vary between a path verb with 1-Parallel and one with 2-cl and between one with 2-cl and one with 1-cl. Most of the sequences of semantic doubling are made with signs with 2-cl and 1-Parallel. Thus, there is no indication that the construction semantic doubling in itself encourages either one or the other classifier. All examples but one have locatives in the middle position; the one exception is a verb about a simultaneous activity (THINK).

Whatever the explanation for the phenomenon, the existence of verb doubling of the echo type and the semantic type contributes to the high number of same-event verbs in signed discourse.

8.3.2 Verb doubling in ASL

The ASL signers use altogether 38 tokens of verb echoes that involve one of the three classifiers 1-cl, 2-cl, or 1-Parallel (from one to eight tokens per signer). The verb echoes in ASL include middle constituents of the same semantic kinds as in DTS, e.g., the location (IX_{up} BOARD in example [10] and BUILDING TALL in [11]), the topical argument’s simultaneous activity (PONDER in example [11]), or the topical argument’s state of mind.

(10) ASL HM, Episode 3, ‘bowling ball’

DH: BIRD 2-cl+on-NDH IX_{up} BOARD 2-cl+on-NDH
 NDH: IX_{up}----- Flat-object+hold-- BOARD-----

“The bird is on the windowsill [...]”

(11) ASL KN, Episode 3, ‘bowling ball’

DH: CAT 1-cl+straight-back-and-forth BUILDING TALL 1-cl+straight-back-and-forth
 NDH: CAT Flat-object+hold----- BUILDING TALL Flat-object+hold-----

DH: PONDER 1-cl+straight-back-and-forth ...
 NDH: PONDER Flat-object+hold-----

“The cat is going back and forth at the high-rise thinking when he [...]”

There is also an example with a description of the contents of the topical argument’s thinking between two verbs with 2-cl, and a sequence with three verbs as in DTS. That is, the constructions are similar to the ones

¹⁰ Unfortunately, the video is so dark that still-photos from the video would not be of much help.

found in the DTS data, even to the extent that the same events in the videos give rise to the same echo constructions such as Sylvester’s pacing back and forth.

In the ASL data, there are seven examples of semantic doubling where one of the signs includes either 1-cl, 2-cl, or 1-Parallel. In (12), a description of the location appears between the two verbs:

- (12) ASL KN, Episode 2, ‘swinging in the cage’
 DH: THROW_{sl-fr} 2-cl+arching-from-behind-NDH-forwards WINDOW
 NDH: THROW_{sl-fr} Surface-vertical+hold----- WINDOW---

 DH: 1-Parallel+arching-from-NDH-forwards /
 NDH: -----

“(He) is thrown out of the window and flies out.”

In (12), the agent of the first verb *THROW*, based on a sign with a handling classifier, is not mentioned. It is followed by two verbs, one with 2-cl, the other with 1-Parallel. In between the two non-identical verbs of motion, we find a locative constituent *WINDOW* (cf. Figure 17 from DTS, which is almost identical to (12) except that the two path verbs are not separated by the location *WINDOW*). In the ASL examples of semantic doubling, we see descriptions of the location, especially the goal and the source, and of a simultaneous activity between the two verbs.

Among the seven examples of semantic doubling, there are two examples with 1-Parallel followed by 2-cl and one in the order 2-cl followed by 1-cl. There are also examples where either 1-cl, 2-cl, or 1-Parallel doubles with a different type of verb. Thus, it is unlikely that the doubling construction in itself encourages one classifier or the other. Rather the explanation should be sought in the different meanings of the three classifiers.

The similarities between verb doubling of both types in the two languages are striking. The reason why there are not nearly as many tokens of semantic doubling as echo verb constructions in the two languages may be priming: the signers repeat what they just used.

In sum, in both DTS and ASL signs with the three classifiers 1-cl, 2-cl, and 1-Parallel occur in both serial verb constructions, verb echoes, and semantic doubling. These constructions – or types of sequences – are seen with both classifier verbs and other kinds of verbs in many sign languages even when they are not genetically related. The explanation may very well be that doubling is a way of foregrounding the verbs, as suggested by Kimmelman (2019). A specific reason for verb doubling may, at least in some cases, also be that it allows signers to develop sequences of events. When the signers describe Sylvester pacing and repeat the verb about pacing, for instance, after mentioning the location, the repetition allows them to stop in the middle of the last ‘pacing’ verb and describe how Sylvester suddenly gets an idea. Or the signers may describe only motion in the first verb and motion and arrival in the second verb. In such ways, they link two events, pacing and getting an idea, or moving and arriving, iconically in the description, but they can at the same time mention circumstances such as the location in between the two verbs.

9 Conclusion

Both 1-cl and 2-cl can be used by humans and anthropomorphic beings, and in this article, we have compared the choice of classifier in verbs of motion and location in ASL and DTS from several angles. Given the frequent use of 1-Parallel in DTS and its formal differences from 1-cl, we separated out 1-cl and 1-Parallel.

