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The acquisition of Cantonese classifiers by preschool children in Hong Kong*

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ABSTRACT

The Cantonese language has a complex classifier system and young learners need to pay attention to both the semantics and syntax of classifiers. This study investigated the repertoire of classifiers produced by 492 Cantonese-speaking preschoolers in three age groups (3;0, 4;0 and 5;0). Spontaneous utterances produced in 30-minute toy-play contexts were collected and transcribed. Analyses identified a productive repertoire of 73 classifiers in the utterances, which could be appropriately classified into the typology proposed in the present study. An age-related increase in the number of classifier types per child as well as the repertoire size of each group was found. 個 *go3* (CL) was widely used as the general classifier by the young children. It was also discovered that the three-year-olds were already showing signs of grasping the basic syntax of classifiers. Cognitive, linguistic and contextual influences presumed to shape the evidence are discussed.

Classifiers are a common-place feature of Chinese, and proficiency in their usage and acquisition is the subject of much research (Loke & Harrison, 1986; Loke, 1991; Erbaugh, 1992; Lee, 1996; Wei & Lee, 2001).

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Cantonese, as with other variations of Chinese, calls for a classifier after the number when referring to amounts (Yip & Matthews, 2000). Nouns in Cantonese may have such words associated with them that are obligatory both syntactically and semantically, for example *jat1 go3 jan4* 'one (CL) person',[1] *loeng5 tiu4 jyu2* 'two (CL) fish', *saam1 zek3 gau2* 'three (CL) dogs' and *sei3 gaa3 ce1* 'four (CL) cars'. The complex syntax and semantics of classifiers pose major problems for Cantonese learners, particularly the choice of which one to use with which noun and when and where to use particular classifiers. The actual acquisition of such proficiency by Cantonese speakers in early childhood is a fascinating research area per se and it also illuminates the mental processes of categorization in young learners. Although there is considerable research into the acquisition of Cantonese classifiers (Poon, 1980; Loke & Harrison, 1986; Mak, 1991; Szeto, 1996; Wong, 1998, 2000; Wei & Lee, 2001; Erbaugh, 2002), there is a dearth of large-scale studies using representative samples to permit the establishment of norms.

The typology of Cantonese classifiers

Allan (1977) defines classifiers as morphemes that denote salient perceived or imputed characteristics of the referents of associated nouns. He suggests four types of classifier languages: numeral, concordial, predicate and intralocative. Aikhenvald (2000) uses the term 'classifiers' as an umbrella label for a wide range of noun categorization devices and suggests seven types of classifiers in the world: (1) noun classifiers that merely categorize the noun by itself (e.g. Yidiny, an Australian language); (2) numeral classifiers that categorize the referent of a noun in terms of its animacy, shape or other inherent properties (e.g. Chinese, Japanese); (3) possessed classifiers that are special morphemes characterizing a possessed noun in a possessive construction (e.g. Tariana, a South American language); (4) relational classifiers that are special morphemes in possessive constructions characterizing the way in which the referent of a possessed noun relates to that of the possessor (e.g. Fijian, an Austronesian language); (5) verbal classifiers that appear by the verb to categorize a noun which is typically in intransitive subject or direct object function in terms of its shape, consistency and animacy (e.g. Waris, a Papuan language); (6) locative classifiers that occur with locative adpositions (e.g. Palikur, an Arawak language); and (7) deictic classifiers that are associated with deictics and articles (e.g. Mandan, a Siouan language).

[1] Cantonese examples are given in the Romanization scheme developed by Wong Shik Ling (also known as S. L. Wong), in which tones are numbered from 1 (high level) to 6 (low level). The online edition of S. L. Wong's Chinese Syllabary is available: http://humanum.arts.cuhk.edu.hk/Lexis/Canton/.

According to the proposed typologies of both Allan (1977) and Aikhenvald (2000), Cantonese is a numeral classifier language in which enumeration or quantification requires the use of a classifier as a bound form to designate semantic features or the quantum of whatever is being enumerated. Cantonese has a large set of classifiers and the classifier system is intricate (Erbaugh, 2002). It is widely accepted that noun classifiers and verb classifiers are differentiated according to whether they classify nouns or verbs (Mak, 1991; Szeto, 1998; Wong, 2000; Yamamoto, 2005). Verb classifiers enumerate the number of times an action has taken place, such as *daa2 saam1 kyun4* 'hit with the fist three (CL) times'.

The majority of Cantonese classifiers are noun classifiers (Szeto, 1998; Erbaugh, 2002), thus the subsequent review focuses on these 'noun categorization devices' (Aikhenvald, 2000). Two main types of noun classifiers predominate: 'sortal' and 'mensural' (Lyons, 1977). A sortal classifier individuates whatever it refers to in terms of the kind of entity that it is, while a mensural classifier classifies noun referents according to quantity or general grouping. Mensural classifiers are comparable to words denoting measurement as well as to so-called 'collective nouns' in English, whereas the use of sortal classifiers is unique to classifier languages such as Cantonese (Killingley, 1983). The typology proposed by Lyons (1977) has been employed to analyze Cantonese classifiers by Killingley (1983) and Mak (1991): (1) sortal classifiers: belong with nouns and classify them in terms of some intrinsic feature, e.g. *zi1* (CL) denoting long, thin objects such as pens and guns; (2) mensural classifiers: denote quantities of an item, such as *bui1* (CL) denoting a glass of uncountable substances, or the collective *baan1* (CL) referring to a group of people. This dichotomy of noun classifiers by Killingley (1983) and Mak (1991) has been widely accepted by other researchers, for instance Matthews & Yip (1994), Szeto (1998), Yip & Matthews (2000), Wong (2000) and Wei & Lee (2001).

Killingley (1983) classifies mensural classifiers into three subtypes: (1) collective classifiers that form the most important and most semantically interesting class, consisting of generic classifiers (referring to a type or kind of entity, not to be confused with the 'general' sortal classifier such as *go3*), and non-generic classifiers (denoting entities grouped in twos or units of more than two); (2) measurement classifiers involving the measurement of linearity (1D), surface (2D), volume (3D) weight and other features; and (3) containment classifiers denoting that which can be contained in a box, parcel or vessel of some kind.

