Emily Koenders*

The count-mass distinction in Hong Kong Sign Language: an intra- and cross-modal comparison
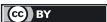
Abstract: This article is in part an intra- and cross-modal comparison of the count-mass distinction (CMD) in Hong Kong Sign Language (HKSL). For the intra-modal analysis, HKSL data are compared to data found in Koulidobrova's (2021) work on the CMD in American Sign Language/ASL (Koulidobrova, Elena. 2021. Counting (on) bare nouns: Revelations from American Sign Language. In Tibor Kiss, Francis Jeffry Pelletier & Halima Husić (eds.), *Things and Stuff: The Semantics of the Count-Mass Distinction*, 213–231. Cambridge: Cambridge University Press). According to Koulidobrova, the existing diagnostics used in spoken language research are insufficient to bring to light CMDs in sign languages. ASL's CMD is visible in the failure to conjoin count and mass nouns and in the ungrammaticality of partitive constructions containing mass nouns. HKSL and ASL differ from each other in a few respects, among which the two aforementioned ASL diagnostic criteria. Regarding the cross-modal comparison, HKSL and ASL belong to different categories in Chierchia's (2010) count-mass typology (Chierchia, Gennaro. 2010. Mass nouns, vagueness and semantic variation. *Synthese* 174. 99–149). Chierchia's typology is based on CMDs in spoken languages. ASL is a number-neutral language (Type III), whereas HKSL is a number marking language (Type I) and thus patterns with languages like English and Dutch. The CMD in HKSL is visible in its failure to combine mass nouns directly with numerals and count adjectives without the intervention of a classifier. Based on my data analysis, I can furthermore argue that HKSL is a number marking language but that its plural number marking is realised through zero marking.

Keywords: count-mass distinctions; cross-modal comparison; Hong Kong Sign Language; number marking; sign language typology; sign linguistics

*Corresponding author: Emily Koenders**, The Centre for Sign Linguistics and Deaf Studies (CSLDS), The Chinese University of Hong Kong (CUHK), Sha Tin, Hong Kong, E-mail: emilykoenders@gmail.com

1 Introduction

Koulidobrova (2021) offers a first exploration of the count-mass distinction (CMD) in sign languages. Her argument is that the count-mass diagnostics used in spoken language research do not hold for American Sign Language (ASL). Instead, Koulidobrova (2021) devises her own diagnostic to bring the lexically encoded CMD in ASL nouns to the surface and thereby argues for the enrichment of diagnostic criteria so that they may encompass sign languages as well. In the present paper, I will summarise Koulidobrova's findings about ASL's CMD and compare her data to my data on Hong Kong Sign Language (HKSL).

HKSL is the visual-manual language used by members of the Deaf and Hard of Hearing community in Hong Kong. The origins of HKSL can be traced back to when a Deaf signing couple moved from Shanghai and Nanjing (China) to Hong Kong after World War II. They brought local varieties of Chinese Sign Language with them to teach the Hong Kong Deaf community at the Deaf school they established. Prior to this, local signing must have existed in Hong Kong which interacted with the Shanghai/Nanjing signs used in educational settings (Sze et al. 2013; Woodward 1993). HKSL subsequently developed into an independent language.

1.1 Sign languages and language typology

It is a well established fact among sign linguists that sign languages are as diverse and different as any two spoken languages,[1] though of course, due to modality effects, sign languages tend to have some features in common, such as the use of referential loci or non-manuals (cf. Meier 2002, 2012; and see Section 7.3 of Zeshan and Palfreyman [2017: 182–185]). An understanding of modality-specific characteristics is necessary for a cross-modal comparison and typology of features. Previous studies in language typology show intra-modal variation (e.g., Zeshan and Palfreyman 2017, 2020), i.e., variation between different sign languages, and discuss how sign language typology can help rethink and redefine terminology used in spoken language research (e.g., including sign language non-manual features into the definition of suprasegmentals), thus contributing to the broadening of our understanding of cross-modal similarities and differences between sign and spoken languages.

An example of intra-modal variation would be that some sign languages make use of an agreement marker (e.g., the **p**erson **a**greement **m**arker PAM in German Sign Language, DGS [Rathmann 2003]). In (1) below, MAG 'like' is a plain verb that does not

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[1] Note that despite the diversity amongst sign languages, there are also modality-specific characteristics and effects that sign languages share. See, for example, Meier (2002, 2012).

mark agreement between the arguments through spatial modification, PAM occurs as an auxiliary morpheme that shows spatial agreement with the subject ($_i$) and object ($_j$) arguments. On the other hand, some sign languages do not have such agreement markers (e.g., HKSL), as shown in (2), where the plain verb LIKE does not mark agreement with either argument. This is grammatical in HKSL.

(1)   HANS$_i$ **$_i$PAM$_j$** MARIE$_j$ MAG.   *DGS*
       'Hans likes Marie.'
       (Rathmann 2003: 182, [3b])

(2)   FATHER LIKE DOG.   *HKSL*
       'Father likes dogs.'

A large intra-modal cross-linguistic study was done by Zeshan (2004) based on data of 35 different sign languages regarding interrogative constructions. For example, in some sign languages WH-words occur in situ (3), and in others they occur clause-final (4).

(3)   CAR **WHERE** BUY?   *Vlaamse Gebarentaal (VGT)*
       'The car, where did you buy it?'
       (adapted from Zeshan 2004: 24, [16])

(4)   MILK USE-UP **WHO**?   *HKSL*
       'Who drank all the milk?'

Though Zeshan (2004) reports on typological differences for interrogative constructions in different sign languages (i.e., intra-modal), the above example of WH-words can be extended to a cross-modal typological comparison. Similar to the VGT data in (3), languages like Cantonese are WH-in situ (5), whereas English sees movement of WH-words to the left periphery (6).

(5)   你   呢   架   車   係   邊度   買   嘅?   *Cantonese*
       néih   nī   gá   chē   haih   **bīndouh** máaih   gé
       you   this   CL:vehicle   car   to.be   **where**   buy   SFP
       'Where did you buy this car?'

(6)   ***What$_i$ did you eat t$_i$?***   *English*

In languages like English, movement of the WH-word is into a projection in the left periphery. Though on the surface this looks like the opposite of what happens in HKSL (4) – where the WH-word moves to the right periphery – but since HKSL is right-branching (cf. Cecchetto et al. 2009; De Quadros 1999; Koenders 2024b, among others), the underlying mechanism of WH-movement to a peripheral projection is the same. Hence, typologically speaking, English and HKSL can be said to behave the

same in terms of WH-movement. This is an example of a cross-modal perspective on language typology.

Zeshan and Palfreyman (2017, 2020) also differentiate between absolute and relative modality effects. Absolute modality effects are at play when a sign and a spoken language differ from one another in the expression of a grammatical feature due to modality alone. For example, use of space is not readily available to spoken language and is thus largely limited to the sign modality. In such cases, researchers should compare the closest correlate of a grammatical feature in a given spoken language that in the sign language is expressed through use of space (e.g., spoken language prepositions vs. sign language spatial agreement verbs). On the other hand, relative modality effects concern "the frequency of certain structures rather than their existence" (Zeshan and Palfreyman 2017: 208), such as the absence of nominal case marker systems in most sign languages (cf. Makharoblidze [2024], on Georgian Sign Language; Meir [2003], on Israeli Sign Language).

For example, Zeshan and Palfreyman (2017) focus on intra-modal sign language variations for interrogatives, negation, and possession. Such intra-modal typologies show that sign language variation aligns well with existing spoken language typologies, which is why the present study aims to describe the cross-modal comparability of CMDs in sign and spoken languages.

In terms of overall development of sign language typological research, currently some researchers focus on smaller sets of sign languages for comparative studies (e.g., Perniss et al. 2007; Pfau et al. 2022). Furthermore, in order to conduct large-scale typological studies on sign languages, sets of stimulus materials for typological data collection from across sign languages have been developed (Zeshan and Perniss 2008; Zeshan and Sagara 2016) and are being used by researchers studying different sign languages. Finally, efforts exist to include sign languages in typological studies that show cross-modal linguistic diversity (e.g., Dixon and Aikhenvald 2002; Dryer and Haspelmath 2013; Haspelmath et al. 2001; Mantovan 2015; Mantovan and Geraci 2017; Zhang 2007, among others).

