The count-mass distinction in Hong Kong Sign Language

A typological study into the surface manifestations and the grammatical encoding of the count-mass distinction in Hong Kong Sign Language using the framework of Distributed Morphology

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In terms of spoken language research, the count-mass distinction (CMD) has been explored from a multitude of angles. Nevertheless, research on sign language CMDs has thus far been limited to Koulidobrova's (2021) study on American Sign Language (ASL).

The aim of this new study is twofold: firstly, to offer a first and thorough exploration of the Hong Kong Sign Language (HKSL) CMD; and secondly, to enrich the existing discourse on CMDs with sign linguistic data. The main research question addressed, is what the surface manifestations of the HKSL CMD are and where in the grammar the CMD is encoded. The theoretical framework used for this syntactic analysis is that of Distributed Morphology (DM). DM holds that the internal structure of words is operated by syntax which is the only computational component of the grammar.

This study also places the HKSL CMD in typological perspective by adopting Chierchia's (2010) CMD typology. Furthermore, the DM account of the HKSL CMD encoding is extended to all three CMD types from Chierchia's typology. By doing so, this study increases our understanding of the cross-linguistic and cross-modal differences that exist between languages, whilst at the same time showing that sign languages fit within the existing language typologies.

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Background to the study

The discourse on CMDs in spoken languages is extensive and pertains to different areas, such as (morpho)syntax, semantics, acquisition, processing, and language typology. The crux of the discussion on the difference between count and mass nouns is that the former presuppose atomic referents, and this atomicity is reflected in the grammar, for example, by allowing for the direct combination with numerals, individuating quantifiers, and plural morphology. The latter, on the other hand, denote substances that cannot be counted, rather than atomic units. Another feature of countability is the presence or absence of a conceptual or physical boundary (Jackendoff 1991; Franzon et al. 2021): dogs are bounded objects, whereas substances like water do not have pertinent boundaries. The different characteristics of count and mass nouns are referred to as "diagnostics".

Of the different ways to approach the topic of CMDs, this study takes a primarily morpho-syntactic approach because it aims to identify the ways in which HKSL count and mass nouns can be identified based on their syntactic behavior. The most notable existing count-mass diagnostics from spoken language research are that (i) count nouns can pluralize while mass nouns cannot; (ii) count nouns combine directly with numerals, but mass nouns cannot; (iii) certain quantifiers are restricted to count nouns and others to mass nouns; and (iv) count nouns compare based on number, whereas mass nouns compare based on volume (Bale & Barner 2009, 2012).

In terms of CMD typology, this study adopts Chierchia's (2010, 2021) typology, which classifies languages into three types based on whether nouns can combine directly with numerals or exhibit number marking (2021: 22):

Type I: Number marking languages:
Some nouns may combine directly with numerals, others need the intervention of a classifier or a measure phrase.
e.g., English: *three chairs* vs. **three blood(s)*

Type II: Classifier languages:
No noun can combine directly with numerals; the presence of (overt) classifiers is always required.
e.g., Cantonese:
*yāt *(jek) gáu* – one *(CL:animal) dog – 'one dog'

Type III: Languages with generalized numerals:
All nouns combine freely with numerals.
e.g., Nez Perce:
lepit cickan – two blanket – 'two blankets'
and
lepit kieke't – two blood – 'two quantities of blood'

(Deal 2017; Chierchia 2021: 22)

Count-mass distinctions in sign linguistics

CMD diagnostics do not yet exist for sign languages. The CMD has only been discussed in the context of sign linguistics by one earlier study, namely Koulidobrova (2021), who works on ASL. According to her research, in ASL, the distinction between count and mass nouns is only accessible in conjunctions and in pseudo-partitive constructions. All other existing CMD diagnostics from spoken language research fail to bring the ASL CMD to the surface. For example, ASL count and mass nouns may both combine directly with numerals: THREE BOOK, but also THREE BLOOD. ASL also allows for the pluralization (through reduplication) of mass nouns: $\text{SHIT}_{\text{arc}}{}^{>+>+}$ 'shit.PL' (2021: 215 (6a–b)). Koulidobrova thus argues that ASL is a Type III language according to Chierchia's (2010) CMD typology.

Methodology

Two sources were used to gather the data used in this study: (i) corpus data and (ii) experimental data. The corpus data consisted of the coding and analyzing of all nominal entries in the Asian Signbank (ASB) and free narrative and conversation data.[1] The ASB is an online lexical database developed by the CSLDS for the storage of sign entries and for the purpose of sign analysis at the level of phonology. The interface of the ASB allows for the filtering of signs based on specific characteristics, e.g., country of origin, word class, finger selection, etc. I coded the HKSL nominal entries for several features, including whether they combined directly with numerals.