Yip & Matthews (2000) suggests an easy-to-understand typology of Cantonese classifiers: (1) 'measures' that in the narrow sense words are used in counting quantities that are called 'measurement classifiers' by Killingley (1983), for example *jat1 gan1 coi3* 'a catty of vegetables'; (2) 'containers' constituting an open-ended category since any container can

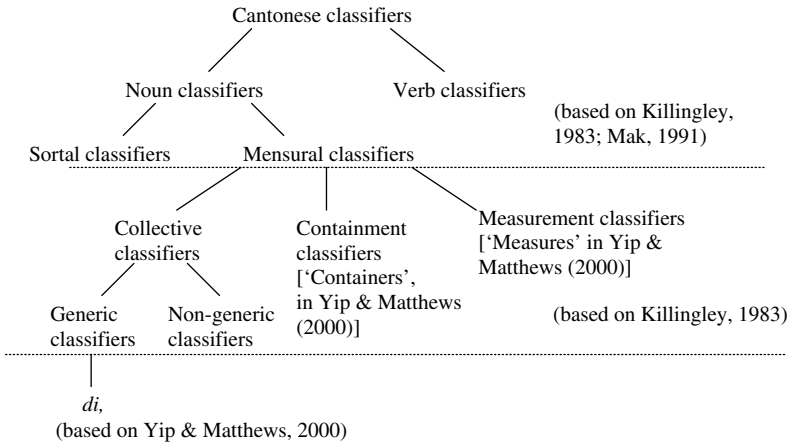

Fig. 1. A typology of Cantonese classifiers.

serve as a measure, such as *saam1 bui1 caa4* 'three cups of tea', called 'containment classifiers' by Killingley (1983); (3) 'collective' classifiers refer to a grouping of items such as *nei1 ban1 hok6 saang1* 'this class of students', *go2 deoi1 laap6 saap3* 'that pile of rubbish', equivalent to Killingley's (1983) 'collective classifiers'; (4) 'plurals' and 'quantities' with *di1*, the word *di1* being used for both countable and uncountable nouns. This can be seen as a special kind of collective classifier, for example *di1 caang2 hou2 tim4* '(CL) the oranges are very sweet' (referring to an unspecified number of countable items), *di1 seoi2 ng4 gaau3 jit6* '(CL) the water is not hot enough' (referring to quantities of uncountable substances). Wei & Lee (2001) assert that *di1* is a classifier denoting plural and non-count nouns and is often overgeneralized to denote countable and singular nouns. After considering these widely received typologies of Cantonese classifiers, the writers have converted them into the systematic typology described in Figure 1, then investigated whether the productions of Cantonese-speaking preschoolers are in accord with the proposed typology.

Figure 1 summarizes the subtypes of mensural classifiers. Yamamoto (2005: 42) proposes 'a semantic structure for Chinese classifiers' that seems able to encompass most Chinese classifiers. It is a semantic typology of the sortal classifiers for Mandarin per se. Despite various grammatical differences between Mandarin and Cantonese, classifiers make similar semantic distinctions in the two varieties of Chinese. Accepting that Yamamoto's typology is almost wholly applicable to Cantonese, the writers employ this typology to classify sortal classifiers in Cantonese and propose a more

complete typology of Cantonese classifiers for the present study (see Figure 3).

In Yamamoto's typology, *go3* (CL) is placed at the top node as a default general classifier. General classifiers are supposed to be widely used with all nouns in many numeral classifier languages (Lyons, 1977). In Mandarin, *go3* (CL) is the most frequently used classifier and classifies numerous nouns, so is widely regarded as the general classifier (Chao, 1968; Li & Thompson, 1981; Erbaugh, 1986). Cantonese has the same morpheme *go3* (CL), making it the most likely candidate for the general classifier. However, Mak (1991) questions whether *go3* (CL) can be qualified as the general classifier in Cantonese on semantic grounds, pointing out that *go3* (CL) has its own semantic restrictions and cannot be used with some nouns. For instance, *go3* (CL) is generally not used with substance-denoting nouns. Thus, the acceptability of phrases such as *jat1 go3 seoi2* 'one (CL) water' is marginal. Mak (1991) therefore suggests that it seems more appropriate to group it under 'mixed' classifiers, as no single classifier in Cantonese can claim to behave comprehensively as a general classifier. The writers question the evidential base for this conclusion for, whilst it is important to examine children's actual use of *go3* in Cantonese, it is just as important to explain why a general classifier in the acquisition process is welcome and helpful. One advantage of having a general classifier in the system is that it can predict/explain the direction of overgeneralization and why children overuse and generalize *go3* (CL) to other specific classifiers.

In addition to the debate about the existence of a general classifier, there are arguments among linguists over the exact number of Cantonese classifiers. Although over 200 classifiers have been documented as being in everyday use by adult speakers of Cantonese in Hong Kong (Wong, 1998, 2000), some researchers propose that there are only some 60 classifiers or so in Cantonese (Wei & Lee, 2001; Erbaugh, 2002). Uncertainty over the exact number of Cantonese classifiers is partly due to dialectal differences and the non-orthographic nature of some classifiers. It is also the case that container classifiers form an open-ended category and any container can serve as a classifier (Yip & Matthews, 2000). If it is a difficult task for psycholinguists to specify all the classifiers in Cantonese, the problems experienced by young children in mastering the system are understandable. In addition, the choice of classifier is often arbitrary and not predictable from the meaning or physical characteristics of the referent (Wei & Lee, 2001). Sometimes there may be two or more alternative classifiers for the same noun, depending on the context and on the particular attribute of the referent the speaker wishes to emphasize. All these usages have to be learned individually. These unique features help to make the acquisition of Cantonese classifiers a fascinating research topic for Chinese psycholinguists.

The acquisition of Cantonese classifiers

A number of longitudinal and experimental studies have been conducted over recent decades into the acquisition of classifiers in languages such as Mandarin (Erbaugh, 1986; Loke & Harrison, 1986; Hsu, 1987; Loke, 1991; Tse, Tang, Shie & Li, 1991; Hu, 1993*a*, *b*), Cantonese (Poon, 1980; Loke & Harrison, 1986; Mak, 1991; Szeto, 1996, 1998; Wong, 1998, 2000), Thai (Gandour, Petty, Dardarananda, Dechongkit & Mukngoen, 1984; Carpenter, 1991), Japanese (Sanches, 1977; Matsumoto, 1987; Uchida & Imai, 1999) and Hokkien (Ng, 1991). For example, Fang (1985) conducted an elicited counting study on 12 classifiers (11 sortal, 1 mensural) by Mandarin- and Cantonese-speaking children and found that the ability to use appropriate classifiers was low for both Mandarin- and Cantonese-speaking four-year-olds, and that performance increased rapidly during the preschool period. The syntax of classifiers in noun phrases in the form of [Num-CL-N] NP was mastered much earlier than the classifier semantics. All of the four-year-olds had already acquired the correct classifier syntax in enumerating noun phrases. In addition, both Mandarin- and Cantonese-speaking children used *ge/go3* to replace more appropriate classifiers.

