This paper examines the use of additive and restrictive focus particles in child Cantonese using longitudinal data from five children aged between one and a half and three years old. We address the issues of relative onset of additive and restrictive focus, the range of application of focus particles in the language input, and alternative semantic representations of focus that may be entertained by children. The paper will be organized as follows. First, I will discuss the representation of additive and restrictive focus, and issues in the acquisition of focus. Next, I describe the properties of additive and restrictive focus particles in Cantonese. Then I will present the longitudinal data, observing when the particles appear in children's naturalistic speech, their contexts of use, and how range of application is marked in the input. Finally, I will discuss the findings with reference to the learning issues as well as data from other languages.

1. The representation of restrictive and additive focus

Focus-sensitive particles such as *only* and *also* are logical operators that interact with focus in intricate ways. Focus realized by pitch prominence on a constituent induces a set of alternatives which substitute for the value of the focused constituent. The particles as operators specify the ways in which the alternatives are to be included or excluded with respect to the quantificational postulates the particles encode. The set of alternatives serves as the domain of quantification of the operators (Rooth 1985, 1992). In addition, the particles circumscribe, by virtue of their syntactic position and lexical properties, the range of constituents which can be focused in such interaction.

Besides inducing a set of alternatives, some particles such as *only* and *even* introduce a scale which ranks the alternatives in relation to the value of the focused constituent (König 1991: 37).

(1a) George only wiped [the bicycle].
(1b) George only [wiped], the bicycle.

Consider how *only* associates with focus in (1). Intuitively, (1a) presupposes that George wiped the bicycle and asserts that George wiped the bicycle, and nothing else. The sentence (1b) presupposes the same, and asserts that the only action George performed on the bicycle was wiping it. In (1a), the object is in focus, and the alternatives are the set of objects x such that George wiped x. In (1b), in which the verb is focused, the alternatives will be the set of actions r such that what George did to the bicycle was r. The set of alternatives actually considered in discourse will be generally confined to those relevant to the communicative context.

Following the formulation of Rooth (1985, 1992), the interpretation of a sentence of the form ‘George only VP’ is given in (2).

\[(2) \forall P \left[ P \in C \& P(g) \rightarrow P=VP^*\right] \text{ where } C \subseteq [VP]^f\]

The focus semantic value of VP, represented as \([VP]^f\), is defined as the set of open formulas which result from replacing the focused constituent with a variable. C
represents a pragmatically determined subset of the focus semantic value of VP. It is an open variable whose content is determined by focus position and discoursal context. The quantificational statement (2) says that for all properties P such that P belongs to the contextually determined set of alternatives, and P holds of George, then P is identical to the semantic value of the VP. To illustrate, for the case of object focus in (1a), C represents a set of formulas of the form ‘wiped x’; for verb focus in (1b), C will be a set of formulas of the form ‘r the bicycle’. Depending on which constituent is in focus, the focus semantic value of VP (i.e. the set [VP]₀) will vary, as will C, which is a subset of the focus semantic value. In this manner, focus constrains the set C, from which the universally quantified property P is drawn. In the terminology of Rooth, focus constrains the domain of quantification of the logical operator.³

The particle also associates with focus in analogous ways. Consider (3a-c), which are instances of object focus, verb focus and subject focus respectively. Intuitively, (3a) presupposes that George wiped something other than the bicycle, (3b) presupposes that George did something else to the bicycle besides wiping it, and (3c) presupposes that someone else besides George wiped the bicycle. All three sentences assert that George wiped the bicycle.

(3a) George also wiped [the bicycle].
(3b) George also [wiped] the bicycle.
(3c) [George] also wiped the bicycle.

Following the framework of Rooth (1992), one may represent the presupposition of the focus-sensitive particle also as follows.⁴

(4) \(\exists Q \ [ Q \in C \& Q \neq S']\) where Q is a proposition and \(C \subseteq [S]₀\)

On this analysis, the focus semantic value of the sentence, \([S]₀\), and the form of the alternatives in C, will depend on which constituent is focused. For (3a), C will be a set of alternatives of the form ‘George wiped x’; for (3b), C will consist of alternatives of the form ‘George r the bicycle’; and for (3c), C will be composed of formulas of the form ‘z wiped the bicycle’. Here too, focus constrains the set of alternatives in deciding where the variable in the alternatives of C will be positioned. In this instance, focus helps identify the domain of quantification for the existential quantifier, which operates on propositions Q drawn from the set C.

Focus-sensitive particles differ with respect to the quantificational statements that they encode. Thus, the meaning of the restrictive focus particle only as expressed by universal quantification in (2) signifies exclusion or restriction, in that the predicational content of the sentence applies to the value of the focused constituent, excluding all other alternatives. The meaning of the additive focus particle also as captured by existential quantification in (4) expresses addition or inclusion, since the set of entities which the propositional content of the sentence applies to includes not just the value of the focused constituent, but additionally at least one alternative to it. The particles only and also in preverbal adverbial position have different ranges of application, with the former being able to operate on the subject NP, but not the latter. Two other differences between the particles should be noted. Only contributes to the truth conditions of the sentence while also does not (Horn 1969, König 1991). Further, only has a scalar use in its being able to introduce a scale of ranking into the
alternatives. Such a scalar use is not available to also. Thus (1a) may have an interpretation in which the focus value is considered minimal in importance on a scale of values. For example, one may consider the set of alternatives to be sets of objects of different cardinality, so that singleton sets are considered the minimal on the scale. George may have been expected to wipe a number of objects, one of which was the bicycle. The sentence may then be understood as “George wiped the bicycle and nothing more” on this scalar use of only. In contrast, the sentence (3a) involving also does not have a scalar interpretation.

In the Alternative Semantics approach of Rooth (1992, 1996), the set of alternatives C will be generally in the form of properties or propositions, even though the focused constituent may denote an individual, as can be seen from (2) and (4). Further, the variable C in Rooth’s representation of focus, which delimits the domain of quantification of the logical operator encoded by the focus particle, is an open variable whose interpretation is context-sensitive. The analysis of Rooth does not assume focus movement, and the bound variables in (2) and (4) are not bound variables at the level of syntax.5

2. Issues in the acquisition of focus
What does it take for a child to master focus-sensitive particles like only and also? Minimally, the child needs to learn the syntactic categories the particles belong to, and the syntactic distribution of the particles. For example, the child must become sensitive to the fact that only can immediately precede the subject or may appear in preverbal adverbial position, while also typically appears in preverbal position between the subject and the predicate. The child would need to learn the range of application of the focus particles, which can be largely identified by the c-command scope of the particles. Thus, the range of preverbal adverbial only and also will include the verb phrase, which falls within their c-command domain. However, there may be other idiosyncratic properties of the particles that have to be acquired on the basis of positive evidence, for instance, the fact that preverbal adverbial only cannot associate with subject focus, whereas also in the same position can. Additionally, the child will have to figure out the semantic representations of the individual particles, decide on whether they are inclusive or restrictive, whether they show scalar uses, and whether they contribute to the truth conditions of the sentence.

As we have seen in the preceding analysis of only and also, the semantic representation of these particles involves existential and universal quantifiers binding semantic variables of various types, including individuals, properties and propositions (cf. the formulas in (2) and (4)). From the point of view of knowledge acquisition, the learning of these logical structures highlights the classic poverty of stimulus problem (Chomsky 1965, 1986, Wexler and Culicover 1980, Hornstein and Lightfoot 1981). Given the abstractness and complexity of these structures, it is unlikely that positive data alone are sufficient as an inductive basis for their acquisition. The logical structures must be present in blueprint form as part of the child's initial state. On the other hand, given that these operator-variable structures differ from one another in their specific content, there is no reason to assume that all emerge at the same point in children's language development. It would be interesting to compare the development of focus in children with the growth of other kinds of operator-variable structures, e.g. nominal quantifiers (Roeper 1986, Roeper and de Villiers 1993). It would also be of interest to see how existential and universal quantification representations embedded
in presuppositions and assertions emerge in children's language.

Cross-linguistic studies of quantificational structures have shown a great deal of variation in how quantification is expressed in natural language (Bach, Jelinek, Kratzer and Partee 1995). For example, some languages favor the use of determiners to encode quantificational notions such as universal quantification, a strategy called D-quantification. Other languages, however, may prefer to encode the same quantificational notions in the form of adverbs, auxiliary verbs, and affixes, using a strategy termed A-quantification (Partee 1991, 1995). In the domain of focus, the categories used to encode additive and restrictive focus range from adverbs, prenominal modifiers, verbs, verb affixes, to sentence final particles. The range of application of focus devices may be derivable purely from syntactic position in one language, but may depend additionally on lexical differentiation in another. For example, in a particular language one may have an adverbial focus particle positioned between the subject NP and the verb phrase which only associates with the subject NP, and not with any of the constituents in the verb phrase, contrary to what one may predict on the basis of syntactic position alone. One is naturally tempted to ask whether cross-linguistic variation in linguistic encoding would affect the acquisition of additive and restrictive focus in a language.