Regarding the CMD, Koulidobrova's paper not only aims at uncovering the ASL CMD, but also seeks to draw conclusions about where ASL fits in with Chierchia's (2010) language typology, i.e., a cross-modal comparison. Following Koulidobrova's example, I will establish where HKSL fits in with this typology. This intra-modal comparison of ASL and HKSL serves the purpose of showing how two different sign languages both encode CMDs in different ways and thus belong to different language types according to Chierchia's typology. Noteworthy is that Chierchia's typology is based on spoken language data only and that the addition of ASL and HKSL data thus provides a cross-modal usage of this existing typology.

1.2 Notation conventions

For the transcription of sign language data, each individual lexical sign is glossed in SMALL CAPS with the closest English translation. When the closest English translation of a single sign consists of more than one word, a hyphen is inserted between those words. A ˆ between two glosses or linguistic expressions indicates a compound, for example WAR^PLANE 'jet fighter'.

Sign language personal pronouns are index signs (i.e., pointing signs), which are transcribed as IX with a subscript number that indicates the person IX_1 for 'I', IX_2 for 'you', and IX_3 for 'he/she/they.SG'. Similarly, subscript numbers attached to verbs denote person agreement, for example $_2GIVE_1$ 'you give me'.

Subscript letters, on the other hand, denote spatial agreement with referential loci in the signing space, for example DOG BE-LOCATED+$CL^{animate\text{-}being\text{-}on\text{-}four\text{-}legs}_{abc}$ 'there are three dogs standing here (a), here (b), and here (c)'. The CL in the above example indicates the use of a verbal classifier, which are handshapes attached to verbs of motion and location that represent discourse referents based on the semantic category of the referent (e.g., animate beings, vehicles, etc.), size-and-shape characteristics, or how an object is manipulated (e.g., the pulling of the trigger of a gun, the holding of a cup, etc.). For classifier predicates, the verb root is glossed first (BE-LOCATED in the above example) and the attached classifier handshape is represented by +$CL^{specification}$.

A superscript + denotes reduplication (i.e., a reiteration of the sign), a superscript > denotes sideward movement, and a superscript >+ denotes sideward reduplication (see Section 4.1 below). Which of the three aforementioned methods is chosen for a sign depends on its phonetic features, e.g., if a sign contains a path movement (BOTTLE), sideward reduplication is used. Reduplication is a method of pluralisation used in both sign and spoken language. Owing to the availability of the signing space (i.e., the space in front of the signer), sign language can reduplicate a sign multiple times and with a slight sideward movement. In Sections 4.1 and 4.4, the acronym SASS refers to size-and-shape specifiers. In Sign Linguistic research, SASSes are signs that indicate a referent's size and shape (e.g., the dimensions indicated by a SASS handshape can provide information about the size of a spheric object: a tennis ball is a smaller spheric object than a football). In the literature, SASSes are sometimes considered a type of classifier (cf. Supalla 1986), but are also said to serve adjectival functions (cf. Bergman and Wallin 2003; Koenders 2024a).

In addition to manual signs and the use of sign space, sign languages also express a lot of their grammar through facial expressions, movements of the mouth (i.e., *mouthing*), and movement of the torso. These aspects of sign language grammar are called *non-manual markings* or *non-manuals* (NMs). In the transcription of the

data in this paper, relevant non-manuals are represented by a line on top of the signs with labels that describe these non-manuals. An example of movement of the torso is a *body lean* (glossed as *disj-shift* in Koulidobrova's data). For body leans, the signer's torso slightly leans left or right to mark agreement with discourse referents represented by these two loci or to show disambiguation (i.e., to show a clear distinction between two things, for example RICE$_a$ BOOK$_b$ HAVE 'I have rice and a book', note that the subscript letters indicate the body lean).

1.3 Content of this paper

The present paper is organised as follows: in Section 2, I will introduce the topic of count-mass distinctions, specifically Chierchia's (2010) count-mass typology. I also summarise Koulidobrova's research on the CMD in ASL. Section 3 briefly introduces the methodology that underlies the data collection method used to gather the HKSL CMD data. In Section 4, I present the results of the HKSL data collection. In Section 5, I discuss the HKSL CMD according to Deal's (2017) diagnostics. I also discuss how the HKSL CMD differs from the ASL data (intra-modal comparison) and what the implications of those differences are for its place in Chierchia's typology (cross-modal comparison). Finally, Section 6 summarises and concludes this paper.

2 Count-mass distinctions in sign and spoken languages

2.1 Count-mass distinctions

The basis of the discussion on count-mass distinctions (CMDs) are the ontological, semantic, morphological, and syntactic differences between two types of nouns in a language, namely count nouns and mass nouns. For example, the English *dog* is a count noun, whereas *water* is a mass noun. The most important difference between count and mass nouns is that the former presuppose separate, individual – i.e., 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, denotes substances that cannot be counted, rather than atomic units. Another feature of countability is the presence or

absence of a conceptual or physical boundary (Franzon et al. 2021; Jackendoff 1991): dogs are bounded objects, whereas substances like water do not have pertinent boundaries.

The debate about the distinction between count and mass nouns is in essence ontological in nature and revolves around the grammatical encoding of concepts strongly related to human cognition, i.e., whether the referents denoted by nouns are countable individuals or masses. In fact, cognitive psychologists like Carey and Spelke (1996) note that children can already distinguish clearly defined "units", such as cars, from masses like water and sand that do not come in such units even before they acquire language. In other words, the countability distinction is already "present in the cognitive system of children before any manifestation of language" (Chierchia 2021: 22).

In sum, count-mass semantics are to do with the relationship between referents and linguistic expressions. If we look at the characteristics of count nouns and mass nouns, it is possible to make some generalisations about how count and mass nouns "behave" differently. I will refer to such characteristics as "diagnostics", because they are often used in the literature to "diagnose" the count-status of a noun. Though not an exhaustive list, Deal (2017) lists the most notable count-mass diagnostics (as shown in Table 1 below). Firstly, count nouns can pluralise and mass nouns cannot. Secondly, count nouns may combine directly with numerals, but mass nouns cannot: *two dogs* versus *two rice(s)*. Furthermore, certain quantifiers are restricted to count nouns and others to mass nouns. For example, *each*, *several*, *every*, *many*, and *fewer* may only combine with count nouns, whereas *much* and *less* may only combine with mass nouns. A further important diagnostic for the difference between count and mass nouns is that count nouns compare based on number, whereas mass noun compare based on volume (Bale and Barner 2009, 2012).

2.2 Chierchia's (2010) count-mass typology

As briefly described above, the discussion on CMDs centres on the ontological, semantic, morphological, and syntactic differences between two types of nouns in a language, namely count nouns and mass nouns, i.e., countable/atomic referents and non-atomic/substance referents respectively. Despite the fact that languages show great variation in the encoding of the CMD, it is possible to group languages together based on their CMD type.

Chierchia (2010) uses a threefold typology that classifies languages depending on the ability of their nouns to combine with numerals or to exhibit number marking (Koulidobrova 2021: 214, [3]):

(7) Type I: Number marking languages (e.g., English);
     Type II: Classifier languages (e.g., Chinese, Japanese), where *no* noun can combine directly with numerals but require the presence of (overt) classifiers;
     Type III: Languages in which *all* nouns combine freely with numerals (e.g., Yudja [Lima 2014], Nez Perce).

In Type I languages, the difference between count and mass nouns is encoded through number marking, i.e., whether a noun allows plural marking or not, see (8). In Type II languages, there are different sets of classifiers for mass and count nouns (cf. Cheng and Sybesma 1999), nouns are kinds and become properties by the classifier, see (9),[2] and in Type III languages both count and mass nouns combine freely with numerals, see (10).