Poon (1980) examined the acquisition of sortal classifiers by 27 Cantonese-speaking children aged between 2;7 and 6;10. Altogether, 27 sortal classifiers were anticipated to be prompted through the 89 different noun objects depicted on picture cards. In fact, the children produced 1–19 types of classifiers. Significant individual differences were found and the use of classifiers generally increased with age. The youngest children used only *go3* and the oldest children (6;10) had not yet reached adult-level proficiency.

With 122 normal children aged between four and eight years and 63 children aged between nine and sixteen years who had mild learning disability, Mak (1991) tested children's knowledge of 6 shape classifiers and 4 function classifiers. The major findings were that on average the children's performance improved with age and, in the initial stage, children overwhelmingly preferred the general classifier *go3* (CL). It is interesting to note that rules later also start emerging for *tiu4* (CL), *zi1* (CL) and *lap1* (CL). The small number of test items (10 classifiers), however, is too small for pronouncing definitively on early classifier acquisition.

Szeto (1998) explored the development of the entire classifier system in early child Cantonese via a one-year, in-depth longitudinal study of eight Cantonese-speaking children aged from 1;5 to 3;8. She found that: (1) the first set of Cantonese classifiers emerged around 1;7 to 1;8, although usage was sporadic; (2) the syntactic acquisition of classifiers was completed around 2;1 to 2;2; (3) children's classifier inventories varied from 23 to 39 different classifier types with examples of verb classifiers, sortal and

mensural classifiers; (4) verb classifiers were rarely used, whereas the majority of classifiers used were sortal noun classifiers; (5) children were sensitive to the mandatory nature of classifiers and rarely omitted them; and (6) the inappropriate use of classifiers was infrequent and mostly occurred with mixed classifiers. The small sample size was freely acknowledged as a major limitation of the study.

Wong (2000) argues that the above studies focus solely on sortal classifiers, thus missing out a very revealing piece of the puzzle, that of mensural classifiers. Only by taking into consideration all three subtypes of classifiers (sortal, mensural and verbal) is it possible for a complete developmental trend to be validly identified. Hence, Wong conducted a longitudinal study of four monolingual Cantonese-speaking children in Hong Kong (three males and one female) aged between 1;5 and 2;10. The major findings were that: (1) the children were sensitive from the onset of acquisition to all three subtypes of classifiers: numeral, verbal and mensural; (2) the general classifier *go3* (CL) was highly overgeneralized by children, with a strong preference to extend it to animals and various other referents; and (3) the general classifier *go3* (CL) and the verbal classifier indicating location, *dou6*, were the first two classifiers that all four children used. *zek3* (CL), a numeral classifier for animals, and *di1*, a mensural classifier for plurality, were the next set of classifiers. However, the very small sample size ($N=4$) and few age variations (between 1;5 and 2;10), weaken the generality of the findings of the study.

In brief, analyses of previous studies have elicited as many questions as answers. There is doubt about the exact number of the productive repertoire of classifiers by Cantonese-speaking children. A robust typology of Cantonese classifiers of the type made possible in the present study needs to be tested, and whether children use *go3* as the general classifier needs to be ascertained. At the same time, the developmental trend that syntactic acquisition precedes semantic mastering and that the core set of first classifiers reflects a proto-system with the crucial elements in place needs to be examined in a large sample. In an attempt to resolve these issues and to shed light on the acquisition of Cantonese classifiers in early childhood, the writers raised the following questions to guide the design of the fieldwork:

(1) How many types of classifiers can be identified in the productive repertoire of classifiers of Cantonese-speaking preschoolers?
(2) Will a typology emanating from the present study be sufficiently robust to permit conclusions about Cantonese-speaking children's productive repertoire?
(3) Will any core set of first classifiers reflect the subtypes of classifiers listed in the typology?

(4) Are there differences in classifier acquisition between children at different age levels? Specifically, will one find stable age-related developments in the type of classifiers and repertoire size?
(5) Is there a general classifier in Cantonese-speaking preschoolers' daily production? How might this be overgeneralized in classifier usage in early childhood and why?

METHOD

Subjects

The subjects were randomly selected from the sample participating in the International Educational Achievement (IEA) Preprimary Project, which gathered data from Hong Kong children in order to establish a normative framework of developmental milestones for children aged 3;0 to 5;11. The sampling pool of the IEA Project consisted of all the Cantonese-speaking preschoolers in this age range in Hong Kong. The sample in the present study consisted of 492 children selected from 68 preschools (58 kindergartens and 10 nurseries) located in Hong Kong Island, Kowloon and the New Territories. The subjects were randomly selected from each class in the participating preschools, representing three age groups (3;0, 4;0 and 5;0), with 82 boys and 82 girls in each age group. In order to minimize the influence of variability of home background and teaching approach, the number of children in each preschool was limited to 10.

Communication task

A toy-play context was set up in the selected children's classroom and furnished with a set of toys, including cooking materials, food and fruit, furniture and electrical appliances, hospital materials and vehicles. Each randomly arranged pair of participants (boy/girl, boy/boy or girl/girl) was left in the play corner to play for 30 minutes. They were encouraged to talk while they were playing and the 30-minute conversations were recorded using an unobtrusive recorder. During the free-play sessions, researchers observed but did not intervene and there were no other children present.

Transcription

All conversations were audiotaped using high-fidelity equipment. Each conversation was first transcribed by one of two conversation researchers to a level of detail that captured all words and word fragments audible to the ear, as well as overlapping speech. Also transcribed were non-lexical fillers (such as 'uh') and other vocalizations (such as laughter). Transcriptions were made using a tape player that allowed automatic rewinding for

repeated playing at slow and normal speeds. After each conversation was transcribed, other researchers independently checked transcripts while listening to the tape to guarantee that each transcript was accurate.

Coding of the lexical classes

Specially trained research assistants entered the transcribed utterances into a computer using Microsoft Chinese Windows 98 and Office 97. Next, the Chinese script of each child's oral language was segmented into utterances. Classifiers (including wrongly-used ones) were identified in the types of noun phrases below in Cantonese (Szeto, 1998) by two research assistants. Then the coding results were scrutinized by one author of this paper and all the writers carefully went through the listed classifiers to achieve a consensus of the Cantonese classifiers.