Findings on the development of additive and restrictive focus have been varied. With respect to the acquisition of additive focus, it has been reported that Cantonese-speaking children begin to signal additive focus with preverbal focus adverbs productively by two and a half years old (Lee 1995a). Using longitudinal data from a German-speaking child, Heinzel (2000) has shown that by 2;07 the child’s use of the additive focus particle *auch* resembled the adult’s. On the other hand, in testing Dutch-speaking children’s understanding of the additive particle *ook* (“also”) with a picture selection task, Bergsma (2000b) found that about one third of her subjects, aged between 4 and 6 years old, ignored the existential presupposition of the particle. The remainder of the subjects did not show more than 60% accuracy for test sentences in which the particle was associated with the object NP, or for test sentences in which *ook* was in postverbal position associating with a non-adjacent subject NP. The experimental findings hitherto reported on the development of additive focus do not tally with the observations of the longitudinal studies.

Studies on English-speaking children’s understanding of restrictive focus have shown that young children may have problems in determining the range of application of *only*. Crain, Ni and Conway (1994) report that some of the young children they tested interpreted pre-subject *only* as applying to the VP rather than the subject. In other words, they would interpret a sentence like ‘*Only the dinosaur is painting a house*’ as if it were ‘*The dinosaur is only painting a house*’. These children would also favor associating preverbal *only* with the VP over associating it with the object, preferring the narrower of the two interpretations. The VP interpretation of the sentence would amount to “The only thing the dinosaur is doing is painting a house”, whereas, the object focus interpretation could be rendered as “The only thing that the dinosaur is painting is a house”. The VP focus interpretation is compatible with a smaller set of circumstances than the object focus reading. The VP focus interpretation is true if the only activity the dinosaur is engaged in is house-painting. On the other hand, the object focus reading is consistent with a larger set of situations with the dinosaur painting a house or performing other non-painting actions.
The phenomenon of children’s adopting narrower interpretations than adults is also evidenced in experimental data from Mandarin-speaking children, reported in Yang (2000). She tested four-, five-, six- and eight-year-olds with a picture verification task on sentences such as ‘Zhiyou xiao nanhai tizhe shuitong’ (“Only the little boy is carrying a bucket”) and ‘Xiao nanhai zhi tizhe shuitong’ (“The little boy is only carrying a bucket”). About two-thirds of the children interpreted the two sentences as if they meant “Only the little boy is only carrying a bucket”. In her study of Dutch-speaking children, Bergsma (2000a) used a truth judgment task to test three- to five-year-olds’ understanding of the restrictive particle alleen (“only”). It was found that children behaved like adults by four and a half years old in comprehending sentences in which alleen preceded the focused NP. However, children showed a great deal of difficulty with cases of subject focus when the focus particle occurred postverbally, as in a sentence like ‘PINO heeft alleen een spin gevangen’ (“Only Pino caught a spider”). This suggests that association with a non-adjacent focus poses problems for young children. The tendency to associate focus particles with immediately adjacent constituents has also been noted in Heinzel (2000)’s study of additive focus, who reports that her German-speaking subject produced non-adult forms like ‘[Elefant] auch [ich] auch tanz’ (“Elephant too me too dance”). More recently, Gualmini, Maciuikaite and Crain (2002) studied four- and five-year-olds’ sensitivity to prosodic prominence in the interpretation of focus, using stories and a truth judgment task. It was found that the children interpreted sentences containing only with contrastive stress on the indirect object the same way as adults did, in sentences like ‘The Troll only bought an onion ring to SUPERMAN’. However, the same children interpreted sentences containing only with contrastive stress on the direct object accurately only 35% of the time, on sentences like ‘The Troll only bought an ONION RING to Superman’. This suggests that young children do not use prosodic prominence reliably in associations with focus, and may have a default preference in linking the particle with the indirect object.

Three issues in the acquisition of focus are addressed in this paper. First, when do additive and restrictive focus markers appear in child Cantonese? Do they appear before or after the other quantificational expressions such as the nominal universal quantifiers? Previous literature has reported that English-speaking four-year-olds show good understanding of terms such as all in experimental situations, although they still have difficulty with quantifiers such as each and another at this age (Hanlon 1982). In Chinese, universal quantifiers such as suoyou (“all”), mei (“every”), dou (“each”) appear in naturalistic data before three years of age, and children have grasped the meaning of exhaustiveness encoded in these items by three and a half years old in experimental situations (Lee 1986, 1991, Chien and Wexler 1989). Do restrictive and additive focus particles, which are logical operators, appear around the same time as nominal quantifiers, or before the latter? Do focus particles follow an order of development, with, for example, additive focus particles emerging earlier than restrictive focus particles? If so, is the relative order of emergence due to the fact that the restrictive focus particle affects the truth-conditions of the sentence containing it, whereas the additive focus particle only contributes to the presupposition of the sentence containing it? Or might the relative order of acquisition be related to the relative cognitive complexity of existential and universal quantification? Might other factors such as input frequencies of the two focus particles be relevant to their emergence in child language?
Secondly, how is the range of additive and restrictive focus particles marked in the input data to the child? Given that languages vary in how focus is indicated, target input must be crucial in providing the clue to marking the range of application of the focus particles. For instance, the direction of quantification of a focus device needs to be learned, since it may vary from one language to another, and may vary from one type of focus device to another within the same language. In Cantonese, for example, some additive focus markers quantify only leftward, some operate only rightward, while others have sentential scope. In English, while the additive focus adverb also may quantify leftward, the restrictive focus adverb only does not permit such an option. The properties are presumably learned from exposure to the input.

Thirdly, what are the semantic representations underlying children's restrictive focus markers. It has been shown that with respective to quantificational competence, children's representations may not be the same as adults. Philip (1995)'s work on quantifier scope suggests that children's representation of relative scope of quantifiers may involve event quantification rather than nominal quantification, the former being more restricted in interpretation.6 As we have seen from the above review of previous studies of focus acquisition, children may associate the particle with focus in different ways than adults. Further, children may follow certain default options that are non-adult like, as in their preference for the particle to be immediately adjacent to the focused constituent or in their preference for indirect object focus than direct object focus. Are children’s initial representations of additive and restrictive focus quantificational in nature, or should they be viewed as non-quantificational structures containing elements of similarity and contrast? If children use focus particles as logical operators, how do they associate the particles with focus? While naturalistic data may not be as decisive as controlled experiments in investigating issues of semantic representation, the spontaneous productions of children (in particular their errors) may shed light on possible divergences from adult grammar in the representation of restrictive focus.


3. Additive and restrictive focus in Cantonese
Cantonese is a language rich in its devices for A-quantification (cf. Partee (1991, 1995). Additive focus and restrictive focus are signaled by means of preverbal and postverbal particles each of which has distinct quantificational range.

3.1 Additive focus particles in Cantonese
Additive or inclusive focus ("also") is signaled primarily by means of a number of particles: the preverbal adverb dou1, associating with the subject (as in 5); the preverbal adverb zung6 and the final particle tim1, both of which associate with the VP (as in 6-7); and preverbal jau6, having sentential range (see 8). In addition, additive focus is signalled by a verb suffix maai4, which operates on the object, if there is one present, or on the subject in the case of verb is intransitive, as shown in (9a,b). These additive focus particles can co-occur, as shown in (10). In such sentences, if the ranges of application marked by the various particles overlap, the resultant range is given by the narrowest one marked. Thus in (10a), the additive
focus particles, *zung6, maai4*, and *tim1* associate only with the object rather than the VP; in (10b), the preverbal adverb *dou1* interacts with the subject, while the remaining additive particles associate with the object. I assume the structure (11) for these focus-sensitive particles. In this representation, both *zung6* and *tim1* have VP range, as the VP falls within their c-command domain. *Dou1* is defective in that it can only quantify leftward and has no effect on elements lying to its right. *Jau6* can occupy an adjoined position next to *I* or *VP*, reflecting its freedom to interact with the subject or the VP. This particle can also operate on time, conveying repetition of events. *Maai4* associates with the object.7

(5) Aa3 George *dou1* maat3 zo5 saam1gaa3 daan1ce1.8
    George also wipe asp three-CL bicycle
    "GEORGE (in addition to someone else) also wiped three bicycles"

(6) Aa3 George *zung6* maat3 zo5 saam1gaa3 daan1ce1.
    George also wipe asp three-CL bicycle
    "George also wiped THREE BICYCLES (in addition to wiping other things)"
    "George also WIPED THREE BICYCLES (in addition to doing other things)"

(7) Aa3 George maat3 zo5 saam1gaa3 daan1ce1 *tim1*
    George wipe asp three-CL bicycle also
    "George also wiped THREE BICYCLES (in addition to wiping other things)"
    "George also WIPED THREE BICYCLES (in addition to doing other things)"

(8) Aa3 George *jau6* maat3 zo5 saam1gaa3 daan1ce1
    George also wipe asp three-CL bicycle
    "GEORGE (in addition to someone else) also wiped three bicycles"
    "George also WIPED THREE BICYCLES (in addition to doing other things)"
    "George wiped three bicycles again"

(9a) Aa3 George maat3 *maai4* nei1gaa2 daan1ce1
    George wipe also that-CL bicycle
    "George also wiped THE BICYCLE (in addition to wiping other things)"

(9b) Aa3 George heoi3 *maai4*
    GEORGE go also
    "GEORGE (in addition to someone else) also went"

(10a) Aa3 George *zung6* maat3 *maai4* nei1gaa3 daan1ce1 *tim1*
    George also wipe also that-CL bicycle also
    "George also wiped THE BICYCLE (in addition to wiping other things)"

(10b) Aa3 George *dou1* maat3 *maai4* nei1gaa3 daan1ce1 *tim1*
    George also wipe also that-CL bicycle also
    "GEORGE (in addition to someone else) also wiped THE BICYCLE" (in addition to wiping other things)"
Each of these additive focus particles has other non-focus uses. Thus, *dou1* can also function as a universal quantifier quantifying leftward, like its cognate in Mandarin Chinese, as in (12a). It can also be used as a strong denial of the interlocutor's presupposition, as illustrated in (12b). The preverbal adverb *zung6* occurring in imperfective sentences can function as an aspectual operator signaling continuation of an activity or state, meaning "still" as shown in (13) (cf. Loebner 1989). The final particle *tim1* has the additional function of indicating new information (Leung 1992), as exemplified in (14). The preverbal particle *jau6* can be used to mark an unexpected situation, as indicated in (15). The postverbal suffix *maai4* can also be used as a verb complement signaling movement toward a spatial reference point, which may be inherently specified. It has also an aspectual use signaling completion of an event (Cheung 1972). These uses are illustrated in (16-17).