(8)   *chair* – *three chairs*   *English*
      blood – **three blood(s)*

(9) a. 三   輛   車   *Mandarin*
         sān   liàng   chē
         three CL:vehicle car
         'three cars'

     b. 三   磅   肉
         sān   bàng   ròu
         three MW:pound   meat
         'three pounds of meat'

(10) a. *lepit cickan*   *Nez Perce*
         two   blanket
         'two blankets'

     b. *lepit   kieke't*
         two   blood
         'two quantities (e.g., drops) of blood'
         (Chierchia 2021: 22, [2]; Deal 2017)

The classifiers intervening between noun and numeral in (9) are numeral classifiers. Their function is individuation and enumeration (e.g., Aikhenvald 2000; Allan 1977;

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2 MW: measure word (see Cheng and Sybesma 1999).

Bisang 1999; Croft 1994; Grinevald 2000, among others): they pick out individual units that can be counted. If classifiers serve an individuating function, then their relationship to the discussion on count-mass distinctions is evident. What is also relevant is that – as noted by many researchers (e.g., Bale and Khanjian 2008; Borer 2005, among others) – in languages that use both number marking and classifiers, these two are in complementary distribution and are thus likely to occupy the same syntactic position.

The reason it is Chierchia's typology specifically that is discussed in this section is because, as I will show below, Koulidobrova (2021) has chosen to use this typology to fit ASL in with the existing discourse on CMDs centred on spoken languages.[3]

2.3 The count-mass distinction in ASL[4]

Koulidobrova (2021) successfully shows that the syntactic diagnostics used in spoken language research that determine whether a noun is count, mass, or an aggregate (e.g., English *furniture*, *footwear*, etc.), are defied by ASL data, thus seemingly suggesting that there is no CMD in ASL. The diagnostics used by Koulidobrova are based on Deal (2017: 132):

Table 1: Deal's (2017) count-mass diagnostics; adapted from Koulidobrova (2021: 213).

		Count nouns (e.g., *cat*)	Aggregates (e.g., *footwear*)	Mass nouns (e.g., *water*)
i	May pluralise	✓	*	*
ii	Combine directly with numerals	✓	*	*
iii	Combine with *each*, *many*, *fewer*	✓	*	*
iv	Combine with *much*, *less*	*	✓	✓
v	Combine with "count adjectives" (e.g., *small* [Schwarzenschild 2011])	✓	✓	*
vi	Compare based on number	✓	✓	*
vii	Compare based on mass/volume (Bale and Barner 2009)	*	*	✓

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3 Lima and Rothstein (2020) have also provided an excellent overview of the CMDs of Brazilian Indigenous languages based on existing count-mass diagnostics and discuss what the typological implications of these languages' CMDs are.

4 See also Schlenker and Lamberton's (2019) account of the count-mass distinction in ASL.

Table 1 shows that (i–iii, v–vi) are not allowed for mass nouns, however, Koulidobrova's ASL data, in (11a–e) below, show that either the above diagnostics are insufficiently accurate, or there is no CMD in ASL (2021: 215, [6]). Note that Koulidobrova's notation methods differ in some respects from the notation described in Section 1.2 above.

(11)   a.   WOW {BOOK >+>+ / SHIT$_{arc}$>+>+} HERE.
            'Wow, {books / shit-pl} are all over here.'
            - piles, puddles
            pluralisation of a mass noun, cf. (i)

      b.   PLEASE GIVE-1 THREE {BOOK/BLOOD}.
            'Please give me three book/blood.'
            - piles, containers, puddles
            direct combining of mass noun and numeral, cf. (ii)

      c.   NEED FEW/MANY {APPLE/OIL/RAIN/IMAGINATION/LIGHT/FURNITURE}.
            'I need a few/many {apple/oil/rain/imagination/light/furniture}.'
            - piles, containers, puddles, instances of
            combining of mass noun with *many, few(er)*, cf. (iii)

      d.   (IX$_a$) {BOOK/GOLD} SMALL.
            '(That) gold small.'
            - a unit (e.g., a book, a golden ring), a pile (e.g., of books, gold pieces), a chunk/puddle (of gold stuff)
            combining of mass noun with 'count adjectives', cf. (v)

      e.   *Context: Mary's wine barrel contains more wine (volume) than Peter's fifteen bottles.*
            PETER HAVE MORE WINE.
            'Peter has more wine.'
            (True on the number reading, false on the volume reading.)
            comparison based on number, cf. (vi–vii)

In (11a), both the nouns BOOK and SHIT, assumed to be count and mass respectively, show sideward reduplication, which is a method of pluralisation in ASL. In (11b), the numeral THREE can directly precede both the nouns BOOK and BLOOD, which are assumed to be count and mass respectively. In (11c), the quantifiers FEW and MANY combine with all nouns, which range from count to mass and from concrete to abstract referents.[5] In (11d), the nouns BOOK and GOLD, assumed to be count and mass respectively, can both

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5 Note that Section 4.1 uses HKSL data to address the issue of why these ASL quantifier signs gloss as FEW and MANY, because it implies ASL quantifiers pattern with English quantifiers in terms of count-mass restrictions.

combine with the count adjective SMALL. In (11e), the mass referent WINE is compared based on number rather than volume.

However, a diagnostic that appears to have been overlooked in spoken language research is the question of conjunction.[6] ASL data show that mass and count nouns cannot be conjoined (adapted from Koulidobrova 2021: 216):

(12) a. GIVE-1 BOOK disj-shift PEN
          'Give me a book and a pen.'
      b. GIVE-1 BLOOD disj-shift MUD
          'Give me blood and mud.'
   *c. GIVE-1 [BOOK disj-shift BLOOD]
          'Give me a book and blood.'

This failure to conjoin a count and a mass noun in (12c), according to Koulidobrova, shows that there is a distinction between count and mass nouns in ASL, but that Deal's diagnostics are insufficient to account for it. Koulidobrova presents another piece of evidence for the existence of a count/mass distinction and with it a means of distinguishing count nouns from mass nouns: "mass nouns cannot occur in partitive constructions" (2021: 226–227, [38]):

(13) *a. BLOOD$_i$ IX$_1$ WANT {THREE/FEW} ~~BLOOD$_i$~~
           'I want three/a few bloods'; *lit*: 'of blood, I want three/a few'
       b. APPLE$_i$ IX$_1$ WANT {THREE/FEW} ~~APPLE$_i$~~
           'I want three/a few apple'; *lit*: 'of apples, I want three/a few'

Boster (1996) asserts that ASL is underlyingly an SVO language and within its NPs quantifiers precede the head nouns. An utterance such as BOOK IX$_1$ WANT THREE is

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6 I have no knowledge of Nez Perce and therefore cannot speak to the application of the count-mass conjunction diagnostic to this language, however, please compare its application to English and Mandarin as the representatives of Type I and Type II languages respectively. For both, count-mass conjunction is allowed, but the mass noun comes in the form of a bare noun, whereas the DP that contains the count noun must have a structure that serves the purpose of enumeration. In English, that is the obligatory presence of the indefinite article *a*. In the absence of this structure, a bare plural can receive an indefinite reading. In Mandarin, the presence of a numeral classifier structure serves the purpose of individuating single entities of books. In the absence of the numeral and numeral classifier, BOOK receives an indefinite reading, 'books'.

English: *Give me blood and *(a) book./ Give me blood and books.*
Mandarin:

給	我	血	和	一	本	書
gěi	wǒ	xuè	hé	yi	běn	shū
give	me	blood	and	one	CL:publications	book

'Give me blood and a book/Give me blood and books.'

derived from IX₁ WANT THREE BOOK. The movement of the N to the topic phrase causes it to be accompanied by a topic facial expression (1996: 166).[7] The NP-Q split is the result of A-bar movement that obeys subjacency. For that reason, the movement is allowed from an object QP and an argument PP, but not from a subject QP nor an adjunct PP. The A-bar movement that underlies these constructions has brought out the CMD (Koulidobrova 2021: 227). The argument is that both the landing site and the A-bar movement itself are blind to the countability distinction, therefore mass and count nouns must originate in different positions. Mass nouns must either originate above count nouns and are therefore too close to undergo movement, or they originate below count nouns which would make them ineligible for movement because they would be too far removed from the QP. Koulidobrova argues in favour of the latter of the two above-mentioned possibilities for the following reason: although it has been established that ASL disallows the conjunction of mass and count nouns, in the presence of a numeral or quantifier, however, such conjunction is allowed (2021: 227, [39d]).