(a)	[Dem-Num-CL-(N)]	呢 一 隻 (狗) *nei1 jat1 zek3* (gau2) [this one (CL) dog] 'this dog'
(b)	[Dem-CL-(N)]	呢 隻 (狗) *nei1 zek3* (*gau2*) [this (CL) dog] 'this dog'
(c)	[Num-CL-(N)]	一 隻 (狗) *jat1 zek3* (*gau2*) [one (CL) dog] 'one dog'
(d)	[Q-CL-(N)]	每 隻 (狗) *mui5 zek3* (*gau2*) [each (CL) dog] 'each dog'
(e)	[Wh-CL-(N)]	邊 隻 (狗) *bin1 zek3* (*gau2*) [which (CL) dog] 'which dog'
(f)	[CL-N]	隻 狗 *zek3 gau2* [the (CL) dog] 'the dog'
(g)	[CL-CL-(N)]	隻 隻 狗 *zek3 zek3* (*gau2*) [(CL) (CL) dog] 'every dog'
(h)	[N1-CL-N2]	瑪莉 隻 狗 *ma5lei6 zek3 gau2* [Mary (CL) dog] 'Mary's dog'

Reliability

The text transcript of the corpus, which consisted of 246 cases, was divided into halves and two trained coders coded each half ($n = 123$). Before starting

the formal coding, the two coders recoded 6 cases selected from each half. The percentage agreement on the 12 cases was a satisfactory 93·8%, indicating an excellent inter-rater reliability.

RESULTS

The final database consisted of a total of 90,908 words from the 492 children. The sample produced a mean of 48·65 (*S.D.* = 17·35) utterances that yielded a mean of 184·77 (*S.D.* = 52·38) vocabulary words per child. The percentages of each lexical class (including exclamations and onomatopoeia) across the three age groups were calculated. The majority of words produced by the sample were verbs, auxiliaries, pronouns, nouns and adverbs, accounting for 80% of the total number of words produced by the participants. By contrast, the proportion of classifier tokens was consistently lower than 8% (6·72% for age 3 ;0, 7·11% for age 4 ;0 and 7·5% for age 5 ;0). It is important to note that all of the language samples were of variable length; thus the absolute counts were not used directly in the analyses. In counting the number of classifier types produced by each child, for example, the researcher counted only whether the child had used the classifiers or not, not the number of times a classifier had been used. In this way, this study could count how many types of classifiers the children used and then the repertoire size of each age group. This calculation is therefore independent of utterance length.

The productive repertoire of Cantonese preschoolers

Altogether 73 classifier types were identified from the utterances produced by the 492 participants. As shown in Table 1 and Figure 3, all these classifiers were able to be placed appropriately within the typology proposed by the writers. The number and relative percentages of each subtype within the subcategories are shown in Figure 3. The results indicate that: (1) most (93·15%) of the Cantonese classifiers were noun classifiers; few (6·85%) were verb classifiers; (2) within noun classifiers, mensural classifiers exceeded sortal classifiers in terms of percentages (60·29% vs. 39·71%) and total numbers (41 vs. 27); (3) inanimate classifiers (25, 92·59%) predominated over animate classifiers (2, 7·4%) within the subcategory of sortal classifiers; (4) collective classifiers (14, 34·15%), containment classifiers (15, 36·59%) and measurement (12, 29·27%) had almost even levels in the subcategory of mensural classifiers; (5) concrete classifiers (22, 88%) prevailed over abstract classifiers (3, 12%) within the subcategory of inanimate classifiers; (6) there was only one classifier within the subtype of animal classifier and that of human classifier; (7) an even proportion between function classifiers (11, 50%) and shape classifiers (11, 50%) was found in

TABLE 1. *List of the classifiers produced by the Cantonese-speaking preschoolers* ($N = 492$)

Noun classifiers

No.	Chinese	Wong	No.	Chinese	Wong
1	個	*go3*	35	排	*paai4*
2	隻	*zek3*	36	疊	*dip6*
3	架	*gaa3*	37	樽	*zeon1*
4	杯	*bui1*	38	頂	*ding2*
5	把	*baa2*	39	種	*zung2*
6	條	*tiu4*	40	層	*cang4*
7	間	*gaan1*	41	朵	*doe2*
8	舊	*gau6*	42	餐	*can1*
9	塊	*faai3*	43	班	*baan1*
10	張	*zoeng1*	44	盆	*pun4*
11	粒	*lap1*	45	首	*sau2*
12	碗	*wun2*	46	煲	*bou1*
13	啖	*daam6*	47	日	*jat6*
14	度	*dou6*	48	月	*jyut6*
15	件	*gin6*	49	行	*hong4*
16	樣	*joeng6*	50	套	*tou3*
17	啲	*di1*	51	匙	*ci4*
18	枝	*zi1*	52	匙羹	*ci4gang1*
19	蚊	*man1*	53	毫	*hou4*
20	對	*deoi3*	54	壺	*wu4*
21	棵	*fo2*	55	筒	*tung4*
22	支	*zi1*	56	點	*dim2*
23	幅	*fuk1*	57	羹	*gang1*
24	位	*wai2*	58	吋	*cyun3*
25	本	*bun2*	59	組	*zou2*
26	份	*fan6*	60	款	*fun2*
27	部	*bou6*	61	屋	*uk1*
28	歲	*seoi3*	62	面	*min6*
29	碟	*dip6*	63	格	*gaak4*
30	號	*hou6*	64	晝	*zau3*
31	包	*bau1*	65	錢	*cin4*
32	盒	*hap6*	66	箕	*gei1*
33	缸	*gun3*	67	籠	*lung4*
34	批	*pai1*	68	箱	*seong1*

Verb classifiers

No.	Chinese	Wong	No.	Chinese	Wong
1	次	*ci4*	4	步	*bou6*
2	輪	*leong4*	5	眼	*ngaan5*
3	拳	*kyun4*			

the subcategory of concrete classifiers; and (8) there was no predominance of 1D (4, 36·36%), 2D (4, 36·36%) or 3D (3, 27·27%) classifiers within the subcategory of shape classifiers.

The noun classifiers produced by the three age groups were analyzed and placed within the typology to permit identification of developmental trends. As shown in Table 2 and Figure 2, the results indicate that: (1) the first set of classifiers produced by the three-year-old Cantonese speakers covered all the subtypes in the typology; (2) 54% of the noun classifiers were present in the three-year-olds' utterances, 25% in those of the four-year-olds and 21% in those of the five-year-olds; and (3) the time of and before three years is possibly a critical period for the acquisition of Cantonese classifiers.

ANOVAs of age and gender were applied to examine age and gender differences in the number of classifier types. The results shown in Table 3 indicate that there was a marginally significant effect for age ($F(2, 489) = 2{\cdot}42$, $p = 0{\cdot}09$), but not for gender ($F(1, 489) = 0{\cdot}73$, $p = 0{\cdot}392$) in the number of classifier types. Further, no significant age-by-gender effect was found from a two-way ANOVA of age by gender. There was a gradual but significant increase in the repertoire sizes among the three age groups, as shown in Figure 2, suggesting an apparent age-related growth trend in classifier variations.