(12a) Di1 hung4maau1 *dou1* sik6 bau2 laa3
    CL  panda ALL eat full sfp
    "The pandas have all had a full meal"
    "THE PANDAS too have had a full meal"

(12b) Aa3 John *dou1* m4 sik1 gong2 jing1man2
    John denial-marker/also not know speak English
    "John does not speak English (contrary to our presuppositions)"
    "JOHN also does not speak English"

(13) a. Aa3 John *zung6* jam2 zau2.
    John still/also drink wine
    "John still/also drinks wine'.
 b. Aa3 John *zung6* hai6 hai6zyu6jam6.
    John still/also be  chairperson
    "Johnny is still/also a department chairperson"

(14) Ceot1min6 lok6 jyu2 *tim1*
    outside fall rain sfp
    "It's raining outside (a new situation has occurred)"
(15) Keoi5 jau6 m4 coi2 ngo5
s/he  JAU not pay-attention-to me
"S/he does not pay attention to me (contrary to my expectation)"
“S/he again does not pay attention to me”
“S/HE (in addition to someone else) does not pay attention to me”
“S/he DOES NOT PAY ATTENTION TO ME (in addition to acting on me in other ways)

(16) Keoi haang4 maai4 go2tiu4 gai1
s/he  walk close/also that-CL street
“She walked near that street”
“She also walked THAT STREET”

(17) ngo5 jiu3 jam2 maai4 nei1 bui1 nai2
I  want drink MAAI this CL  milk
"I want to finish drinking this glass of milk"
“I want to also drink THIS GLASS OF MILK”

3.2 Restrictive focus particles in Cantonese
Restrictive focus ("only") is encoded in three particles: a preverbal particle zing6hai6, a sentence final particle zaa3, and a particle dak1. The final particle zaa3 has sentential range, able to associate with any constituent in its c-command domain, including the subject, the exact focus determined by context and intonation, as shown in (18).10 The particle zing6hai6 has VP range when in preverbal adverbial position (as in 19) but can only have the subject within its scope when preceding the latter (see 20). The two restrictive focus particles can co-occur, as in (21), but are distinguished from one another in that while zaa3 has both scalar and non-scalar uses, zing6hai6 is limited to non-scalar quantification (cf. König 1981, 1991). The third restrictive particle dak1 can function as a verb compound signaling restrictive possession, interacting only with the object (22).11 It can also be used to quantify the subject when preceding the latter, as shown in (21).

(18) Aa3 George maat3 zo5 saam1gaa3 daan1ce1 zaa3
    George wipe asp three-CL bicycle only
    "George only wiped THREE BICYCLES"
    “George only WIPED three bicycles”
    “George only WIPED THREE BICYCLES”
    "Only GEORGE wiped three bicycles"

(19) Aa3 George zing6hai6 maat3 zo5 saam1gaa3 daan1ce1
    George only wipe asp three-CL bicycle
    "George only WIPED three bicycles"
    “George only wiped THREE BICYCLES”
    “George only WIPED THREE BICYCLES”

(20) zing6hai6/dak1 Aa3 George maat3 zo5 saam1gaa3 daan1ce1
    only George wipe asp three-CL bicycle
    "Only GEORGE wiped three bicycles"
(21) Aa3 George zing6hai6 maat3 zo5 saam1gaa3 daan1ce1 zaa3
    George only     wipe asp three-CL  bicycle only
"George only wiped THREE BICYCLES"
“George only WIPEd three bicycles”
“George only WIPEd THREE BICYCLES”
zing6hai6/dak1 Aa3 George maat3 zo5 saam1gaa3 daan1ce1 zaa3
only George wipe asp three-CL  bicycle only
"Only GEORGE wiped three bicycles"
(22) Aa3 George dak1 saam1gaa3 daan1ce1 (zaa3)
    George have-only three-CL  bicycle only
"George has only THREE BICYCLES"

The sentential range of the final particle follows naturally if we assume that it occupies the head of CP which is head-final, as shown in (23). Previous literature (Leung 1992, Tang 1998) has generally assumed two classes of final particles: a class of inner particles that are concerned with tense, aspect, and quantification, and a class of outer particles, having to do with mood and modality. One can assume that the inner particles occupy the C position or are adjoined to VP, and that the outer particles are situated in the SPEC of CP. The restrictive focus final particle zaa3 is in C, which has the subject, the VP and the object within its c-command domain. Thus it may interact with any of these constituents. In contrast, the preverbal zing6hai6 only c-commands the VP, while the pre-subject zing6hai6 only has scope over the subject.

Besides the differences in syntactic position and their concomitant range differences, the preverbal particle zing6hai6 can be distinguished from the final particle zaa3 in another important way. As noted in such earlier works on focus as König (1991), only has scalar uses as well as exclusive uses. With respect to the Cantonese focus particles, while final zaa3 can quantify over a scale, with an associated ranking of values on the scale, preverbal zing6hai6 cannot do so. This difference is illustrated in (24) in which the focused element is a quantifier object.

(23) Syntactic position of Cantonese restrictive focus particles

```
CP
  C'    sfp (outer)
    IP    C
      sfp (inner)
        I'    zaa3 "only"
zing6hai6(dak1)
  "only"
    VP
      zing6hai6 VP
        "only"
          V (dak1)
            "only"
```

When zaa3 is used, the limiting or scalar use is evidenced: (24a) means "John bought three books and not more than three". The sentence cannot be used to negate a
proposition such as "John bought two books" in a contrastive context in which the exact quantity of the books bought is denied, e.g. "John bought two books, not three books". On the other hand, when the preverbal adverb zing6hai6 is used, as in (24b), the exclusive reading is possible. The quantity in the focused constituent can be contrasted with values below or above it. This distinction is highlighted if the scale involves ordering of discrete rather than continuous entities like number, as shown in (24c-d). Since a predicate nominal is involved, with no referential object in the predicate, object focus would be odd. Likewise, exclusive VP focus would be odd since the verb is a copula and not an action verb. Thus the only reading possible would be a scalar reading like "John is just a research assistant". The fact that zing6hai6 cannot be used in a predicate nominal context (as in 24d) suggests that it cannot be used in scalar quantification at all.

(24a) Aa3 George maat3 zo5 saam1gaa3 daan1 ce1 zaa312
George wipe asp three-CL bicycle only "George only wiped THREE BICYCLES (and not more than three)"
(24b) Aa3 George zing6hai6 maat3 zo5 saam1gaa3 daan1 ce1.
George only wipe asp three-CL bicycle "George only wiped THREE BICYCLES (and not more than or less than three)"
(24c) Aa3 George hai6 jin4gau3zo6lei5 zaa3
George be research assistant only "George is only a research assistant (not a professor)"
(24d) ??Aa3 George zing6hai6 (hai6) jin4gau3 zo6lei5
George only be research assistant
"George is only a research assistant (not a professor)"

4. Focus particles in the speech of Cantonese-speaking children
4.1 Data and method
The longitudinal data for the study are drawn from CANCORP, the Hong Kong Cantonese Child Language Corpus (Lee and Wong 1998). The five subjects included CKT, a boy observed in 25 sessions from 1 year 5 months to 2 years 7 months; MHZ, a boy observed in 26 sessions from 1 year 7 months to 2 years 8 months of age; CGK, a girl observed in 19 sessions from 1 year 11 months to 2 years 8 months; LTF, a girl observed in 16 sessions from 2 years and 2 months to 3 years and 2 months old; and LLY, the oldest child of the group, studied in 20 sessions from 2 years 8 months to 3 years 8 months old.

The data contain mostly conversations between the children and the investigators, and sometimes conversations between the children and their parents or siblings, all taking place in a home setting. To facilitate examination of longitudinal development, the figures are divided into three periods. Period 1 covers the period before 2 years old. Period II spans the entire two year old range, whereas Period III covers the months after 3;0. Table 1 shows the details of the subjects and the number of sessions of recording for the three periods. In the analysis of the focus particles all the utterances containing these particles, produced either by children or adults, were extracted, together with contextual data, for each of the sessions. An utterance was considered imitative if it was identical to an adult utterance or a sub-string of it occurring in the preceding two conversational turns. The data from CKT, MHZ, CGK, and LTF were used in the analysis of additive focus. Data on restrictive focus were drawn from the speech corpora of CKT, MHZ, LTF and LLY.
Table 1  Number of sessions of observation for the Cantonese-speaking children studied: CKT, MHZ, CGK, LTF and LLY.