(14)   *a.   GIVE₁ [BOOK disj-shift BLOOD]
              'Give me a book and blood.'
      b.   GIVE₁ [BOOK disj-shift FEW/THREE BLOOD]
              'Give me a book and a few/three blood.'

The quantifier in (14b) turns the mass noun BLOOD into a quantity of the same size as BOOK. This structure shows the following hierarchy (Koulidobrova 2021: 227, [40]; cf. Chierchia 2010):

(15)   a. $[_{NP1}$ BOOK$]$ & $[_{NP2}$ THREE BLOOD$]$
     b. $[_{NP1}$ N$_{count}]$ & $[_{NP2}$ Quantity $[N_{mass}]]$

As (16) below shows, adding an overt classifier to the structure renders it grammatical (Koulidobrova 2021: 228, [41]). Note that these classifiers are not verbal classifiers as mentioned in Section 1.2, but mensural classifiers (or measure words) comparable to the English *bottle* in *two bottles of wine* or the (mensural) numeral classifiers that intervene between numeral and mass noun in Sinitic languages, such as the Cantonese *būi* 'cup' in *yāt būi séui* 'one cup of water'.

(16)   BLOOD$_i$ IX₁ WANT {THREE/FEW} CL^{container}+>+>+> ~~BLOOD$_i$~~
         lit: 'of blood, I want three/few CL'

Therefore, in conjunctions such as that of BOOK and BLOOD, a head that houses an expression of quantity is necessary. This can be a quantifier, a cardinal, or a

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7 Note that there is an apparent discrepancy in this analysis: it is said that N moves into the topic phrase, but later these nouns are referred to as bare nouns in FocP.

classifier, since they serve an individuating function (Koulidobrova 2021: 228). The ungrammaticality of (13a) is due to the fact that movement of a noun past this quantifying head, unless when filled with a quantity expression such as a classifier, forms a violation.

A note of criticism of Koulidobrova's analysis would be this: if partitive constructions such as the ones in (13a–b) are the result of A-bar movement, the entire QP containing the noun BLOOD would be required to raise to TopP (or FocP, see footnote 6), not only the head noun BLOOD. Only a full DP can be raised to TopP. A bare noun appearing in TopP would receive a generic or specific indefinite reading. Extending this analysis to (13), perhaps APPLE in (13b) has in fact received such a reading. As a matter of fact, Koulidobrova knows that very well, as the two translations for (13b) suggested in her paper, i.e., 'of apples, I want three/a few', reflect such a bare noun reading. This translation does not insinuate any movement has taken place. It could be that the difference in grammaticality of (13a) and (13b) is not the result of (failed) movement out of a lower DP, but instead both APPLE and BLOOD could have been base generated in the FocP. The reason (13a) is ungrammatical, is because perhaps mass nouns do not allow such a generic reading.

2.4 ASL's count-mass distinction in typological perspective

Koulidobrova (2021) notes that ASL is not a Type II language, but unfortunately fails to clearly address the distinction between classifiers in Type II languages such as Chinese, i.e., numeral classifiers, and classifiers used in sign languages, i.e., verbal classifiers. The discussion of the use of classifiers in ASL muddles on without discussing the vastly different functions of both types of classifiers, namely individuation and enumeration for the former and spatial predication for the latter. (17a–b) below (2021: 223, [24]) illustrate this; although Koulidobrova is right to argue that the classifier handshape (i.e., 1 = ✌; 44 = 〰️) encodes the number of referents,[8] it does not serve the same function as a numeral classifier. These classifiers are verbal classifiers, they represent the referent MAN in the predicate (see Section 1.2 above).

(17)   a.   a-STORE, MAN CL:/1/-GO-a
           'The man went to a store.'
     b.   a-STORE, MAN CL:/44/-GO-a
           'The men went to a store.'

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8 The classifier handshape ✌ in (17a) iconically denotes a single animate entity. When attached to the movement (i.e., the verb root), the predicate as a whole means 'one person moving in X direction'. The use of two classifier handshapes 〰️ in (17b) iconically denotes a plurality of single animate entities, i.e., 'men'.

Though the confusion of numeral and verbal classifiers might have been unintentional, it does not help that Koulidobrova then invokes the Greenberg-Sanchez generalisation (Greenberg 1972) which states that (within a noun phrase) the adjacency between classifier and numeral cannot be disrupted (Koulidobrova 2021: 223; cf. Pfau and Steinbach [2006], who argue this exact point for DGS), only to follow up that statement with data containing verbal classifiers (Koulidobrova 2021: 223, [26], slightly adapted), i.e., examples in which the classifier is part of the predicate:

(18)   a.   THREE YELLOW CAR (HUGE) CL^{vehicle}>+>+>+
         'Three (huge) yellow cars (are standing there).'
     b.   WOMAN (DRUNK) CL^{person}1 FALL
         'A (drunk) woman fell.'

The adding of the parentheses in the translation of (18a) does not do the meaning of sign language verbal classifiers justice. The utterance is not an NP 'three huge cars', but rather it is a clause (CP), and the reduplicated classifier functions as predicate, locating the referents in space. In fact, the location of the reduplications is highly meaningful and the text between parentheses is the crucial component of the meaning of the utterance. In other words, the translation of (18a) should be something along the lines of 'There are three (huge) yellow cars standing there'. As briefly mentioned in Section 1.2, sign languages make use of verbal classifiers, which attach to verbs of motion and location. The reduplication of the classifier in (18a) thus shows exactly how the cars were located in space, i.e., next to each other, behind each other, in a circle, etc.

     The evidence given by Koulidobrova in (18) cannot support her claim that ASL is not a Type II language. In Type II languages, classifiers are housed within the NP (cf. the Greenberg-Sanchez generalisation mentioned above), but the classifiers in (18) are part of the VP. The classifiers in (18) are verbal classifiers, whereas the classifiers obligatorily intervening between noun and numeral in Type II languages are numeral classifiers.

     Moving forward Koulidobrova also asserts that ASL is not a Type I language either because ASL nouns may remain unmarked for number (2021: 230). Any form of number marking (i.e., reduplication) remains optional in ASL (cf. Pfau and Steinbach [2006], for DGS). ASL nouns that are not reduplicated are, in contrast to those in Type I languages, number-neutral, meaning they can receive both a singular and a plural reading (Koulidobrova 2021: 216, [8a]):

(19)   1-POSS FATHER TREE CUT
       'My father has cut a tree / the tree / multiple trees'.

In the examples below, entailment data show that English *children* is equal to or more than (≥) one child, however, the ASL CHILDREN has to indicate more than one child.[9]

(20) a. A: *Do you have any children?*   *English*
          B: *Yes, I has one. / #No, only one.*
          (Koulidobrova 2021: 221, [21a])

      b. A: ₂IX KNOW a-IX HAVE CHILDREN WIGGLE ?   *ASL*
          B: #YES HAVE ONE DAUGHTER
          A: 'Do you know if she has children?'
          B: 'Yes, she has one daughter.'
          (Koulidobrova 2019: 14, [26])

The data thus show that ASL nouns are number-neutral when unmarked for plural, however, when they are marked as plural, through reduplication, they must be interpreted as such. This is unlike Type I languages, such as English, where nouns cannot be number-neutral and plural nouns like *children* can receive a singular reading.

The conclusion Koulidobrova thus arrives at is as follows: the CMD in ASL is not to be found in number marking (as expected for Type I languages) nor in the classifier (Type II languages). Instead, ASL is number-neutral, like Type III languages. The CMD in ASL surfaces in quantificational expressions, as is expected for Type III languages. Consequently, mass nouns "must be preceded by something which is present in the structure either covertly or overtly in order to reach the type of equivalence required for a conjunction. This 'something' is a head that offers information on quantity" (Koulidobrova 2021: 230).