Two-way contingency tables were used to test for statistically significant age and gender differences in the first 10 classifiers with the highest frequency of occurrence. As shown in Table 4, significant age differences were found in most cases, the exceptions being *bui1* (CL) (mensural classifier, containment) and *gaan1* (CL) (sortal classifier, function). No gender differences were found. Dramatically, 9 of the top 10 classifiers are sortal classifiers, the only mensural classifier being *bui1* 'cup', which is originally a name of a container. To partial out the effect of sample size, Cramer's phi was used to calculate the effect size. The biggest effect is *gaa3* (CL), which is 0·155 and is considered a small effect. This is reasonable since the effect of a large sample size has been discounted. Hence, though there are significant effects of age on these top classifiers, the effects are not large.

Overgeneralization and inappropriate use of classifiers

It was found that the percentages of use of the classifier *go3* in children's conversations were 86% (141/164), 95% (155/164) and 89% (146/164) for age 3;0, 4;0 and 5;0, respectively. The overextended use of *go3* (CL) occurred most frequently to refer to everyday objects which have their own specific classifiers, such as human beings *nei1 go3 jan4* 'this (CL) person' and *keoi5 go3 hok6 sang1* 'his/her (CL) student', and round objects such as *jat1 go3 caang2* 'one (CL) orange' and *loeng5 go3 bo1* 'two (CL) balls'. As shown in Table 5, *go3* (CL) was used by the Cantonese-speaking children to replace most of the subtypes of sortal classifiers such as *zek3* (animate), *tiu4* (1D flexible), *zi1* (1D rigid), *gaa6* (function), *gaan1* (function), *zoeng1* (2D shape), *faai3* (2D shape), *po1*(3D shape) and *baa2* (function). It's important

TABLE 2. *The list of noun classifiers manipulated by Cantonese-speaking preschoolers*

Noun classifiers						3;0	4;0	5;0
Sortal classifier	General classifier (Go3)	Animate	Animal			隻 /zek3/		
			Human			位 /wai2/		
		Inanimate	Concrete	Shape	1D Flexible	條 /tiu4/		
					1D Rigid	支 /zi1/、枝 /zi1/		
					2D	幅 /fuk1/、張 /zoeng1/、塊 /faai3/	格 /gaak4/	
					3D	舊 /gau6/、粒 /nap1/、個 /go3/		
				Function		本 /bun2/、部 /bou6/、件 /gin6/、間 /gaan1/、架 /gaa3/、把 /baa2/、棵 /fo2/、啖 /daam6/	朵 /doe2/、餐 /can1/、頂/ding2/	
			Abstract			樣 /joeng6/		首 /sau2/
Mensural classifier	Collective classifier					對 /deoi3/、份 /fan6/、包 /bau1/、批 /pai1/、排 /paai4/	種 /zung2/、班 /baan1/、行 /hong4/	套 /tou3/、組 /zou2/
	Containment classifier					杯 /bui1/、碗 /wun2/、碟 /dip6/、盒 /hap6/、缅 /gun3/	樽 /zeon1/、煲 /bou1/、筒 /tung4/、羹 /gang1/、屋 /uk1/	盆 /pun4/、匙 /ci4/、匙羹 /ci4gang1/、壺 /wu4/、箱 /soeng1/
Measurement classifiers						歲 /seoi3/、號 /hou6/、蚊 /man4/、度 /dou6/	點 /dim2/、吋 /cyun3/、錢 /cin4/、毫 /hou4/	日 /jat6/、月 /jyut6/、款 /fun2/、晝 /zau/

TABLE 3. *Mean and* S.D. *of types of classifiers and repertoire size produced by age* 3;0, 4;0 *and* 5;0

Age	N	Mean	S.D.	Compare means	T	Effect size	Repertoire size
3	164	11·0	7·4	Between age 3;0 and 4;0	1·3	0·14	36
4	164	12·1	7·4	Between age 4;0 and 5;0	1·0	0·11	54
5	164	13·1	9·9	Between age 3;0 and 5;0	2·1*	0·23	73

* $p < 0{\cdot}05$.

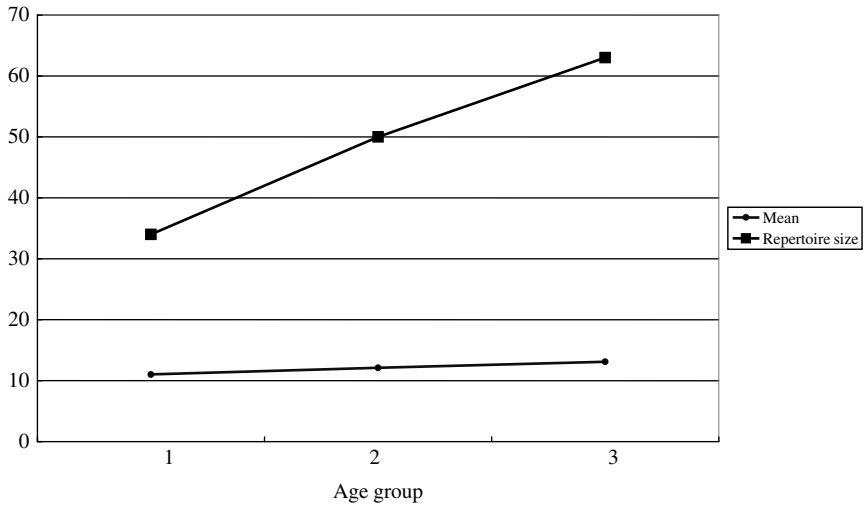

Fig. 2. Mean number of classifier types and repertoire size produced by three age groups ($N = 492$).

to note that all of the overgeneralizations of *go3* occurred in the cases where a specific sortal classifier is needed to classify the noun. No cases of replacing mensural classifiers with *go3* were found in the present study. This indicates that, in terms of the syntactic awareness of these Cantonese preschoolers, the general classifier *go3* was used to replace only sortal classifiers, not all kinds of classifiers.