The experimental data comes from two rounds of experiments. The participants of these experiments were eleven Deaf native signers of HKSL between the ages of 30 and 45 years old. All eleven participants were born to two Deaf parents, acquired HKSL as their native language, graduated from Deaf schools, and use HKSL as their primary means of communication in work and daily life. The first experiment was a gap-filling task. The design of this task is based on a novel approach taken by Van Boven (2020), who applied a gap-filling task in the context of sign languages in order to elicit nominal plurals from Sign Language of The Netherlands (NGT) users. The task circumvents the often-recognized problem in sign language elicitation tasks that make use of images, namely that of the spatial configuration depicted in the image. I translated Van Boven's experimental methods to the context of eliciting noun countability in HKSL. The stimuli designed

1. Property of the Centre for Sign Linguistics and Deaf Studies: http://cslds.org/asiansignbank/

for this adaptation will test whether signers are comfortable combining carefully selected nouns directly with numerals. These stimuli address Chierchia's (2010, 2021) claim that it is countability – i.e., the direct combination with numerals – that can bring the CMD to the surface.

The second experiment took place a month after the first experiment and consisted of three tasks: (i) a grammaticality judgement task; (ii) an image description task; and (iii) an interpretation task. For the grammaticality judgement task, the participants were shown a video on a computer screen in which my native signer consultant signed an utterance. Participants were then asked to score the utterance on a Likert Scale of 1 to 5. For the second task, the participants were shown images of count and mass referents contained in a type of container (e.g., a box or a jar) and then asked to describe the image. For the interpretation task, participants were shown a different set of short clips of my native signer consultant signing sentences (i.e., CPs) or parts of sentences (i.e., NPs) and then asked to state what interpretations came to mind after watching the video clip. The participants also had the opportunity to comment on the grammaticality or acceptability of the utterances in the video clips.

The Hong Kong Sign Language count-mass distinction

The major conclusions that can be drawn from the analysis of the data gathered for this study are the following:

i. Based on Chierchia's (2010, 2021) criterion for noun countability, of the 700 lexical nouns from the ASB that were coded and analyzed for this study, 558 (79.7%) are count nouns and 142 (20.3%) are mass nouns. The intervention of a classifier is necessary to combine mass nouns with numerals: WATER *(CL:cup) THREE 'three *(cups of) water.'

ii. Of those mass nouns, the majority can be coerced into a count interpretation with sufficient context, thus undergoing a reference shift. The Universal Sorter and the Universal Packager are available to HKSL. In order to achieve the sorting effect of the Universal Sorter, HKSL requires adjectival post-modification, e.g., IX_{loc} (=shop) SHOP SELL WINE ALL-KINDS-OF 'That shop sells many wines'. The two adjectives ALL-KINDS-OF and DIFFERENT "sort" mass into types. In DM, the Narrow Lexicon does not only provide roots, but also features and functional heads. Following Acquaviva (2009), root-related lexical properties are constructional, and though roots lack features, features are located elsewhere in the syntactic structure, and they are what drive the derivation, for example through selectional criteria. If the

Narrow Lexicon introduces a [+sorting] or [+type] feature into the derivation, this could select the adjectives DIFFERENT and ALL-KINDS-OF.

The Universal Packager is available to HKSL under circumstances of familiarity. In a restaurant, one could ask for COFFEE TWO, TEA ONE, WATER THREE 'two coffees, one tea, and three waters'. I follow Borer (2005), who argues that what heads the classifier phrase (ClP) can assign range to <e>div, ClP being the dividing structure necessary for creating countable units. Presumably, the use of the Universal Packager involves the elision of the mensural numeral classifier in ClP.

iii. Based on the above-mentioned data, HKSL fits into Chierchia's CMD typology as a Type I language. The reason that classifier intervention between mass noun and numeral is necessary in Type I languages, according to Chierchia (2021), is because unlike count nouns, mass nouns do not have stable atoms. Number (i.e., singular/plural) presupposes the presence of stable atomicity (2021: 42). Chierchia (2021), like Rothstein (2010), believes that mass nouns are also atomic, but due to the vagueness of mass atoms, they do not combine directly with numerals.

iv. HKSL being a Type I language means that HKSL and ASL are typologically distinct. This is further evidenced by the fact that the ASL CMD diagnostics proposed by Koulidobrova – namely, count-mass conjunction and partitive constructions – fail to bring the HKSL CMD to the surface. Notice how count-mass conjunction is allowed in HKSL – e.g., RICE_a BOOK_b GIVE_1 'give me rice and a book' – and how HKSL mass nouns can occur in partitive constructions – e.g., OIL_i BUY {THREE/FEW} ~~OIL~~$_i$ 'Buy (me) three (bottles of)/a bit of oil'.

v. Reduplication of the noun is not a productive means of pluralization in HKSL. HKSL count nouns use zero marking instead (cf. Pfau & Steinbach 2006): DOG-Ø TWO 'two dogs'.

vi. HKSL mass nouns may not be modified by count adjectives. Count adjectives describe features of the referent that are related to its pertinent boundaries, for example SMALL and LARGE, as well as adjectives pertaining to shape, such as OVAL. In order to combine mass nouns and count adjectives, the intervention of a classifier is necessary: GOLD *(CL:SYCEE) SMALL 'a small *(piece of) gold'.

vii. HKSL does not contain so-called *collective nouns*, which are nouns that are semantically count, but syntactically behave like mass nouns (e.g., English *footwear, furniture*, or *clothing*). According to Chierchia (2021), it is not uncommon for languages to lack collective nouns, for example, Greek is a Type I language that lacks collective nouns (Tsoulas 2009).

viii. There are no quantifier restrictions in HKSL, i.e., all quantifiers combine with both count and mass nouns.

ix. An aspect of the HKSL CMD that warrants further research is the fact that mass nouns can receive both a volume and a number reading. For example, the stimulus OIL A-LOT 'a lot of oil' received both volume readings – a large puddle of oil, large quantities of oil in the pan while cooking – as well as number readings – many bottles of oil.