3 Methodology: the Hong Kong Sign Language data

In the remainder of this paper, I will compare HKSL data to the ASL data (intra-modal comparison) and make an effort to situate HKSL within Chierchia's typology (cross-modal comparison). The HKSL data are derived from grammaticality judgements tasks with 11 Deaf HKSL signers and interviews conducted with four Deaf HKSL signers. The signers were between the ages of 30 and 45 years old. All 11 participants were born to two Deaf parents and acquired HKSL as their native language, graduated from Deaf schools, and use HKSL as their primary means of communication in work and daily life.

For the grammaticality judgement, the native signers were shown 62 clips (including 20 fillers) of signed utterances and asked whether the shown utterance

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9 As pointed out by an anonymous reviewer, the English noun *children* is not necessarily always interpretable as singular. For example, *#She has children. It's a girl.*

Table 2: Grammaticality judgement test stimuli overview.

	Type	No. of items
1)	Count and mass conjunction	8
	e.g., IX$_1$ RICE BOOK HAVE.	
2)	Abstract count noun + numeral	7
	IDEA, FREEDOM, EXPERIENCE, DEMONSTRATION, WORK, METHOD, SUMMARY	
3)	Abstract mass noun + numeral	16
	INFORMATION, NEWS, WELFARE, WEATHER, EDUCATION, INSURANCE, PRESSURE, EVIDENCE	
4)	Concrete mass noun + numeral	11
	SAND, BLOOD, WASABI, OIL, WATER, WOOL, JADE, NOODLES	
5)	Fillers	20
	Total	**62**

was grammatical and if not, how they would sign it themselves. Information about the nouns used in the stimuli can be found in Table 2 below. All of the participants' responses were recorded, however, the participants of my study remain anonymous so no images from the judgement task itself will be displayed in this research.

Stimulus type (1) is based on Koulidobrova's (2021) ASL CMD diagnostic, see Section 2.2 above. Concrete count nouns were not included in the stimuli because they always allow for direct combination with numerals.

The interviews were conducted on another day with four of the native signers who participated in the experiment. These four signers work at the Centre for Sign Linguistics and Deaf Studies (CSLDS). During the interviews, the native signers were asked for their reasoning as to why they had found a certain utterance ungrammatical during the grammaticality judgement task. Please note that all (more general) data points on the (un)grammaticality of certain HKSL structures used in this paper, such as (29a–b) below, are not necessarily from the post hoc interviews, but they have been verified by the native signers who work at the CSLDS. These data points are similar to those of Dutch and Cantonese, as in (32) and (33) below, and simply serve to inform the reader of the grammatical features of HKSL.

4 The count-mass distinction in Hong Kong Sign Language

In spite of the above-mentioned criticisms, a strong feature of Koulidobrova's work is that it questions the applicability of spoken language criteria to sign languages and through her analysis she shows that it is those criteria that fail to account for sign language data. Since sign languages are often overlooked in linguistic typologies and

research, it is sign linguists upon whom falls the responsibility to investigate in how far sign language data align with existing paradigms. ASL might be a Type III language in Chierchia's (2010) typology, however, sign languages are not a monolith and what might hold true for ASL is not necessarily transferable to other sign languages. This brings us to the purpose of the remainder of the present paper, which is to go through the motions set by Koulidobrova and observe how HKSL comes out on the other end, i.e., does HKSL pattern with ASL or will the data show very different facts? In other words, in this section, we apply Deal's (2017) spoken language diagnostics to HKSL data.

As mentioned in Section 2 of this paper, according to Deal's (2017) findings, mass nouns are not supposed to (i) pluralise, (ii) combine directly with numerals, (iii) combine with *each*, *many*, *few(er)*, (v) combine with count adjectives, and (vi) compare based on number. We shall consider these criteria in the context of HKSL.

4.1 Pluralisation

According to Deal's (2017) criterion (i), mass nouns should not pluralise. For sign language nouns, Van Boven (2021) [10] has described the strategies for and restrictions on noun pluralisation in NGT. In another study, Pfau and Steinbach (2006) argue that there are three types of pluralisation and the phonological properties of the sign determine which pluralisation strategy is used: (1) body-anchored signs or signs with complex movement pluralise through *zero marking* (Ø); (2) non-body-anchored signs with simple movement on the midsagittal plane pluralise through *simple reduplication* (i.e., reduplication on the spot; $^{+++}$); and (3) non-body-anchored signs with simple movement articulated in the lateral signing space pluralise through *sideward reduplication* (2006: 159; $^{>+>+}$), as in (21a). The Warlpiri example in (21b) shows that spoken languages also employ reduplication for the sake of pluralisation.

(21) a. HOUSE   HOUSE$^{>+>+}$ *DGS*
          'house' 'houses'
          (Pfau and Steinbach 2006: 147)
      b. *kamina   kamina-kamina*   *Warlpiri*
          'girl'   'girls'
          (Nash 1986: 130)

In cross-modal typological terms, it can thus be said that reduplication for pluralisation is available to both sign and spoken languages. It is a modality-specific

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10 Van Boven (2021) discusses methods of reduplication in NGT other than noun reduplications. She found that NGT can express pluralisation through, for example, SASS reduplication, verbal modification, and changes in mouthing.

feature of sign languages that reduplication uses space, whereas for spoken languages it is the repeated articulation of (part of) the same word.

In HKSL, however, reduplication appears to be very limited. Only sideward reduplication is available and there is only one noun which reduplicates with the sole purpose of pluralisation: CHILD 'child' versus CHILD$^{>+>+}$ 'children'. There are other nouns that allow sideward reduplication, but not without implied spatial allocation (cf. Pfau and Steinbach 2006; Van Boven 2021). For example, the signs PERSON$^{>>>}$[11] means 'people', but the signer envisions the plurality of people to be located in the surrogate space surrounding them. Similarly, HOUSE$^{>+>+}$ and BUILDING$^{>+>+}$ do mean 'houses' and 'buildings', but by reduplicating them in space, the signer simultaneously provides details about their location. For example, signing BUILDING$^{>+>+}$ means that the signer is visualising a wall of buildings standing next to each other. The same effect occurs with the reduplication of mass nouns, e.g., GOLD$^{>+>+}$, WATER$^{>>>}$, and SHIT$^{>+>+}$: when, for example, signing WATER$^{>>>}$ the signer visualises a large mass of water located in the space in front of them. The reduplication of most other nouns, for example BOOK, DOG, CAT, PEN, and TEACHER, is ungrammatical. The very limited exception to this is the sideward reduplication of nouns that contain a classifier handshape:

(22) a.   IX$_1$ BUY CUP$^{>+}$ TWO.
           'I bought two cups.'
      b. $_2$GIVE$_1$ PAPER+SASS$^{rectangle>+}$ TWO.
           'Give me two sheets of paper.'

It should be noted, however, that these examples really are limited. The reduplication cannot occur more than once (23a), and not with too high a numeral (23b).

(23) *a.   IX$_1$ BUY CUP$^{>+>+>+}$ FIVE.
            'I bought five cups.'
      *b.   IX$_1$ BUY CUP$^{>+}$ TWENTY-FOUR.
            'I bought twenty-four cups.'

HKSL does not mark plural number through reduplication. Nouns in their bare form can be interpreted as plural:

(24)   IX$_1$ MOTHER GO BUY BOOK.
       'My mother is going to buy a book/books.'

In (24), the bare noun book can indicate both a single book as well as a plurality of books (cf. Erbach et al. 2019, on Hungarian).

Yet the absence of overt marking of pluralisation – be it by affixation or reduplication – does not indicate a lack of pluralisation. Pfau and Steinbach (2006)

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11 See Section 1.2 for notation conventions.

show that a plural marking strategy available to both spoken and sign languages is
zero marking [Ø] (cf. Corbett 2000; Rijkhoff 2002).