However, *go3* was not the only overgeneralized classifier. Other classifiers, such as *zek3* (CL), *tiu4* (CL) *and gaan1* (CL), were also 'borrowed' to replace other specific classifiers. A summary of these cases is presented in Table 6. As they are not general classifiers, the overgeneralization of these classifiers is regarded as 'inappropriate' usage. Other instances of the inappropriate use of a classifier out of place, for example using a classifier where one is not required, the omission of classifiers and so on were not

TABLE 4. *Age differences in top* 10 *classifiers with the highest frequency of occurrence in Cantonese-speaking children*

	Classifier	Subtype	Age 3;0	Age 4;0	Age 5;0	Chi-square value	Cramer's phi
1	個*go3*	general classifier (CL)	141	155	146	6·72[b]	0·117
2	隻*zek3*	sortal CL (animate)	40	52	56	4·02[a]	0·090
3	架*gaa3*	sortal CL (function)	34	13	20	11·85[c]	0·155
4	杯*bui1*	measural CL (containment)	16	17	22	1·27	0·051
5	把*baa2*	sortal CL (function)	16	15	8	3·18[a]	0·080
6	條*tiu4*	sortal CL (1D flexible)	12	17	28	7·98[b]	0·127
7	間*gaan1*	sortal CL (function)	11	10	12	0·20	0·020
8	舊*gau6*	sortal CL (3D shape)	9	13	16	2·11[a]	0·065
9	塊*faai3*	sortal CL (2D shape)	9	10	15	1·96[a]	0·063
10	張*zoeng1*	sortal CL (2D shape)	8	16	13	2·86[a]	0·076

[a] $p < 0{\cdot}05$.
[b] $p < 0{\cdot}005$.
[c] $p < 0{\cdot}001$.

found in the present study. The finding of no omission of classifiers seems to indicate that, by three years, Cantonese-speaking children understand that a classifier is obligatory when enumerating or quantifying nouns. However, one case of using redundant classifiers was found, as is evident in the following example:

UTTERANCE: *Jau5 go3 jau5* ***go3 gaan1*** *maai5 tong4 gwo2 ge3 dim3 hai2 dou6*.
CORRECTED: *Jau5* ***gaan1*** *maai5 tong4gwo2 ge3 dim3 hai2 dou6*.
ENGLISH: 'There is a (CL) shop selling candies, over there.'

This example with two classifiers could be a case of self-repair or correction: the child begins with the non-target *jau5 go3* 'there is a (CL)' before repeating this sequence and eventually arriving at the target classifier, *gaan1* (CL). If so, the apparent double classifier would be a performance error rather than a systematic one.

DISCUSSION

As the largest investigation ever made so far of classifier acquisition in Cantonese-speaking children, the research set out to examine a rich set of data in an attempt to ascertain the productive repertoire of classifiers and to outline developmental trends. Turning first to the productive repertoire of Cantonese classifiers by the preschool children, using a substantially sized sample there was abundant evidence to test the appropriateness and suitability of the typology proposed in Figure 3. It was found that the

TABLE 5. *Summary of the overgeneralizations of* go3 *by the Cantonese preschoolers* ($N = 492$)

Type of overgeneralization		Cases
Replace *zek3* (sortal, animate)	*Lo2* ***go3*** *bui1* 'Take that (CL) cup'	*Cung4 cin4 wo3 jau5 jat1 go3 cing1 waa1* 'Once upon a time, there is a (CL) frog'
	jat1 ***go3*** *gaai1 dan2* '(There) is an (CL) egg'	*Jau5* ***go3*** *hung4 jan2 gin3 dou2 ho2 do1 ngai5* 'There was a (CL) (toy) bear who saw many ants'
Replace *tiu4* (sortal, 1D flexible)	*Li1* ***go3*** *jyu2 lei1?* 'This (CL) fish?'	*Zing2* ***go3*** *cong4 cong2, zing2* ***go3*** *bei6 zai2 a3* 'Make a (CL) caterpillar, make a (CL) small nose'
	Li1 ***go3*** *kiu4 lai4 gaa3!* 'This is a (CL) bridge!'	*Ngo3 so2 dak1 bei2* ***go3*** *so2 si4 ngo3 tai2 ha3* 'I locked and show me this (CL) key'
Replace *zi1* (sortal, 1D rigid)	*Zou6* ***go3*** *fo2 zin3* 'Make a (CL) rocket'	*Bei2* ***go3*** *jik1lik6dou1 ngo3 a3* 'Give the (CL) yakult to me'
Replace *gaa6* (sortal, function)	*Zing2 lan6* ***go3*** *fo2 ce1* 'Broke the (CL) train'	*Wai3! Lei5 jau6 cuo3 li1* ***go3*** *laam6 ce1 .....*
	Wai3! Lai4 ***go3*** *baa1si2* 'Hey, give me the (CL) bus'	'Hey, you again take this (CL) cable car' *Ji1 dou6 jau5* ***go3*** *jing2 seong2 gei1 a3* 'Here is a (CL) camera'
Replace *gaan1* (sortal, function)	*Jau5 jat1 go3 jau4 gok2 hai2 dou6* 'There is a (CL) post office'	*Jau5 jat1* ***go3*** *dim3 hai3 mai3 syun4 ge3 dim3* 'There is a (CL) shop for buying ship'
Replace other sortal classifiers	Animate (horse)	*Pei1 : Ngo3 jau5 li1* ***go3*** *ma3, li1 dou6 wo3* 'I have this (CL) horse, here'
	2D shape	*zeong1 : Cai3* ***go3*** *bi4 bi1 cong4* 'Build a (CL) baby bed'
		faai3 : Leong3 ***go3*** *gau1 bou3* 'Two (CL) plasters'
	3D shape	*po1 : Cai3 sai3 sing4* ***go3*** *sing3 daan3 syu6* 'Build the whole (CL) Christmas tree'
	function	*ba2 : Tang1 dou2 jat1* ***go3*** *sing1 jum1* 'I heard a (CL) voice'

productive repertoire of Cantonese classifiers could be classified fully within the typology in Figure 3. The 492 children produced a total number of 73 classifier types, a figure very close to that ($N = 63$) in Szeto's (1998) study of 8 Cantonese-speaking Hong Kong children from 1;5 to 3;8. The tiny difference between two studies might be primarily due to the age difference, as the subjects in the present research were aged from 3;0 to 5;0. The writers

TABLE 6. *Summary of the overgeneralizations of other classifiers by the Cantonese preschoolers* ($N = 492$)

Types	Cases
Overgeneralization of *zek3*	*Sei3* ***zek3*** *faa1 saang1* 'Four (CL) peanuts' (*nap1*) *Ngo3 gin3 dou2* ***zek3*** *se4 hai2 dou6 hang4gan2* 'I saw the (CL) snake walking' (*tiu4*) *Mo3 ce1 luk1 ga3 lei5* ***zek3*** *fei1gei1* 'Your airplane has no (CL) wheel' (*gaa3*) Dim2 zi1 dak6 jin4 jau5 ***zek3*** *gei1 haai6 jan4* 'Suddenly there is a (CL) robot' (*go3*)
Overgeneralization of *tiu4*	*Li1* ***tiu4*** *zi3 hai6 zam1 a3, nei3 zi6 gei2 sin1 zi3 ceon2* 'This (CL) is the needle, you are the one who is stupid' (*zi1*) *Li1* ***tiu4*** *mat1 je3 saam1* 'What this (CL) garment is' (*gin6*)
Overgeneralization of *gaan1*	*Ngo3 ma1mi4 hai2* ***gaan1*** *fa1 jyun2 dou6 jau5 mei6 dou6 jau5 ngan4 sik1* 'My mum in the (CL) garden have smell and colour' (*go3*)

believe that the total number of 73 seems reasonable, even though there is no absolute consensus on the exact number of Cantonese classifiers among linguists. In addition, both Szeto (1998) and the present study found that the core set of first classifiers contained all three subtypes of classifiers: numeral, verbal and mensural. These consistent findings indicate that the young children had acquired the syntactic prototype of the three subtypes of classifiers by age 3;0.