<table>
<thead>
<tr>
<th>Name of child</th>
<th>Period observed</th>
<th>Period I (before 2;0)</th>
<th>Period II (2;0 - 2;11)</th>
<th>Period III (3;0 and later)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CKT (male)</td>
<td>1;05;22-2;07;22</td>
<td>12</td>
<td>13</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>MHZ (male)</td>
<td>1;07;00-2;08;06</td>
<td>10</td>
<td>16</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>CGK (female)</td>
<td>1;11;01-2;08;08</td>
<td>4</td>
<td>15</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>LTF (female)</td>
<td>2;02;10-3;02;18</td>
<td>0</td>
<td>13</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>LLY (female)</td>
<td>2;08;10-3;08;09</td>
<td>0</td>
<td>8</td>
<td>12</td>
<td>20</td>
</tr>
</tbody>
</table>

4.2 Additive focus particles in Cantonese-speaking children

Children's use of the additive focus markers is summarized in Tables 2 and 3. As can be seen from Table 3, the additive particle *zung6*, which has VP range, and the particle *jau6*, having sentential range, emerged at around 2;2 or 2;3 for all four children. The emergence of the other two particles showed some variation. The additive particle *dou1*, which only quantifies the subject, emerged around the same time as the VP particles for MHZ and CKT. However, it appeared later, at around two and a half years old for the other two children CGK and LTF. As for the additive final particle *tim1*, which operates on the VP, the youngest two children MHZ and CKT did not show any command of the particle, whereas the two older children CGK and LTF began to use it at 2;4 and 3;1 respectively. Clear cases of the additive use of the verb suffix *maai4* were found only for one of the children CGK, for whom 3 tokens were recorded, the first at 2;03;18. Table 3 gives the frequencies of occurrence of four of the additive focus particles in the speech of the four children as well as their adult interlocutors.

Table 2 : Age at which the additive focus particles *dou1, zung6, jau6, tim1, maai4* first occurred in the speech of four Cantonese-speaking children

<table>
<thead>
<tr>
<th></th>
<th>dou1</th>
<th>zung6</th>
<th>jau6</th>
<th>tim1</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHZ</td>
<td>2;03;28</td>
<td>2;03;09</td>
<td>2;02;26</td>
<td>---</td>
</tr>
<tr>
<td>CKT</td>
<td>2;02;15</td>
<td>2;03;03</td>
<td>2;01;08</td>
<td>---</td>
</tr>
<tr>
<td>CGK</td>
<td>2;07;11</td>
<td>2;02;21</td>
<td>2;03;25</td>
<td>2;04;30</td>
</tr>
<tr>
<td>LTF</td>
<td>2;06;01</td>
<td>2;02;10</td>
<td>2;03;02</td>
<td>3;01;21</td>
</tr>
</tbody>
</table>
Table 3: Number of spontaneous occurrences of the additive focus particles dou1, zung6, jau6, tim1 in the speech of four Cantonese-speaking children and their adult interlocutors.

<table>
<thead>
<tr>
<th></th>
<th>dou1</th>
<th>zung6</th>
<th>jau6</th>
<th>tim1</th>
</tr>
</thead>
<tbody>
<tr>
<td>child</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>adult</td>
<td>212</td>
<td>357</td>
<td>414</td>
<td>17</td>
</tr>
<tr>
<td>CKT</td>
<td>3</td>
<td>89</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>adult</td>
<td>336</td>
<td>344</td>
<td>414</td>
<td>26</td>
</tr>
<tr>
<td>CGK</td>
<td>30</td>
<td>22</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>adult</td>
<td>179</td>
<td>97</td>
<td>374</td>
<td>15</td>
</tr>
<tr>
<td>LTF</td>
<td>51</td>
<td>31</td>
<td>58</td>
<td>3</td>
</tr>
<tr>
<td>adult</td>
<td>171</td>
<td>207</td>
<td>181</td>
<td>19</td>
</tr>
</tbody>
</table>

The individual profiles of three of these children are given in Tables 4A-4C. The data show that the first constituents to be focused by the additive particles were either the subject or the object. These occurred at around 2;3 for the three children. The first occurrence of an additive focus particle quantifying a VP was not found until 2;11, in the speech of LTF. Only a tiny proportion of the focused phrases were null arguments. As can be seen from Table 4A, MHZ showed 4 instances of subject focus and 11 instances of object focus. Only 1 of the former and 3 of the latter contained null arguments as focused constituents. Figure 4B reports the focus particles used by CKT, with 7 instances of subject focus and 21 instances of object focus. None of the subject focus examples contained null subjects, and only 2 of the 21 object focus uses involved a null object. Turning to the additive focus particles used by LTF in Table 4C, of the 39 instances of subject focus, only 6 contained null subjects, and only 6 of the 27 instances of object focus involved null object NPs. The four instances of VP focus all contained overt focused constituents. Thus, the Cantonese data differed from the observation of Heinzel (2000) that early German showed a tendency not to express the focused phrase overtly in marking additive focus at early stages of development.14
Table 4A: The additive focus particles *dou1, zung6, jau6, tim1, maai4* in MHZ (1;07;00-2;08;06)*

<table>
<thead>
<tr>
<th>Type of Focus particle</th>
<th>Focus on time</th>
<th>Focus on subject</th>
<th>Focus on object</th>
<th>Aspectual use (continuation of activity)</th>
<th>Other uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>dou1</em> &quot;also&quot;</td>
<td></td>
<td>1 (2;03;28)</td>
<td></td>
<td></td>
<td>1 (2;03;28) strong denial of presupposition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (2;04;07)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (2;05;19)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (2;06;18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>zung6</em> &quot;also/ still&quot;</td>
<td></td>
<td></td>
<td>1 (2;03;09)</td>
<td></td>
<td>1 (2;02;12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 (2;03;28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 (2;05;04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 (2;05;19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 (2;06;04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>jau6</em> &quot;also/ again&quot;</td>
<td>1 (2;03;09)</td>
<td></td>
<td>2 (2;02;26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>tim1</em> &quot;also&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>maai4</em> &quot;also&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 tokens (found in six sessions from 1;09;25 to 2;08;06) all signalling spatial movement.</td>
</tr>
</tbody>
</table>

*The number in each cell represents the number of tokens for the particular particle and category concerned, with the age of occurrence indicated in parenthesis (year; month; day).*
Table 4B: The additive focus particles *dou1, zung6, jau6, tim1, maai4* in CKT (1;05;22-2;07;02)*

<table>
<thead>
<tr>
<th>Type of Focus Focus particle</th>
<th>Focus on time</th>
<th>Focus on subject</th>
<th>Focus on object</th>
<th>Focus on VP</th>
<th>Aspectual use (continuation of activity)</th>
<th>other uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>dou1</em> &quot;also&quot;</td>
<td>1 (2;02;15)</td>
<td>1 (2;03;03)</td>
<td>1 (2;05;00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>zung6</em> &quot;also/ still&quot;</td>
<td>1 (2;06;18)</td>
<td>2 (2;03;03)</td>
<td>4 (2;03;17)</td>
<td>2 (2;02;05)</td>
<td>60 tokens of formulaic <em>zung6jau5</em></td>
<td>(found in 11 sessions from 1;1030 to 2;07;02)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 (2;05;00)</td>
<td>1 (2;05;14)</td>
<td>2 (2;02;15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 (2;06;18)</td>
<td>2 (2;05;00)</td>
<td>2 (2;04;00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (2;07;02)</td>
<td>1 (2;07;02)</td>
<td>1 (2;07;02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>jau6</em> &quot;also/ again&quot;</td>
<td>1 (2;03;17)</td>
<td>1 (2;01;08)</td>
<td>2 (2;03;17)</td>
<td></td>
<td>4 tokens of formulaic <em>jau6jau5/ jau6hai6</em></td>
<td>(found in 4 sessions from 2;00;16 to 2;04;00)</td>
</tr>
<tr>
<td></td>
<td>1 (2;07;02)</td>
<td>1 (2;07;02)</td>
<td>1 (2;03;03)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>tim1</em> &quot;also&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No tokens found</td>
</tr>
<tr>
<td><em>maai4</em> &quot;also&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50 tokens (found in 11 sessions from 2;00;16 to 2;07;02) signaling spatial movement</td>
<td></td>
</tr>
</tbody>
</table>

*The number in each cell represents the number of tokens for the particular particle and category concerned, with the age of occurrence indicated in parenthesis (year; month; day).
Table 4C: The additive focus particles *dou1, zung6, jau6, tim1, maai4 in LTF (2;02;10-3;02;18)*

<table>
<thead>
<tr>
<th>Type of Focus Focus particle</th>
<th>Focus on time</th>
<th>Focus on subject</th>
<th>Focus on object</th>
<th>Focus on VP</th>
<th>Aspectual use (continuation of activity or state)</th>
<th>other uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>dou1</em> &quot;also&quot;</td>
<td>2 (2;06;01)</td>
<td>5 (2;07;05)</td>
<td>2 (2;08;24)</td>
<td>3 (2;09;07)</td>
<td>2 (3;00;20) 8 (3;01;21)</td>
<td>7 tokens signaling strong denial of expectation (found in three sessions from 2;04;27 to 3;02;18); 11 tokens signaling universal quantification (found in 5 sessions from 2;08;24 to 3;02;18); 11 other uses.</td>
</tr>
<tr>
<td><em>zung6</em> &quot;also/ still&quot;</td>
<td></td>
<td></td>
<td>1 (2;02;10)</td>
<td>1 (2;06;01)</td>
<td>3 (2;07;05) 1 (2;10;18) 1 (3;00;21) 11 (3;02;18)</td>
<td>2 (3;00;20)</td>
</tr>
<tr>
<td><em>jau6</em> &quot;also/ again&quot;</td>
<td>1 (2;06;01)</td>
<td>3 (2;10;18)</td>
<td>4 (3;02;18)</td>
<td></td>
<td>1 (2;03;02) 2 (2;08;24) 10 (2;09;07) 1 (2;10;18) 5 (2;11;16) 3 (3;00;20) 17 (3;02;18)</td>
<td>6 (3;02;18) 2 (3;02;18) unexpected event 1 (2;10;18) 2 (3;01;21)</td>
</tr>
<tr>
<td><em>tim1</em> &quot;also&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 (3;01;21) 1 (3;02;18)</td>
<td>new information 1 (3;02;18)</td>
</tr>
<tr>
<td><em>maai4</em> &quot;also&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19 tokens signaling spatial movement and token signaling completion (found in 8 sessions from 2;03;30 to 3;02;18)</td>
</tr>
</tbody>
</table>
Below are illustrations of children's uses of various particles to focus on the subject, the object, the VP and time.