(25) a. *sheep*   *sheep-Ø*   *English*
      b. *Fahrer* *Fahrer-Ø*   *German*
          'driver' 'drivers'
          (Pfau and Steinbach 2006: 141, [5b])
      c. DOG   DOG-Ø   *HKSL*
          'dog'   'dogs'

4.2 Numerals and mass nouns

Regarding Deal's criterion (ii), HKSL mass nouns do not combine directly with numerals
but require the intervention of a classifier. There is no evidence for the existence of
numeral classifiers in HKSL like the type of numeral classifiers in classifier languages
such as Cantonese, i.e., Chierchia's Type II languages.[12] In those languages, classifiers
obligatorily intervene between numeral and noun for the sake of individuation and
enumeration, regardless of whether the nouns are count (26a) or mass (26b).

(26) a. 兩   隻   狗
          léuhng   jek   gáu
          two   CL:animate-being   dog
          'two dogs'
      b. 兩   杯   水
          léuhng   būi   séui
          two   MW:cup   water
          'two cups of water'

Though in Type II languages both count and mass nouns require the presence of
a classifier, this does not mean that these classifiers cannot serve as a diagnostic

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12 Note that Cantonese and HKSL, despite sharing a territory, pattern differently in terms of count-
mass type. Cantonese is a Type II language and requires the intervention of numeral classifiers
between numeral and noun for both count and mass nouns. HKSL, as will be established below, is a
Type I language and thus patterns with languages like English or Dutch. Type I languages require the
intervention of classifiers (measure words) between numeral and mass noun, but not between
numeral and count noun.

   With Cantonese being the dominant language in Hong Kong, it is not surprising that there is
(unilateral) language contact between Cantonese and HKSL. However, the influence of Cantonese on
HKSL is limited to certain word order issues (e.g., the place of modal verbs in a clause) and there are
also many Cantonese loan words found in HKSL. There is no influence of Cantonese on HKSL
regarding count-mass typology.

for CMDs. In fact, Cheng and Sybesma (1999) argue that there exist two types of classifiers that intervene between numerals and nouns: (1) classifiers and (2) measure words. The former, as in (26a), serves the function of merely picking out an individual unit that already exists in the referent nouns and thus combines with count nouns. This classifier also serves the more traditional function attributed to classifiers in general, which is to classify the referent noun according to its characteristics, i.e., whether the referent is an animal, a vehicle, a long narrow entity, etc. The latter, as in (26b), creates a unit of counting in the referent noun and thus combines with mass nouns. These measure words individuate masses such as water by measuring them in *a cup*, *a bottle*, *a bowl*, etc.

Contrary to Type II languages, HKSL does not allow a classifier to intervene between numeral and count noun, (27a). However, similar to Type I languages, a measure word is necessary to create units that can be counted by the numeral for mass nouns (27b).

(27)   a.   DOG (*CL$^{\text{animate-entity-walking-on-four-legs}}$) THREE
            'three dogs'
       b.   WATER *(CL$^{\text{bottle}}$) THREE
            'three bottles of water'

Though HKSL has classifiers that can be used for animate entities walking on four legs such as dogs, the use of these classifiers remains limited to spatial predication, as appears to be the same for all sign languages, including ASL. The assumption that a covert classifier might perhaps be present in the syntactic structure to intervene between the numeral and count nouns remains speculative at this point.

Though (27b) above shows that HKSL mass nouns require a classifier to intervene before the numeral, data suggest that when given sufficient context, signers accept and understand utterances where the classifier has been dropped. Pragmatics play an important role in this (as Kimmelman [2017] also argues for Russian Sign Language [RSL]). In the following stimuli from the grammaticality judgement task (28a–b), the mass nouns WASABI and OIL combine directly with numerals and were considered grammatical[13] by native HKSL signers.

(28)   a.   TOMORROW IX$_1$ GO-TO SUPERMARKET BUY WASABI FOUR.
            'Tomorrow I'll go to the supermarket to buy four (tubes of) wasabi.'
       b.   REALLY-ABSURD, IX$_3$ COOK USE OIL NINE.
            'He used nine (bottles/dashes of) oil while cooking!'

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13 An utterance was considered grammatical if it received an average score of 3 or higher out of 5. (28a) scored an average of 4.4/5 and (28b) 3/5. (29a) received an average score of 2.5/5; (29b) 1/5; and (29c) 2.2/5.
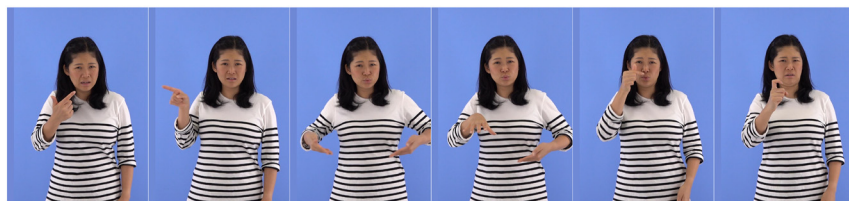
Figure 1: REALLY-ABSURD, IX$_3$ COOK USE OIL NINE (28b).

In contrast to the stimuli in (28a–b), which were deemed acceptable (Figure 1), the grammaticality task stimuli in (29a–c) contain mass nouns (JADE, SAND, and BLOOD) which are not often used in daily life (i.e., world knowledge) or of which the context was not sufficiently clear to be acceptable without the use of a classifier.

(29)   *a.   MOTHER $_3$ORDER$_1$ BUY JADE FIVE.
              'Mother told me to help her buy five (pieces of) jade.'
       *b.   PLEASE $_2$GIVE$_1$ SAND THREE.
              'Please give me three (grains of) sand.'
       *c.   TABLE IX$_{loc}$ HAVE BLOOD FIVE.
              'There's five (containers/drops of) blood on the table.'

In (28a–b) the familiarity with the context or the referent noun allowed *coercion* (i.e., reinterpretation) to occur, similar to how an English speaker in a coffee shop can order *three coffees*. The absence of such familiarity in (29a–c) brought back the ungrammaticality of combining mass nouns directly with a numeral.

What these data show is that, generally speaking (i.e., in the absence of coercion), HKSL mass nouns do not combine directly with numerals, whereas count nouns do. HKSL thus conforms to Deal's (2017) criterion (v).

4.3 Quantifiers and mass nouns

Regarding criterion (iii), as shown in (30) and (31), HKSL quantifiers are neutral to whether the noun is count or mass, unlike the English quantifier pairs *many/much* and *few/little*. Therefore, the HKSL quantifier sign would be more appropriately glossed as A-LOT, however, in order to maintain the connection with Deal's diagnostic (iii) and show the contrast between the HKSL neutral quantifier and its English counterparts *many* and *much*, I have chosen to continue to gloss this sign as MANY/MUCH. The interpretations of (30a–d) were given by the four native signers in the post hoc interview.

(30) a. IX₁ SEE GOLD MANY/MUCH.
‘I saw a lot of gold.’
- gold in the walls of mines, many rings and necklaces, many coins, the colour gold, gold bars

b. TEA IX_obj(=tea) SUGAR FEW/LITTLE.
‘There is too little sugar in the tea.’

c. IX_loc OIL MANY/MUCH.
‘There’s a lot of oil over there.’
- puddle, oil in a dish, bottles, oil in the pan while cooking, the oily surface of a car, oily skin

d. IX₁ HOUSE HAVE COFFEE MANY/MUCH.
‘I have a lot of coffee at home.’
- cups filled with coffee, containers filled with coffee, different types of coffee, coffee powder

(30a–d) show that HKSL mass nouns may combine with MANY/MUCH and FEW/LITTLE. The difference, for example, between (31a) below — a count noun — and (31b) — a mass noun – is that for (31b) the signers have to interpret the unit of the referent noun themselves (cf. [30c] above).

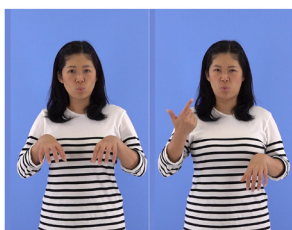(31) a. DOG MANY/MUCH
‘many dogs’

b. OIL MANY/MUCH
‘a lot of oil’

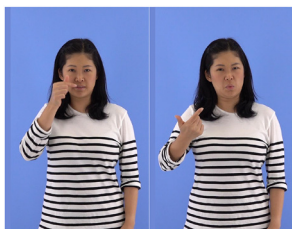**Figure 2:** DOG MANY/MUCH.