It was also found that most of the first classifiers are noun classifiers, with few being verb classifiers. The significant predominance of noun classifiers would be well received by Cantonese linguists (Killingley, 1983; Yip & Matthews, 2000; Erbaugh, 2002). In addition to the predominance of noun classifiers, three other types of predominance were found within the noun classifiers. Mensural, inanimate and concrete classifiers significantly dominate their own subcategories, respectively. The prevalence of inanimate classifiers and that of concrete classifiers has been found in adult productions and accords with the theories of respected Cantonese linguists such as Killingley (1983) and Yip & Matthews (2000). The predominance of mensural classifiers, however, reflects not only the developmental trend of classifier acquisition but also the specific features of Cantonese classifiers. Linguistically, the relatively large percentage of mensural classifiers within the subcategory of noun classifiers may be attributed to the expanding subtype of containment classifiers. Understandably, this usage is open-ended, as any container could be used as a containment classifier. At the

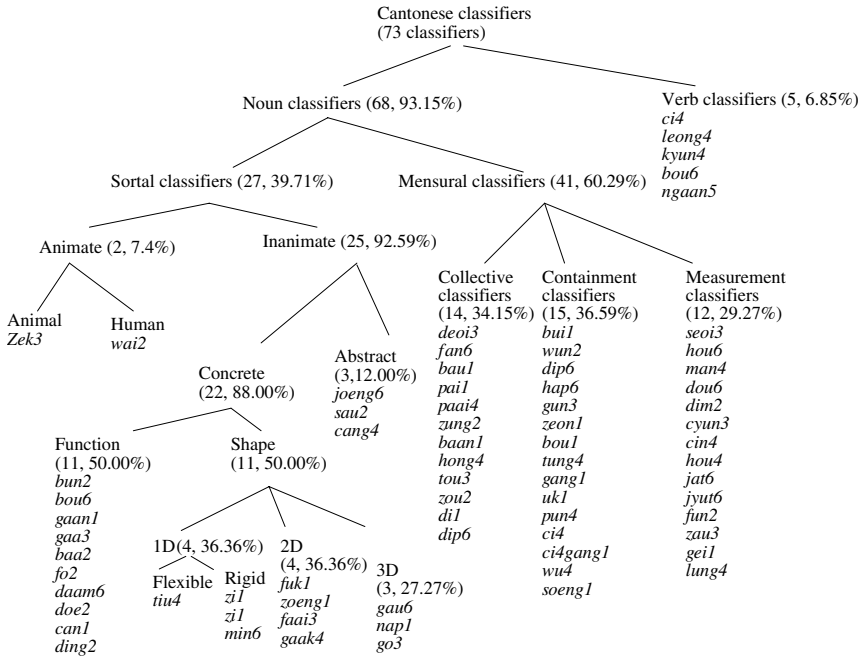

Fig. 3. The typology of the Cantonese classifiers produced by the sample ($N = 492$).

same time, most previous studies of Cantonese classifiers have focused on sortal classifiers (see Wong, 2000).

It may be that, developmentally, this phenomenon is associated with the maturing language proficiency of young children. Types of mensural classifiers were found significantly more often than those of sortal classifiers. However, nearly all the top ten classifiers were sortal classifiers (except for one mensural classifier). The conflict in these findings is possibly attributable to developments in language proficiency and might be reflecting cognitive development. Sortal classifiers qualify the noun referent according to intrinsic characteristics, while mensural classifiers quantify the noun referent by a humanly determined unit (Szeto, 1998). Classification by a sortal classifier is intrinsic whereas a mensural classifier imposes an extrinsic measure on the noun referent. Hence, using sortal classifiers is more applicable than using mensural classifiers as different sortal classifiers suggest different intrinsic attributes of the noun referent. In addition, Szeto (1998) speculates that the impact of a precise quantity on children is less important than the impact of the intrinsic qualities of the noun referent. Therefore, the younger children in her study (Szeto, 1998) used more sortal classifiers, and the young children in our study used sortal classifiers more frequently.

Three developmental trends in classifier acquisition, widely reported in the literature (Poon, 1980; Hu, 1993; Szeto, 1998; Mak, 1991; Wong, 2000), were also found in the present study. First, the children overwhelmingly favoured the 'general classifier' *go3* in this early stage of their language acquisition. Hu (1993*a*, *b*) asserts that children acquire the syntactic structure of the numeral classifier phrase by first acquiring the general classifier as a placeholder that is later replaced by more specific classifiers. The acquisition of a general classifier is syntactically motivated and that of specific classifiers is semantically instigated. This proposal is supported by the evidence in the present study. Second, the study also lends support to the notion that children's performance in classifier usage generally improves with age (Poon, 1980; Hu, 1993*a*; Szeto, 1998; Mak, 1991; Wong, 2000). Some 54% of the noun classifiers in the productive repertoire emerged in the three-year-olds' utterances, and the number substantially increased each year during the remaining preschool years. Wei & Lee (2001) found an age-related but relatively slow progression (the productive repertoire of Cantonese classifiers was fewer than nine items). Sample size and language context might have made the difference, as the subjects in Wei & Lee's (2001) study were 34 British-born Cantonese–English bilinguals aged between five and sixteen years. Third, the present study's finding is similar to that of Fang (1985), who asserts that four-year-olds are able to use the correct classifier syntax in enumerating noun phrases. In fact, the evidence is that the three-year-olds in the present study had to a large extent acquired the basic syntax of classifiers, as no omission of classifiers was observed and *go3* was widely used as a syntactic placeholder. Coincidently, Erbaugh (1986, 2002) found repeatedly that Cantonese-speaking children overused the general classifier but almost never omitted a classifier where it was grammatically required.