**Focus on subject**
The subject NP is considered to be focused if a property encoded in a verb phrase has been predicated of an entity in the preceding discourse. The child utters a sentence containing a focus particle asserting that the property encoded by the same verb phrase is predicated of a different entity represented by the subject of the sentence. In each of the three instances (25-27), the focused phrase was an overt subject.

(25) (LTF and investigator are looking at pictures. LTF at 2;09;07).
INV: Jyut6loeng6 hai2 dou6 zou6 mat1je2?
   moon be there do what
"What is the moon doing there?"
CHI: Fan3gaau3
   Sleep
   “(It’s) sleeping”
INV: Hai6 wo3
   Be sfp
"Yes"
CHI: Keoi5 jau6 fan3gaau3 [!= pointing at the little boy in the picture].
   He also sleep
   "He is also sleeping"

(26) (CGK and investigator are making objects of different shapes out of play-doh. CGK at 2;09;09)
INV: Ngo5 go3 jyun4 gwo3 nei5 wo3 daan3hai6
   I cl round than you sfp but
   "but mine is rounder than yours"
CHI: Ngo5 ji1go3 dou1 jyun4 aa3
   I this cl also round sfp
   "Mine is also round"

(27) (LTF tells investigator what she is afraid of. LTF at 2;08;24).
CHI: Ngo5 geng1 mou4po4 gaa3 ngo5
   I fear witch sfp I
   "I am afraid of witches"
INV: Ngo5 m4 geng1 gaa3
   I not afraid sfp
   "I am not afraid (of witches)"
CHI: Maa1mi4 dou1 m4 geng1
   Mom also not afraid
   "Mommy is also not afraid (of witches)"

**Focus on object**
The object is analyzed as being the focus, when an event has occurred in which an agent has carried out an action on a theme object. The child utters a sentence containing a focus particle, asserting that the same agent represented by the subject of the sentence has carried out or carries out the same action (indicated by the verb) on another theme object. The exchanges shown in (28-29) involve focus on an object of an existential verb jau5 (“have”), whereas the episode in (30) indicates that the particle zung6 focuses on the direct clausal object of the verb bong1 (“help”).
(28) (LTF and investigator are playing with toy babies. Child is taking the toys to eat various things. LTF at 2;02;10).

INV: Nei5 daai3 bi4bi1 heoi3 sik6 mat1je5 aa3?
   You take baby to eat what sfp
   "What are you taking the baby to eat?"

CHI: &Ei6, syut3gou1, zung6 jau2 gwo2zap1, syut4tiu2, hai6 m4 hai6?
   Excl. icecream, also have juice, icecream-stick be not be
   "(Eat) icecream, also juice, icecream bar, right?"

(29) (LTF at 3;01;21. LTF and the investigator pretend that a toy robot is a television and they switch it on. They talk about the programs that will be shown, including the Snow White story.)

INV: Bei5 mou4po4 zuk1 zo5 aa3
   Let witch catch asp sfp
   "(Someone) will be caught by the witch."

CHI: tung4maai4 jau5 wong4hau6 cat1 go3 siu2ngai2jan4 tim1
   and have queen seven CL dwarf also
   "And there will also be the queen and the seven dwarfs as well"

(30) (CGK at 2;07;11. CGK is playing with a toy set, offering to help the investigator comb her hair)

CHI: Bong1 nei5 so1
   Help you comb
   "(I'll) help you comb (your hair)"

INV: Nei5 bong1 ngo5 so1 &aa4?
   You help me comb q-sfp
   "You want to help me comb?"

CHI: Ngo5 bong1 maa4 nei5 ziu3 geng3
   I help also you look mirror
   "I'll also help you look at yourself in the mirror"

**Focus on verb phrase**

An instance of verb phrase focus is recognized when an event has occurred in which an agent has performed an action signified by a verb phrase. The child utters a sentence containing a focus particle, asserting that the same agent has performed or performs another action signified by a different verb phrase. In the exchange in (31), the child describes how a fat boy hit another boy’s head, and then also touched the latter’s head.15

(31) (Investigator describing a story based on a picture of a boy kicking a ball at another boy. LTF at 2;11;16).

CHI: Daa2 laam4kau4 zi1cin4 fei4zai2 lo2 keoi5 go3 bo1
   Play basketball before fat-boy take he CL ball
   "Before playing basketball, the fat boy took his ball"

INV: &m6, gam2 keoi5 dim2joeng2 tek3 keoi3 gaa3?
   so he how kick him sfp
   "So how does he kick him?"

CHI: Gam2 fei4zai2 daa2 keoi5 go3 tau4
   so fat-boy hit he CL head
   "So the fat boy hit his head"
Focus on time
When time is focused, an event occurred at an earlier time. The child utters a sentence containing a focus particle, asserting that an event identical in type has occurred in which the subject NP refers to the same entity. In (32), the child is describing the recurrence of the event of book-falling, using a null subject sentence.

(32) (CGK wants to open the door. A few seconds later, some books fall on the floor. Investigator helps child put books back onto the table. Some books fall down again. CGK at 1;11;29).
INV: &i1, dit3 zo2
   Excl. fall asp
   "(The books) fell"
exp: The books fall again.
INV: &ou3: [=! puts them back on the table].
CHI: Jau6 dit3 zo2
   Again fall asp
   "(They) dropped again"

Aspectual use (continuation of activity or state)
In the context for the aspectual use of zung6, an activity has been going on. The child utters a sentence using a focus particle indicating the activity still goes on or she would like the activity to go on. The episode in (33) shows the child expressing a wish to continue her television watch, in a sentence with null subject and null object.

(33) (CGK watching a television program part one of which has finished. Mother asks child to turn off the TV. Child refuses. CGK at 2;02;07).
CHI: M4 sik1 aa3
   Not turn-off asp
   "(I'm) not turning off (the TV)"
CHI: Zung6 tai2 aa3
   Still watch sfp
   "(I) still (want to) watch (the TV)"

As mentioned above, while the child may be using focus particles spontaneously in apparently appropriate ways, it is possible that their semantic representation of these particles are not the same as the adults. Some of the errors produced by children reflect the confusion of the additive focus marker jau6 and the universal quantifier use of dou1. In (34), the meaning intended is one in which the subject is universally quantified, but the child uses the additive focus adverb jau6 rather than the preverbal adverb dou1, which signals universal quantification as well as additive focus.

(34) (LTF at 3;02;18. She is asked who would snore when asleep. She denies that she does).
Here it seems that she is using the additive focus marker *jau6* as if it were the universal quantifier, since the expression *cyun4 sai3gaai3* "whole world" itself calls for the support of the universal quantifier *dou1*. Other instances of error involve the use of *zung6* without any overt focused element in formulaic expressions. It seems that the child is using the expression as a kind of signal to indicate continuation of action. In the absence of an overt focused element in the child's speech, the adult needed to ask the child repeatedly for clarification, or expanded the child’s utterance to fill in the focused constituent, as shown in (35-36).16

(35) (CKT at 2:05;00. The child and the investigator are inserting some pictures into a box.)

CHI: &u1, zung6 jau5 aa3.

excl. also  have sfp

"there are also.."

INV: Zung6jau5 mat1je5 aa3?

also-have what sfp

"what are also there?"

CHI: **Zung6jau5**

also-have

INV: Nei5 man6 ngo5 aa1

You ask me sfp

"You ask me."

(36) (CKT at 2:05;00. The child and the investigator are putting pictures into a box).

INV: Ngo bong1 nei5 laa1

I help you sfp

"Let me help you"

CHI: Aija daan1ce1

Oh bicycle

CHI: **Zung6jau5 aa3**

Also-have sfp

"There is some more"

INV: Zung6jau5 zek3 laam4sik1 &mieo1&mieo1

Also-have CL blue kitten

"There is also a blue kitten"

4.3 Restrictive focus particles in Cantonese-speaking children

The figures in Table 5 indicate that 19 tokens of restrictive focus particles were used by the children. These were not evidenced in the youngest child CKT. One isolated token was found in MHZ at 2 years 6 months. The data from the two older children, LTF and LLY, show that beginning from around 3;1, children were using the restrictive focus markers productively. Thus, in naturalistic speech, restrictive focus particles emerged shortly after children turned three years old.