Figure 3: OIL MANY/MUCH.

In fact, criterion (iii) is based on the very anglophone distinction between *many/much* and *few/little*, and its failure to apply not only to ASL and HKSL (Figures 2 and 3), but also to spoken languages such as Dutch (32), and Cantonese (33), implies that it is not a very useful criterion at all. Not even within the category of Type I languages, as Dutch is an example of a Type I language.

(32)   a.   *veel   honden*
           many   dog.PL
           'many dogs'
       b.   *veel   olie*
           much   oil
           'a lot of oil'

(33)   a.   好   多   狗
           hóu   dō   gáu
           very   many   dog
           'many dogs'
       b.   好   多   油
           hóu   dō   yàuh
           very   much   oil
           'a lot of oil'

In sum, regarding Deal's criterion (iii), in HKSL quantifiers are not restricted to either count or mass nouns. Though HKSL and ASL both thus show no restriction in the combination of quantifiers and count and mass nouns. However, Kimmelman (2017) shows that in RSL, the quantifier FEW only combines with count nouns (BOY FEW vs. *MILK FEW) and A-BIT only with mass nouns (MILK A-BIT vs. *BOY A-BIT [Kimmelman 2017: 19, (58), (59)]). All other RSL quantifiers show no distinction between count and mass nouns.

4.4 Count adjectives and mass nouns

Regarding criterion (v), (34a–c) below show that HKSL mass nouns may not combine directly with count adjectives, as predicted by Deal (2017). Native signers indicated that in order to convey the intended meaning of (34a–c), it would be necessary to add a classifier, as in (35b). The classifiers introduced in the structure here are neither verbal nor numeral classifiers. In sign languages, a sub-class of verbal classifiers – size-and-shape specifiers (SASSes) – may also be used in an adjectival manner. SASSes are handshapes which indicate a referent's visual properties, such as size, shape, outline etc. When following a noun, SASSes provide further information about the physical properties of the noun (Figure 4).

(34) *a. GOLD SMALL
          'a small piece of gold'
     *b. RICE BIG
          'a large grain of rice'
     *c. WATER SMALL
          'a small amount of water'

(35) *a. GOLD SMALL
          'a small piece of gold'
     *b. GOLD SASS^sycee SMALL
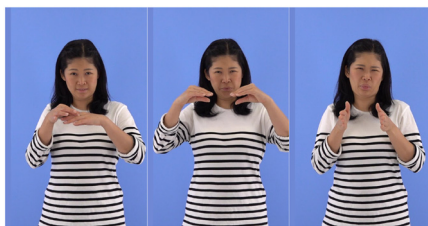   'a small piece of gold'

Figure 4: GOLD SASS^sycee SMALL ([35b] above).

Similar to when combining mass nouns and numerals, however, the structure is saved when introducing a classifier (i.e., a SASS). The classifier is modified to incorporate the meaning 'large' or 'small', specifying the size and shape of the measure unit. The non-manual adjectival morphemes that accompany the signs LARGE and SMALL spread to the SASSes. In the presence of the non-manual markers, the adjectives themselves become optional, as shown in (36) and Figure 5 below.

                    ————————————— (rounded lips, protruding tongue)

(36) a. WATER   SASS^small-cup (SMALL)
          'a small cup of water'

                         ——————————— (lips pressed together, puffed cheeks)

     b. OIL   SASS^large-bottle (LARGE)
          'a large bottle of oil'

                       —————————— (rounded lips, protruding tongue)

     c. RICE   SASS^small-grain (SMALL)
          'a small grain of rice'

Figure 5: RICE SASS$^{\text{small-grain}}$ (SMALL) ([36c] above).

Summarising the findings of Sections 4.2 and 4.4, the failure of mass nouns to combine directly with numerals or count adjectives unless a classifier intervenes is thus where HKSL's CMD surfaces (Table 3).

Table 3: The count-mass distinction in two structures.

	Count nouns	Mass nouns
Numerals	[$_{NP}$ Ncount [$_{NumP}$ NUM]]	[$_{NP}$ Nmass [$_{CLP}$ CL [$_{NumP}$ NUM]]]
Count adjectives	[$_{NP}$ Ncount [$_{AdjP}$ ADJ$^{[count]}$]]	[$_{NP}$ Nmass [$_{CLP}$ CL^{SASS} {$_{AdjP}$ ADJ$^{[count]}$}]]

4.5 Comparison based on volume or number

According to Deal's criterion (vi), mass nouns compare based on volume, whereas count nouns compare based on number, as shown in the English example below:

(37) a. *Peter has more cars than Mary.*
           True on number reading: the number of cars Peter has is higher than Mary's.
      b. *Peter has more wine than Mary.*
           True on volume reading: the amount of wine Peter has is higher than Mary's.

The ASL data in (11e) have shown that ASL allows mass nouns to be compared based on number. The HKSL data below show that HKSL allows for both number and volume readings for count and mass nouns.

(38)   PETER$_{3a}$ HOUSE X MANY $_{3a}$COMPARE$_2$
           'Peter has more X at home than you.'

In the grammaticality judgement, the X in (38) was replaced by the nouns listed in Table 4 below. The sign COMPARE could also be glossed as MORE-THAN. The subscript 3a agrees in locus with PETER and the subscript 2 indicates a second person discourse

Table 4: Nouns that replaced X in (38) above and their available readings and interpretations.

X =	Count/mass	Reading	Interpretation
Apple	Count	Number	Amount of individual apples
Book	Count	Number	Amount of individual books
Clothing	Aggregate	Number	Layers of clothing worn
		Volume	Piles of clothing in closet
Paper	Mass	Volume	Size of pile
Hair	Mass	Volume/number	Hair volume as a result of amount of hair
Water	Mass	Volume	Content of water storage tank
		Number	Glasses drunk
Wine	Mass	Volume	Litres of wine; content of a glass
		Number	Bottles

referent. In other words, $_{3a}$COMPARE$_2$ (or $_{3a}$MORE-THAN$_2$) literally means 'Peter compared to you' or 'Peter more than you'.

Table 4 shows that some mass nouns can receive either a volume or a number reading depending on the interpretation of the signer (these interpretations were given during the post hoc interview). Note that the lexical form of these mass nouns does not happen to be specified for a handshape that can also be used as a classifier, i.e., the sign WINE does not contain the classifier handshape BOTTLE. These data show that Deal's argument that mass nouns are compared based on volume does not hold true for HKSL.

4.6 Conjunctions and partitive constructions

In addition to Deal's diagnostics, I will apply Koulidobrova's (2021) ASL CMD diagnostics to HKSL data. For Koulidobrova, a first indication that the CMD exists in ASL came from the fact that count and mass nouns fail to conjoin (cf. [12c] above). HKSL data, on the contrary, show that such conjunction is allowed and is thus not a useful means of distinguishing between HKSL count and mass nouns. (39a–c) are stimuli of the grammaticality judgement task (Figure 6).

(39) a. RICE$_a$ BOOK$_b$ GIVE$_1$.
    'Give me rice and a book.'

b. REMIND$_1$ TOMORROW BUY CHEESE$_a$ APPLE$_b$ THREE$_b$.
    'Remind me to buy cheese and three apples tomorrow.'

c. IX$_1$ BANANA$_a$ OIL$_b$ HAVE.
    'I have bananas and oil.'
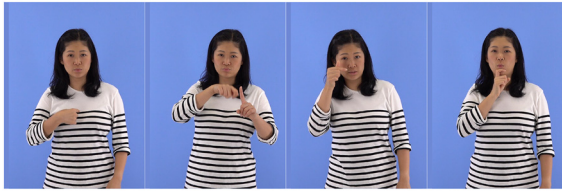
Figure 6: IX$_1$ BANANA$_a$ OIL$_b$ HAVE ([39c] above).

Furthermore, according to native signer judgement, HKSL also allows for mass nouns to occur in partitive constructions (cf. ASL [13] above) (Figure 7):

(40) a.   APPLE$_i$ BUY {THREE/FEW} ~~APPLE$_i$~~
           'Buy (me) three/a few apples.'
      b.   OIL$_i$ BUY {THREE/FEW} ~~OIL$_i$~~
           'Buy (me) three bottles of/a bit of oil.'