Grammatical encoding of [count] using Distributed Morphology

DM has the explanatory power to underpin the surface manifestations of the HKSL CMD whilst also allowing the option to avoid choosing between the CMD as a lexical or a syntactic phenomenon. First introduced by Halle & Marantz (1993), DM has as its main premise that the morphological and syntactical domains are governed by the same processes. This means that the internal structure of words is operated by syntax, which is the only computational component of the grammar (Kelly 2013). DM does away with the role traditionally assigned to the Lexicon and distributes the lexical materials throughout other components of the model. The Root Hypothesis of DM states that roots – like √break – contain no grammatical features, and that syntax is the grammar's sole computational component (Marantz 1997). Thus, roots are "category-neutral" (Embick 2021:70).

In this study on HKSL, I assume HKSL nouns to be complex root compounds which receive a grammatical category when merged with a functional head in syntax. The feature [±count] is located under the category node little *n* with which the rootPhrase merges in syntax. Inspired by Embick & Noyer (2012), I propose the following structure, in which the [±count] feature is in a local relationship with the phonological root merged under little *n*. Through this local relationship, the root has become categorized for [±count].

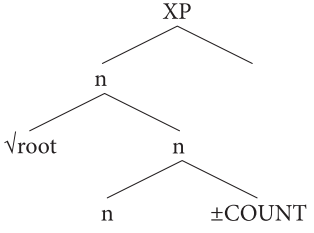


Figure 1. The [±count] feature under little *n*

The complementary distribution between classifiers and number marking has been pointed out by many researchers (e.g., Borer 2005; Bale & Khanjian 2008; Nomoto 2013; among others). Therefore, researchers have proposed syntactic structures in which number marking and classifiers occupy the same position. I follow this view and call the projection that houses numeral classifiers and plural marking (Ø) ClP. Based on whether an *n*P is [+count] or [−count], the HKSL ClP thus contains either plural marking or a classifier, respectively.

Continuing to follow Chierchia's (2010) threefold CMD typology, the above analysis suits HKSL as a Type I language. However, this DM account can also account for the typological variation between the three types. For Type II languages, all nouns require the intervention of numeral classifiers before numerals. Following my proposed analysis, the structure of Type I and Type II languages is the same. Noun countability is established at the *n*P level. However, for Type II ClPs, number marking is not available, only classifiers can head ClP. If ClP is merged with a [+count] *n*P, ClP is headed by a sortal classifier, whereas if *n*P is [−count], ClP is headed by a mensural classifier (cf. Cheng & Sybesma 1999). For Type III languages, all nouns combine freely with numerals. The reason for this lies in the nature of Type III numerals. According to Chierchia, numerals are property modifiers of type <<s,et>, <s,et>> (2021: 36). All Type II nouns and Type I mass nouns are kind-denoting, <s,e>, and therefore, there is type mismatch between noun and numeral. Following Chierchia's (2021) argumentation, nouns in Type III languages must be property-denoting, for this would mean that there is no mismatch between numeral and noun types. As Koulidobrova herself points out, there is preliminary evidence that ASL nouns begin their lives as properties (2021: 231).

Significance

The significance of this study on the HKSL CMD can be summarized as follows:

i. This study adds to the knowledge of CMDs in sign languages. Following Koulidobrova's (2021) work on ASL, this study is the second study in existence that investigates CMDs in a sign language. In doing so, it might provide a blueprint for other sign linguists to pursue this topic for their respective sign languages.
ii. Comparing ASL and HKSL in terms of their CMDs has shown that sign languages are not monolithic in how they express and encode CMDs.
iii. The more sign linguistic accounts on CMD are published, the more likely it will be that sign language data are incorporated into the existing CMD

discourse. A cross-modal approach to CMDs would greatly benefit the discourse as a whole. For example, Koulidobrova's ASL CMD diagnostics are not attested for any spoken language and would therefore be a valuable addition to the general linguistic literature on count-mass distinctions. Similarly, the fact that HKSL is a Type I language but lacks collective nouns is typologically rare (cf. Chierchia 2021).

iv. The DM account proposed in this study can be extended to all three CMD types found in Chierchia's typology. The benefit of a DM account is that it does away with the necessity to choose between the lexicon or syntax as the location of grammatical encoding for the CMD, as is currently the case in the discourse.

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