First, we examined whether the distribution of the different forms, the 1-handshape in 1-cl and 1-Parallel vs the 2-handshape in 2-cl, could be explained by ease of articulation as the handshapes of these classifiers differ in complexity on the features Selected Finger and Joint Configuration. The handshape of 1-cl/1-Parallel is a low complexity handshape, the handshape of 2-cl has medium complexity. Therefore, if the only influence on the choice between 1-cl/1-Parallel and 2-cl was phonological, it could be expected that signers would prefer 1-cl/

1-Parallel especially in two-handed simultaneous combinations of a sign with the classifier in the active hand and a meaningful handshake without movement in the other hand (always one of Battison's BASCO15 set in the data). However, the choice of classifier does not appear to be strongly influenced by the phonological features of the handshapes, and there are clear differences in how much the signers of ASL and DTS use the two handshapes in signs with the classifiers.

Next through an analysis of classifier choice in specific scenes of the cartoons, we tried to uncover semantic differences between the classifiers in the two languages. The DTS signers clearly prefer 2-cl for atelic walking, whereas the ASL signers use both 1-cl and 2-cl in descriptions of atelic walking, but are individually consistent in their choices. About telic walking in the horizontal plane ('go somewhere'), the ASL signers almost all use 1-cl, whereas the DTS signers still prefer signs with 2-cl, but use more signs with 1-cl proportionately than in the descriptions of atelic walking. Finally, in descriptions of moving on a difficult ground, the DTS signers again prefer signs with 2-cl, to some extent 1-Parallel, especially about vertical motion. The ASL signers here prefer 2-cl, but not to the same extent as the DTS signers. In sum, there are clear differences in the use of signs with 1-cl and 2-cl in the two languages. That indicates that the two classifiers do not have the same meaning in ASL and DTS despite some formal parallels. Or, put differently, the two classifiers have language-specific meanings, which are lexicalized in the sense that they cannot be predicted based on their iconicity. Moreover, there are formal differences with probably semantic consequences between 1-cl and 1-Parallel in the two languages: the ASL signers, and not the DTS signers, use hand-internal movements in both classifiers.

Despite these differences, we found that the semantic feature volitionality influences the amount of hand-internal movement of the handshapes in the classifier signs in both languages. Although there are many cases of volitional actions described by means of signs with no hand-internal movement, there is a clear preference for hand-internal movement to occur in descriptions of volitional actions, and this is true of both languages.

Finally, we examined the occurrence of signs with 1-cl, 2-cl, and 1-Parallel in two types of sequential patterns, serial verb constructions and verb doubling, the latter with two subtypes, verb echoes with identical verbs on either side of a constituent, and semantic doubling with different verbs describing the same event on either side of a constituent. We found that all three classifiers occur in all three types of constructions in both languages.

Because of their semantic differences, using sequences of several verbs with different classifiers and lexical verbs of motion allows signers to describe different aspects of the events. We saw that especially in serial verb constructions, and these constructions also showed that different verbs have different possibilities of combining with other constituents. Manner verbs rarely describe telic motion, whereas verbs with at least some w/e classifiers can describe how a motion comes to a stop and can take a goal argument. There are also indications in the data that the articulator in signs with 1-Parallel cannot touch the articulator of another sign, but the articulator of 2-cl can, which may induce a signer to change from a sign with one to the other classifier.

The study has shown that the signs with classifiers differ the most crosslinguistically at what can be described as the lexical – unpredictable and language-specific – level (see also Engberg-Pedersen 1993, Kimmelman and Khristoforova 2025). We see also that in choosing classifiers, phonological considerations are demoted with respect to those related to meaning. The current work also confirms that, rather than considering the classifier as the whole unit of analysis, semantic distinctions such as volitionality can be responsible for formal features of classifiers such as hand-internal movement.

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Appendix

The examples in the text are simplified annotations of the video examples, limited to what is relevant in relation to the text. In the examples the activities in the dominant hand (DH) are written in the upper line, the simultaneous activities of the nondominant hand (NDH) in the lower line.

WINDOW: Glosses for manual signs are written with small capitals.

BOARD-----: The broken line indicates that the NDH used for the sign BOARD perseveres until the line stops.

2-cl+straight-down+loc: Annotations for signs with classifiers start with the classifier, and after +, the sign's movement and other relevant information are described in words. Two + signs indicate that the movement of the hand changes in the duration of the sign.

+loc: This annotation means that the movement of the hand comes to an abrupt stop, which means either that a motion ends (arrival) or that something is positioned (stationary) somewhere.

+hold: This annotation means that the hand does not move, and whatever it signifies is backgrounded (Engberg-Pedersen 2011).

1-cl: Annotation for a classifier which can be seen in Figure 2a and b.

2-cl: Annotation for a classifier which can be seen in Figure 2c and d.

1-Parallel: Annotation for a classifier expressed by the 1-handshape. The differences between 1-cl and 1-Parallel are explained in Sections 1 and 5.

/: The slash indicates a prosodic boundary, i.e., a boundary marked by, for instance, a lengthening of the final position of the hands in a sign or a change in facial expression or head position.

THROW_{sl-fr}: In the production of the sign, the hands are at the signer's left side and face forwards right.

IX: Annotation for a pointing sign.

Point-buoy: A pointing sign that indicates the start position of the hand in the sign made with the DH.