Three additional observations can be made about children's productions of restrictive focus. First, limiting or scalar uses of restrictive focus particles appeared as early as their exclusive uses in child Cantonese. Second, the exclusive uses were used in
contexts which I have labeled denials of specific alternatives and comments on residues. These were contexts in which what was excluded was not the entirety of the set of alternatives to the focus value, but rather a set of specific alternatives. Third, some instances of limiting uses which did not involve a continuous scale but seem to consist in the ranking of discrete alternatives were found. Representative samples from each of the children are given below to illustrate the exclusive and limiting (scalar) uses.

Table 5. Cantonese-speaking children's use of restrictive focus markers.

<table>
<thead>
<tr>
<th>Use</th>
<th>Number of tokens</th>
<th>Exclusive uses (residue, denial of specific alternatives)</th>
<th>Limiting (scalar) uses (quantity, time, freq.)</th>
<th>Errors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Age</td>
<td></td>
<td>n &amp; not &gt; n</td>
<td>others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CKT (1;5-2;7)</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MHZ (1;7-2;8)</td>
<td>2;6;04</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>LTF (2;2-3;2)</td>
<td>2;11;16 3;1;21 3;2;18</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>LLY (2;8-3;8)</td>
<td>2;11;08 3;3;26 3;5;20 3;6;16 3;7;25 3;8;09</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>

4.3.1 Exclusive uses of restrictive focus particles by children
According to the exclusivity clause given in the semantic representation of only, all of the alternatives should be denied, as none satisfied the predicate description. However, in children's use of restrictive focus particles, typically what was denied were one or more specific alternatives rather than the entire set, as shown by the examples in (37a-b). The denial of a specific alternative was either explicitly mentioned or implicit in the prior discourse. In (37a), the child and the investigator are deciding on who the child would like to sleep with in arranging a set of human figures from a toy set. The child denies that a particular figure represents the grandpa, saying that the figure is in fact a girl. The particle zaaz in this instance is merged with the elaboration particle aalmaaz, which, as described earlier, marks the clause it attaches to as signifying cause or reason for a preceding utterance. In another session, detailed in (37b), the child shows a similar use of exclusive focus with the preverbal particle zingbhai6. The investigator asks the child whether there are 'moles' on her arms, as there are on the investigator's. The child denies that there are 'moles' on her own arms implicitly by
saying that there are 'moles' only on her legs.

(37a) Exclusive use (denial of specific alternatives) by LLY

<LLY at 3;5;20. The investigator and the child are playing with a toy house; the investigator asks the child who she wants to sleep with>

*INV: Nei5 tung4 bin1go3 fan3 aa3?
You with who sleep sfp
"Who do you sleep with"

*INV: Nei5 tung4 go2go3 aa1, gaa1ze1 aa1,
You with brother, sfp sister sfp,
Gung1gung1 po4po1 aa1, baa4baa1, maa4maa1+.
Grandpa, grandma sfp, daddy, mother
"You (sleep) with brother, sister, grandpa, grandma, daddy, mommy?"

*CHI: Mei1 aa3?
What sfp
"What?"

*CHI: Ni1dou6 m4 hai6 gung1gung1 # aa3.
Here not be grandpa sfp
"(It's) not grandpa here"

*INV: Hai6 gung1gung 1aa3 ni1go3.
Be grandpa sfp this
"This is grandpa"

*CHI: Ni1go3, m4 hai6 aa3, ni1go3 sin1 hai6 neoi5zai2 zaa1maa3
This-CL, not be sfp, this then be girl only+elaboration sfp
"This is not (grandpa); (it's because) this is only a girl"

*INV: Hai6 lo1, naam4zai5, neoi5zai2 gung1gung1, po4po2 &lo1,
Be sfp, boy, girl grandpa grandma sfp
Nei5 tung4 bin1go3 fan3 aa1?
You with who sleep sfp
"Yes, boy, girl, grandpa, grandma, who do you sleep with?"

*CHI: Baa4baa1
Daddy

*INV: 0 [=! giggles].

(37b) Exclusive use (denial of specific alternatives) by LLY

(LLY at 3;3;26. The investigator is showing the child the mosquito bites on her arms. The child comments that these are moles. Then they start counting the 'moles' on their legs.)

*INV: Tai5 haa nei5 go2 zek3 sin1, nei5 bei5 ngo5 tai2 haa3 nei5 go5 zek3
Look-at asp you that CL first, you let me look-at asp you that CL
"Look at your (leg) first; you let me look at yours"

*INV: Jau5 mou5 mak2?
Have not-have mole
"Are there moles?"

*CHI: Ngo5 zing6hai6 zek3goek3# ni1dou6 jau5
I only CL-leg here have
"I only have (moles) here on my leg"

*INV: Hai6 wo3, jau5 loeng2 lap1 wo3, jat1 lap1, loeng5 lap1, ## saam1 lap1.
Be sfp have two piece sfp one piece, two piece, three piece
"Yes, there are two pieces, one piece, two piece, three pieces".
A type of restrictive focus that comes close to the adult semantics is seen when children talk about the residue of a set. In these situations, the expected existence of some members of a set is denied, and the remainder or residue of the set is asserted. This can be seen as a special case of exclusivity in that it denies the existence of alternative objects to the one designated by the focused element. In other words, the alternatives excluded are limited to objects and may not consist of actions.

In the episode in (38), the child is looking for some food bearing the label of a tiger, which is gone. The child then comments on what remains of food bearing other animal labels, using the preverbal focus particle *zing6hai6dak1*. This residue use is also found in the speech of LTF, illustrated in (39). In the conversational exchange, the child is aware that the investigator's father has passed away, and asks her whether she only has a mother left.

(38) Exclusive use (residue) by MHZ
(MHZ, at 2;6; 04. Earlier, the child was acting the role of a fireman; he is looking for food that bears various animal labels; the one for tiger is gone, and only the one for chickens and another object are left).

*CHI: M4gin3 zo5
  Disappear asp
  "(Something) disappeared"
*INV: M4gin3 zo5 mat1je5 aa3?
  Disappear asp what  sfp
  "What has disappeared?"
*CHI: Maa4maa1
  Mother
  “Mother”
*MOT: Mat1 si6?
  What matter
  "What's the matter?"
*CHI: xxx baa4baa1 xxx go2go3 daai6 gaa3 # gaa3 lou5fu2 aa3,
  daddy that-CL big CL CL tiger sfp
  *zing6hai6dak1 gai1gai1 tung4maai4 xxx.
  Only-have chicken and
  "Daddy, that big tiger thing, (there are) only chicken and.."
*MOT: O, lou5fu2 sik6 saai3 laa3?
  Oh,tiger eat all  sfp
  "The tiger has been eaten"
*CHI: Hai6 < aa3> [>].
  Be  sfp
  "Yes"

(39) Exclusive use (residue) by LTF
(LTF at 3;2;18. The child is playing with a Garfield toy; saying that it should not watch TV; the investigator's father passed away some time ago, a fact apparently known to the child. The investigator was talking to LTF about who would count as naughty. The child asks whether the investigator has only a mother, such a question avoided by the latter)
4.3.2 Limiting uses of restrictive focus particles by children
In the limiting or scalar uses of restrictive focus particles, the adult and the child may be discussing the size of a set. An estimate is given which exceeds the correct amount. The focus particle is used to indicate that the number or quantity is smaller. This kind of delimitation is typical of the following episodes from LTF and LLY. The context together with the child's utterance signals the representation 'n and not > n'. For example, in the episode (40a), the investigator says that the child LTF has three legs, including the child's neck, since the child includes the giraffe's neck as a leg earlier when counting the number of legs of a giraffe. The investigator applies the same method playfully in counting the legs of the child, coming up with the number '3'. The child corrects this, and says that the number should be scaled down to '2' instead. In another instance of the scalar use of the final particle zaa3, the child measures her height against that of a Christmas tree at home, and says that she is short compared to the tree, measured at a certain point along the length of the tree. The same kind of scaling down from an amount greater than the stated is observed here. It seems that the child is aware that zaa3 is associated with a minimal amount compared with a greater quantity or number.

(40a) Limiting uses of restrictive focus particles by LTF
(LTF at 3;1;21. The investigator and the child are counting the number of legs of toy animals including a giraffe and a rhinoceros; the child counts the neck of a giraffe as a leg intentionally. Then they count the number of their own legs)
%com: The investigator intentionally points at the child's leg and neck as she counts "one, two, three".
*CHI:  M4 hai6 [>] +./.  
Not have  
"No"

*INV:  <Hai6 mai6> [>] aa3?  
Be not-be  sf;  
"Is that so?"

*CHI:  Jat1, ji6.  
One two  
"One, two"

*INV:  <Saam1> [=! pointing at the child's neck].  
Three

*CHI:  M4 hai6 aa3.  
Not be sfp  
"(This is) not (a leg)"

*CHI:  Loeng5 zek3 goek3 zaa3  
Two CL leg only  
"(There are) only two legs"

(40b) Limiting uses of restrictive focus particles by LTF  
(LTF at 2;11;16. The child and the investigator are commenting on colors of objects  
on a Christmas tree at home. Then the investigator and child take turns to compare  
their height to that of the Christmas tree. First the investigator finds that she is shorter  
than the tree).