Figure 7: OIL buy FEW ([40b] above).

This shows that the diagnostics used by Koulidobrova to uncover how the CMD surfaces in ASL do not work for HKSL. For ASL, adding a classifier to a partitive construction (as already shown in [13] above and with an adapted translation repeated here as [41]) saves the structure, for HKSL it would merely make the structure clearer (42) (Figures 8). Regardless of whether a classifier is added, (40b) remains grammatical.

(41)   BLOOD$_i$ IX$_1$ WANT {THREE/FEW} CL^{container}+>+>+> ~~BLOOD$_i$~~
          'I want three/a few containers of blood.'

(42)   OIL$_i$ BUY CL^{container}(+>+>+>) {THREE/FEW} ~~OIL$_i$~~
          'Buy (me) three/a few bottles of oil.'
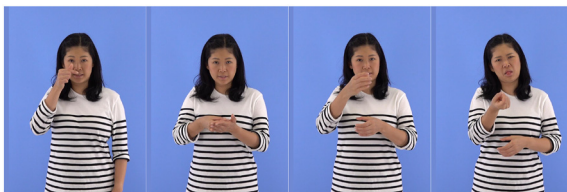
Figure 8: OIL BUY CL^{container} FEW ([42] above).

5 Discussion

5.1 ASL and HKSL: an intra-modal comparison

The above analysis of HKSL data shows that HKSL and ASL differ from each other in a few respects. In Section 4.1, the HKSL data showed that – in contrast to ASL – noun reduplication is not a method of pluralisation in HKSL. Koulidobrova showed in (11a) that both ASL count and mass nouns can reduplicate to give expression to the grammatical plural. However, for the few nouns for which HKSL does allow reduplication, this reduplication is not purely for pluralisation purposes, but rather a form of spatial predication (cf. Pfau and Steinbach 2006; Van Boven 2021). Instead, I argue, zero marking is the type of pluralisation strategy used consistently in HKSL.

Secondly, the data above show that HKSL mass nouns do not combine directly with numerals, whereas ASL mass nouns do. This difference between the two sign languages marks them both most clearly as a Type I and a Type III language respectively in Chierchia's (2010) typology. Future typological research on sign languages will perhaps show that there are also sign languages that pattern with Type II languages and require classifier intervention for both count and mass nouns.

Thirdly, while Koulidobrova's data show that ASL allows for mass nouns to combine with count adjectives, e.g., SMALL or LARGE (cf. [11d] above), such combinations are ungrammatical in HKSL (cf. [34a–d] above). As with mass nouns and numerals, HKSL requires the intervention of a SASS-type classifier between mass nouns and count adjectives.

Finally, ASL does not allow for the conjunction of mass and count nouns nor the occurrence of mass nouns in partitive constructions. However, both of these phenomena are acceptable in HKSL.

Comparing two sign languages regarding their number marking and count-mass encoding strategies has provided evidence for the claim that sign languages are not identical in how they pluralise nouns or in which structures CMDs come to be expressed. Criteria (K1) and (K2) in Table 5 below are the basis of Koulidobrova's count-mass analysis of ASL. Koulidobrova ultimately concludes that ASL is neither a universal classifier language (Type II) nor a number marking language (Type I), but instead a Type III language, i.e., a language that is neutral for number. The main ground for this conclusion is the evidence that ASL's CMD surfaces in its numeral/quantificational expressions, as is to be expected for Type III languages (2021: 230).

HKSL count nouns pattern with ASL count nouns. The difference between these two sign languages can be found in the behaviour of their mass nouns, as shown in Table 5. It is the differences in mass noun patterns that distinguishes the CMD encoding in ASL and HKSL.

Table 5: A comparison between HKSL and ASL using existing count-mass diagnostics.

|		HKSL		ASL	
		Mass nouns	**Count nouns**	**Mass nouns**	**Count nouns**
i	May pluralise	*	✓	✓	✓
ii	Combine directly with numerals	*	✓	✓	✓
iii &	Combine with *each, many, fewer*	✓	✓	✓	✓
iv	Combine with *much, less*				
v	Combine with 'count adjectives' (e.g., *small* [Schwarzenschild 2011])	*	✓	✓	✓
vi	Compare based on number	✓	✓	✓	✓
vii	Compare based on mass/volume (Bale and Barner 2009)	✓	*	✓	*
K1	Can conjoin with count nouns	✓	✓	*	✓
K2	Can occur in partitive structures	✓	✓	*	✓

5.2 HKSL's CMD: a cross-modal perspective

Based on the data presented above, I have argued that HKSL fits in with Type I languages in Chierchia's (2010) typology because its CMD shows its failure to combine mass nouns directly with numerals. This means that HKSL is a number marking language. The expectation of these languages is also that nouns allow plural marking.

Regarding pluralisation strategies, this expectation is borne out. HKSL's use of zero marking is found in Type I spoken languages as well.[14] Examples discussed in the present paper include English and German, see (25a–b) above. Though English and German employ other types of pluralisation strategies in addition to zero marking, the fact that those options are not available to HKSL should be seen as a relative modality effect. For example, given sign languages' tendency to use simultaneous rather than sequential morphology, plural suffixes (e.g., English -*s*) are rare. The fact that in some sign languages reduplication cannot serve purely as a means of pluralisation as in the Warlpiri example (21b), is due to sign languages' modality-specific use of space for the purpose of spatial predication.

The other characteristics of the HKSL CMD do not show modality-specific restrictions that would cause them to surface differently from spoken languages.

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14 It should be noted, however, that it is not just Type I languages that zero mark plural nouns. Cantonese and Mandarin, being Type II languages, have no plural morphology marked on the noun. For example, 書 *syū/shū* can receive both a singular or a plural reading.

For example, the intervention of classifiers between mass nouns and numerals has the same structure for English (e.g., *three **sheets** of paper*) and HKSL. Furthermore, the HKSL DP word order abides by the Universal 20 (Greenberg 1963, 1972; updated by Cinque [2005] to include, among other elements, numeral classifiers). The Universal 20 is a typological tool that has been used in spoken language research to account for the order of elements within DPs (cf. Zhang [2007], on Taiwan Sign Language and the Universal 20). A simplified version of the Universal 20 – showing only the elements relevant to the discussion on numeral classifiers intervening between mass nouns and numerals – based on the updated version by Cinque (2005: 328) would be:
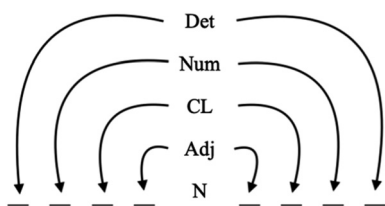
Figure 9: A simplified version of Cinque's (2005) update to Greenberg's (1963) Universal 20.

As Figure 9 shows, Num–CL–N and N–CL–Num are acceptable word orders within this framework. These word orders are those of English and HKSL respectively.

6 Conclusion

In this account of the HKSL CMD, I have predominantly done an intra-modal comparison between ASL CMD data based on Koulidobrova's (2021) account and HKSL data. The differences in CMD encoding between these two sign languages can be summed up as follows: (1) ASL mass nouns pluralise, but HKSL do not; (2) ASL mass nouns combine directly with numerals, but HKSL mass nouns require the intervention of a classifier; (3) ASL mass nouns combine directly with count adjectives, whereas HKSL nouns require the intervention of a SASS between noun and adjective; and (4) ASL does not allow for conjunction of mass and count nouns, but HKSL does.

Since the present paper follows Koulidobrova's approach of using Deal's (2017) and Chierchia's (2010) spoken language CMD frameworks as a means of cross-modal comparison, I have argued that HKSL can be considered a Type I language.

This means that in a cross-modal typology, the HKSL CMD is comparable to that of languages like English.

Data availability statement

The data underlying this study is available on the OSF platform at https://osf.io/ayztv/?view_only=213203f682a448a8a58391cbf9b70116.

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