The present study found no predominance for using 1D, 2D and 3D shape classifiers among the participants. It is important to note that the notion of dimensionality (1D, 2D and 3D) is not an objective classification of the objects classified. Rather, it suggests that certain dimensions are cognitively salient. For example, something classified with *zoeng1* (e.g. a table) is not actually a two-dimensional object. It is classified as such because it has a flat 2D surface as one of its salient features. In addition, the present study found no cases to support Wong's (2000) conclusion that animacy plays a role in determining which classifiers emerge earlier among children aged 1;5 and 2;10. This might be due to the age differences between two cohorts, and research involving a larger sample of younger children is needed to clarify the inconsistencies. Studies of logical thinking and cognitive development are also pertinent for illuminating the processes involved, as cognitive psychologists maintain that language mirrors thought.

The finding that *go3* was overused by the participants is pertinent to theorizing about the use of a general classifier by very young children. Chao (1968) and Erbaugh (1986) observed that Chinese has the general classifier *ge* (*ge* in Man darin, *go3* in Cantonese), which is applicable to any individual noun and can replace any classifier. This is in line with Lyons' (1977) definition of a general classifier. Since then, *ge* has been widely accepted as the general classifier in Mandarin to classify numerous nouns (Chao 1968; Lyons, 1977; Li & Thompson, 1981; Erbaugh, 1986). But some researchers (e.g. Mak, 1991) suggest that *go3* (CL) in Cantonese should not be treated as a general classifier, even though it can be used with very many nouns. The data in the present study seem to indicate that *go3* (CL) in Cantonese could be labelled 'general classifier'. It was found that in 86–96% of the occasions when the children used a classifier, *go3* (CL) was their first choice. And they tended to use *go3* (CL) to replace only the sortal classifiers (not the mensural classifiers) including: (1) animal sortal classifiers; (2) 1D, 2D and 3D shape sortal classifiers; and (3) function sortal classifiers. These findings are consistent with analyses by Matthews & Yip (1994) and the findings of Fang (1985), Stokes & So (1997), Szeto (1998) and Wong (2000). One may argue that the children have not yet securely acquired the exact semantics of the classifiers and do not yet know which classifier is appropriate in certain contexts, and therefore opt for the general classifier *go3* (CL). Erbaugh (2002) found that even highly educated people might use a general classifier where prescriptive grammar expects a sortal classifier, and the general classifier *go3* (CL) is widely used with 44% of Cantonese nouns. Furthermore, the present study found that *go3* (CL) was the most frequently used classifier, even at the age of 4;0 and 5;0 when the children were able to use a greater variety of classifiers, such as *zoeng1* (CL), *faai3* (CL) and *bun2* (CL). In these circumstances, the writers suggest that *go3* be regarded as the general classifier.

Why did the children overuse the general classifier? There are cognitive, linguistic and contextual influences that may be presumed to have shaped this overuse by the sample. First, using the general classifier is a cognitively accessible and economical strategy so that, when in the toy-play situation, the children eased the burden on their cognitive processing and shortened response time by using the widely accepted and 'general' classifier. Similarly, Fang (1985) noted that overuse of the general classifier might be an outcome of a cognitively accessible and economical strategy. Second, the general classifier is typically the only correct choice to refer to 'human' other than *wai2* (CL), the human-only classifier in Cantonese which is widely used in the written language. Third, discourse factors are also important. It was noted in the present study that the first mention of an object often featured a specific classifier, but that later mention very often was simplified to the general classifier. This interpretation is given weight

by the inappropriate use of other classifiers. Beside the wide use of the general classifier, *zek3* (CL), *tiu4* (CL) and *gaan1* (CL) were also employed to replace specific classifiers by the participants in the present study.

Why did the young children overgeneralize these three high-frequency classifiers? First, overusing *zek3* (CL) might be attributed to the fact that this classifier is highly salient for Cantonese speakers (Erbaugh, 2002) and that, accordingly, it was the most frequently used classifier (except for *go3* in the present study. Mak (1991) suggests that children with higher language proficiency, or who are in a higher age group, tend to overgeneralize specific classifiers commonly used in daily life. In the present study, *zek3* (CL) was the top sortal classifier with the highest frequency of occurrence (see Table 4) and the children tended to overuse it in their utterances. This finding is in line with that of Erbaugh (2002). Second, the overuse of *tiu4* (CL) might be a type of misusing behaviour when children tend to repeat the same classifier that has occurred in their previous phrases, such as *nei5 jau5 jat1 tiu4 syun4, ngo3 jau5 jat1 tiu4 ce1* 'You have a (CL) boat, I have a (CL) car'. In this case, they overgeneralize the classifier *tiu4*, as they are aware that a classifier is syntactically necessary but are unable or simply unwilling to produce a semantically more appropriate one. Third, the overuse of *gaan1* is of special interest to the writers, as there have been no similar reports in other studies. In Cantonese, *gaan1* refers to a whole flat or building (Erbaugh, 2002). In the case of *ngo3 maa1mi4 hai2* ***gaan1*** *faa1 jyun2 dou6 jau5 mei6 dou6 jau5 ngaan4 sik1* 'My mum in the (CL) garden have smell and colour', the specific classifier for 'garden' is *zo6*, which is also a function sortal classifier like *gaan1* (CL). However, *gaan1* (CL) is easier than *zo6* (CL) to grasp (e.g. *gaan1* is a top seven classifier) and emerges earlier (around three years) than *zo6* (CL), which is not yet in the repertoire of Cantonese-speaking preschoolers. Possibly, this case might reflect the fact that the child had not yet reached adult-level proficiency.

On the basis of using a large sample and gathering a large bank of linguistic data from an authentic 'child' context, evidence has been gathered that enable a number of conclusions to be drawn: an exact quantification of the productive repertoire of classifiers by Cantonese-speaking children has been proposed; a working typology of Cantonese classifiers has been advanced; and the general classifier *go3* (CL) has been confirmed. The study has also uncovered developmental trends that are worth exploring further. However, the study has its limitations. First, it targeted a cross-sectional rather than a longitudinal sample and, second, the age range examined should, in hindsight, have been extended both downwards and upwards in order to permit comment on the validity of published research in the area.

As it stands, the study offers a descriptive but accurate account. Its design and scope did not permit the researchers to comment on how the children's

language had developed, but the typology and repertoire found in the present study have set up a cornerstone for further theoretical building. Are the developmental trends a product of the nature of Cantonese or are they by-products of home and the linguistic environmental factors? It is likely, of course, that both possibilities apply. The discovery that young Cantonese-speaking children tend to overgeneralize several commonly used classifiers should be noted by early childhood educators. Such usage should be tolerated and children should be provided with structured learning to utilize and extend their linguistic repertoire. The researchers were struck by the considerable variability in the children's language and believe that there is clearly scope for further study of Cantonese classifiers.

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