*INV:  Keoi5 gou1di1 wo4, jyun4loi4 sing3daan3 syu6  
It taller sfp, so after-all Xmas tree  
"So the Xmas tree is taller after all"

*INV:  <Gam2> [>] +./.  
So

*CHI:  <Nei5> [<] ngai5 &aa3.  
You short sfp  
"You are short"

*INV:  Hai6 aa4?  
Be q-sfp  
"Is that so?"

*INV:  Gam2 nei5 ne1?  
So you how-about  
"So how about you?"

*CHI:  Ngai5 aa3!  
Short sfp  
"(I'm) short!"

*INV:  Hai6 wo3  
Be sfp  
"Yes"

*INV:  Gam2 nei5 +./.  
So you  
"So you.."

*CHI:  <Ngo5 hai2> [/] ngo5 hai2 ni1dou6 ngai5 zaa3  
I at I at here short only  
[=! measuring her height against the tree].  
"I'm this short here"
Other limiting uses of focus particles do not involve quantities or number; rather, they may involve comparison or ranking of alternatives. Thus, in (41a), the investigator and the child are talking about what they had for breakfast. The child denies that he had breakfast, but asserts that he only had milk. Here, it is plausible that the child is aware that "milk" is not as big a meal as "breakfast". Thus ranking of two discrete options is involved with respect to the amount of food entailed. Even if one discounts the possibility of such scalar uses, one can at least say that only asserts milk in contrast to an alternative breakfast, so the example can still be classified as denial of specific alternatives. In (41b), the investigator sees the child holding some tissue paper the latter used to wipe the snivel in her nose. The investigator asks whether the child LLY would like her to throw away the paper, indicating an unwillingness to do so. The child denies, saying that she has just folded the tissue. It may be said that the child here is aware of a comparison between dumping the tissue and folding the tissue, with the latter representing a more minimal alternative than the former. In this example, one can argue that ranking of discrete alternatives is involved.

(41a) Limiting uses by LLY that may involve ranking of discrete alternatives
(LLY at 3;3;26. The child and the investigator are talking about what they have eaten for breakfast)

*INV: Nei5 gam1jat6 sik6 zo5 me1 zou5caan1 aa3?
   You today eat asp what breakfast sfp
   "What breakfast did you have today?"
*CHI: Mou5 sik6 zou5caan1 aa3, ngo5 zing6hai6 jam2 nainai zaa3.
   Not eat breakfast sfp, I only drink milk only
   "I didn't have breakfast; I only ate milk"
*INV: O5, nei5 gu5 ngo5 sik6 zo5 me1 zou5caan1 aa1?
   Oh, you guess I eat asp what breakfast sfp
   "Could you guess what i had for breakfast?"
*CHI: M3, mak6pei4
   Mm, oatmeal
   "Oatmeal"

(41b) Limiting uses by LLY that may involve ranking of discrete alternatives
(LLY at 3;8;09. The child has just finished cleaning her sneezing nose with a tissue; she asks the investigator to throw it away but is refused.)

*INV: Nei5 maat3 jyun4 bei6tai3 di1 zi2 jau6 giu3 ngo5 tung4 nei5 dam2 aa4?
   You wipe finish snivel CL paper and ask me for you dump q-sfp
   "You wiped the snivel, and you ask me to dump the tissue for you?"
*CHI: M4 hai6 aa3
   Not be sfp
   "Not so"
*CHI: Baau1 zo5 zaa3.
   Fold asp only
   "(I) only folded it"
*INV: Nei5 zj6gei5 dam2 laa1
   You self dump sfp
   "You dump it yourself"
4.3.3 Children’s alternative semantic representations and errors
The overall picture indicates that on the exclusive uses of restrictive focus particles, the child may be using these particles to signal contrast or incompatibility within a semantic subfield, rather than exclusion of all alternatives. If that is the case, one may assume that the child acquires the meaning of restrictive focus by first grasping the structures of contrast, which can be viewed as a variety of pragmatics uses of focus (Rooth 1992: 79). If a Cantonese-speaking child expresses the meaning “I want X only” in the sense of “I want X, not Y”, the main thing s/he needs to grasp is the relation between X and Y. In the formulation of Rooth (1992: 81), contrast is governed by the constraint in (42). The constraint requires the ordinary semantic value of one phrase to be a member of the focus semantic value of the other phrase.

(42) Construe a phrase \( \alpha \) as contrasting with a phrase \( \beta \), if \([\beta]^o \in [\alpha]^f\)

The above constraint is a much simpler one than the formula given in (2), since in such contrastive uses of restrictive focus, the semantic representations will involve neither quantifiers nor the contextually fixed open variable C. As long as the child has grasped (42), and understands from the context that X and Y are both things that s/he wants, then the constraint (42) will be satisfied, and the restrictive focus particle can be employed appropriately. One alternative representation of restrictive focus given by the child may be (43). The phrase that contrasts with the focused phrase may be in the same sentence as the focused constituent or may be found in preceding discourse.

(43) Young children’s representation of “only”
In a sentence containing a restrictive focus particle, construe a phrase it contains as contrasting with another phrase.

One may interpret children’s comments on residue in terms of contrast. In expressing that a set of given objects X is the residue of a larger expected set is tantamount to saying that the complement of X in the larger set is not available. In other words, if the child says that s/he has only the teddy bear and the doggie, when the presupposed larger set consists of the teddy bear, the doggie, scissors and paper, s/he is asserting that she has the teddy bear, the doggies, but not the scissors and paper. A subset is contrasted with its complement.

Some of children's uses of restrictive focus particles were non-adult like. These deviant forms shed light on the contrasting meaning of zaa3. In the episode in (44), the child is asked whether the cups of jelly she is consuming are all of grape taste. The child denies this by saying m4 hai6 zaa3 (“not be only”) inappropriately, without any constituent being focused, pointing to a possible use of zaa3 simply as a negation device.

(44) Error in use of restrictive focus particles
(LLY 3;3;26. The child has just unwrapped the plastic cover of a cup of jelly; the investigator asks here whether the jellies bought were all of the same type)

*INV: Hai6 mai6 zing6hai6dak1 jat zek3 mei6dou6 gaa3 zaa3? Be not-be only-have one CL taste sfp only "Is there only one taste?"
5. Associating additive and restrictive particles with focus

5.1 Associating additive particles with focus

In acquiring the additive focus particles, not only do children need to learn the background and focus structures associated with these particles, but they also need to become sensitive to their range of application. In other words, they need to know, for instance, that `dou1` can only quantify leftward, that `zung6` and `tim1` only have VP range, but that `jau6` may interact with the subject or the VP or time. What cues them to the range of these additive particles? As observed earlier, experimental studies of restrictive focus from English (Crain et al 1994) and Mandarin Chinese (Yang 2000) have shown that children as late as six years old may have problems determining how to associate `only` with focus, so that the range of the pre-subject `only` may extend to the VP.

It is safe to assume that the exploitation of intonational contours in tone languages like Cantonese should be highly constrained, given the fact that the pitch range has been used for lexical contrasts and lexical stress is said not to exist in such a language (cf. Chao 1947). This should lead us to expect a heavier reliance on syntactic devices to convey focus. Given the fact that Cantonese is a pro-drop language, this property should make it easier for the speaker to drop unfocused elements from the sentence. Table 6 provides information about the sentence structure of the adult utterances containing additive particles with various ranges of application, for two of the children CGK and LTF. The numbers suggest a close correlation between the sentence structure used and the range of the focus particles. Thus a subject-focus particle typically would have a full sentence with overt preverbal elements. In the adult speech directed to CGK, 150 of the 179 tokens of `dou1`, which operates only on the subject, occurred before a full clause with an overt subject; for LTF, the corresponding figure was 141 out of 171. A VP focus particle will typically be found in subjectless sentences with only an overt VP. Thus it was found that in the adult input to CGK, 75 out of 97 tokens of `zung6`, which only has VP focus, appeared in subjectless sentences before an overt VP; for LTF, 156 out of the 207 adult tokens of `zung6` occurred in the same environment. As for `tim1`, which only associates with VP, it appeared in utterances containing only VP in 10 of the 15 adult tokens found in speech directed to CGK, and 12 of the 19 adult tokens in speech directed to LTF. There is thus a good fit between the range of the focus particle and the size of the syntactic constituent that the particle attaches to. The pro-drop possibilities of the language may have made it possible for the range of focus particles to be overtly marked in the syntax.
Table 6. Use of additive focus markers in adult speech to Cantonese-speaking children in relation to sentence structure.

<table>
<thead>
<tr>
<th>Structure</th>
<th>dou1 (subject focus)</th>
<th>zung6 (VP focus)</th>
<th>tim1 (VP focus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP</td>
<td>29</td>
<td>75</td>
<td>10</td>
</tr>
<tr>
<td>S*</td>
<td>150</td>
<td>22</td>
<td>5</td>
</tr>
<tr>
<td>total</td>
<td>179</td>
<td>97</td>
<td>15</td>
</tr>
</tbody>
</table>

Use of additive focus markers in adult speech to LTF (2;2-3;2)

<table>
<thead>
<tr>
<th>Structure</th>
<th>dou1 (subject focus)</th>
<th>zung6 (VP focus)</th>
<th>tim1 (VP focus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP</td>
<td>30</td>
<td>156</td>
<td>12</td>
</tr>
<tr>
<td>S*</td>
<td>141</td>
<td>51</td>
<td>7</td>
</tr>
<tr>
<td>total</td>
<td>171</td>
<td>207</td>
<td>19</td>
</tr>
</tbody>
</table>

*S indicates utterances with overt perverbal constituents that may include adverbials as well as NPs.

5.2 Associating restrictive particles with focus

How do children learn the ranges of application of the restrictive particles zing6hai6, zaa3 and zing6hai6dak1. Table 7 shows how adults structure their sentences when using these particles in their interactions with three of the children. As before, we are interested in the possibility that adults may clarify the focused constituent by demarcating it syntactically, in the form of a segment bounded only by the focus particle.

Table 7. Use of restrictive focus markers in adult speech to Cantonese-speaking children: focus position and sentence structure

| Use of restrictive focus markers in adult speech to MHZ (1;7-2;8) |
|-----------------------------|-----------------------------|-----------------------------|
| Structure | Subject focus | VP focus | Object focus |
| NP        | 0             | 0         | 8            |
| VP        | 0             | 21        | 12           |
| NP-VP     | 4             | 6         | 5            |
| Total     | 4             | 27        | 25           | 56 |

Use of restrictive focus markers in adult speech to LTF (2;2-3;2)

| Use of restrictive focus markers in adult speech to LTF (2;2-3;2) |
|-----------------------------|-----------------------------|-----------------------------|
| Structure | Subject focus | VP focus | Object focus |
| NP        | 0             | 0         | 10           |
| VP        | 0             | 5         | 9            |
| NP-VP     | 3             | 5         | 4            |
| Total     | 3             | 10        | 23           | 36 |

Use of restrictive focus markers in adult speech to LLY (2;8-3;8)

| Use of restrictive focus markers in adult speech to LLY (2;8-3;8) |
|-----------------------------|-----------------------------|-----------------------------|
| Structure | Subject focus | VP focus | Object focus |
| NP        | 2             | 0         | 3            |
| VP        | 0             | 15        | 20           |
| NP-VP     | 10            | 14        | 20           |
| Total     | 12            | 29        | 43           | 84 |

Parallel to what we observed in adults' use of additive focus markers, the data here on restrictive focus particles show that when subject was focused, the predominant structure was the full clause with an over subject (100% of the time for MHZ and LTF,
and 10 out of 12 times for LLY). When VP was focused, adults tended to use subjectless sentences containing only a VP (as in MHZ); alternatively, they used a VP or a full NP-VP clause in approximately equal proportions (as with LTF and LLY). If the object was focused, adults mostly tended to use either just the NP or utterances containing only the VP, as evidenced by MHZ and LTF. It was possible to express object focus with only an NP in Cantonese, since final particles can be attached to noun phrases to form independent utterances, as was seen in (40a,b). The use of NP utterances and VP utterances to signal object focus was likewise evidenced in the input to LLY, in which adults were also found to use a full clause to signal object focus about 50% of the time.

Underlying this syntactic cueing of focus range may be a default principle of Universal Grammar which requires that focused elements be overt in the default case. In a pro-drop language, one can focus on elements whose reference can be picked up from the discoursal context. But that is not the preferred means of expressing focus. A principle such as (45) receives partial support from the fact that not all focus operators can focus on empty elements. Thus as observed by Tancredi (1992), some focus particles such as also can focus on wh-traces, whereas other focus particles such as only cannot, as can be seen from the contrast between (46a) and (46b). The latter is ungrammatical on the reading that the person whose information is sought was the only person the addressee interviewed. However, (46a) is perfectly grammatical on the reading that the answer to the question represents the person who the addressee interviewed in addition to interviewing someone else.

(45) Focussed elements are phonologically overt.
(46a) Do you remember who you also interviewed _F_?
(46b) *Do you remember who you only examined _F_?

If generally we expect focused elements to be overt, and on the assumption that predicates are obligatory, we can understand why in the case of subject focus, the sentence structure chosen would tend to be full sentences or ones with preverbal elements. For the same reason, if the object is focused, the object should be present, as well as the verb. Thus both VP focus and object focus will call for the use of utterances with VP structure. The range of additive and focus particles is thus clearly demarcated on the surface for the children. As we saw in earlier discussion of Cantonese-speaking children’s use of additive focus (section 4.2), the overwhelming majority of the utterances contained overt focused constituents. This tendency may be related to the preference for focus particles to be adjacent to focused constituents in early stages of the acquisition of focus in German and Dutch (see Heinzel 2000, Bergsma 2000b). In our data on Cantonese-speaking children’s uses of restrictive focus particles, all reliably identified occurrences involved overt focused constituents.

6. Children's acquisition of additive and restrictive focus
To return to the issue of onset of focus particles, we have established that Cantonese-speaking children aged between two and three used additive and restrictive focus markers spontaneously. However, these facts should be evaluated against experimental studies which have reported young children's imperfect mastery of additive focus particles (Bergsma 2000), as well as controlled studies which have shown that children as late as five or six may still err in deciding on which sentence constituent the restrictive focus particle should associate with (cf. Crain et al 1994,
Gualmini et al 2002, Yang 2000). At the very least, we can infer from the large numbers of appropriate uses of focus markers in the conversational data that children are able to use them at age three given the appropriate contextual support. Tables 2 and 5 indicate that additive focus particles in Cantonese emerged shortly after 2;0, whereas restrictive focus markers appeared after two and a half years of age. It is noteworthy that children showed limiting or scalar uses of restrictive focus as well as exclusive uses, indicating an early awareness of scales along which alternatives can be ranked.

Table 8: Age at which the the additive and restrictive focus particles first occurred in children's speech.

<table>
<thead>
<tr>
<th></th>
<th>Age of first occurrence of additive particles</th>
<th>Age of first occurrence of restrictive particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHZ</td>
<td>2;02;26</td>
<td>2;06;04</td>
</tr>
<tr>
<td>CKT</td>
<td>2;01;08</td>
<td>-nil</td>
</tr>
<tr>
<td>LTF</td>
<td>2;02;10</td>
<td>2;11;16</td>
</tr>
</tbody>
</table>

For each of the three children whose longitudinal data covered the two year period (MHZ, CKT and LTF), there is a lag of at least four months in the development of restrictive focus markers relative to additive particles. As shown in Table 8, MHZ used additive focus particles for the first time at 2;2 but did not begin to use restrictive focus particles until 2;6. CKT started using additive focus markers as early as 2;1, but did not use restrictive particles at all even up to the last recorded session at 2;7. As for LTF, her additive particles emerged at 2;2 and her restrictive markers at 2;11.

One may account for this relative chronology in two ways. One possible reason for the pattern is that truth-conditional focus particles that encode “only” are inherently harder to acquire than non-truth conditional focus particles that encode “also”. Learning how to use sentences with restrictive particles appropriately demands a sensitivity to the truth conditions of the sentence, which depend on the meaning of “only”. On the other hand, the meaning contribution of “also” affects only the presupposition of the sentence, and not its truth conditions. If the child errs in the use of additive focus, it would be pragmatically odd, but the truth of the sentence is not affected. Alternatively, the greater cognitive complexity of restrictive focus compared to additive focus may be attributed to its involving universal quantification rather than existential quantification. On this view, the temporal precedence of additive focus is linked to the ontogenetic priority of existential quantification over universal quantification. This generalization is supported by the fact that for each of the four children studied (MHZ, CGK, CKT, LTF), if they have learned to use dou1 as a universal quantifier, this use is always preceded by the use of dou1 as an additive focus marker. As listed in the individual profile of MHZ in Table 4A, the first instance of dou1 at 2;3 marked additive focus, and its first use as a universal quantifier appeared at 2;5. Table 4B shows that for CKT, the preverbal particle dou1 was only used to signal additive focus and he did not show any use of the form for universal quantification up to the end of the period studied (2;7). With respect to the uses of dou1 by LTF, Table 4C indicates that the child first used the particle to mark additive focus at 2;6; it was not until two months later that she began to use the form for universal quantification. The evidence on the whole suggests that marking of universal quantification is preceded by the linguistic encoding of existential quantification.
Table 9A: Frequencies of use of additive particles by children and adults

<table>
<thead>
<tr>
<th>Child</th>
<th>MHZ</th>
<th>CKT</th>
<th>CGK</th>
<th>LTF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children's speech</td>
<td>18</td>
<td>103</td>
<td>86</td>
<td>143</td>
</tr>
<tr>
<td>Adult speech to children</td>
<td>1000</td>
<td>1120</td>
<td>665</td>
<td>578</td>
</tr>
</tbody>
</table>

Table 9B: Frequencies of use of restrictive particles by children and adults

<table>
<thead>
<tr>
<th>Child</th>
<th>LTF</th>
<th>LLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children's speech</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Adult speech to children</td>
<td>56</td>
<td>36</td>
</tr>
</tbody>
</table>

One is tempted to ask also whether input characteristics may account for the relative onset of additive and restrictive focus. The frequencies of the focus particles in adult speech directed to children are tabulated in Tables 9A and 9B. As can be seen, it is a striking fact that the numbers of additive focus particles were 8 to 20 times those of restrictive focus particles for each of the children. This indicates that restrictive focus must be more marked than additive focus in discourse. While the children must be innately equipped to represent operator-variable chains, it is possible that the prominence of input may play a role in affecting the relative onset of focus particles. However, in view of the fact that additive focus appeared before universal quantification in the polysemous word preverbal adverb *dou1* (“also/all”) in each of the subjects, and the fact that children seemed to have reduced restrictive focus to contrast initially, it is clear that restrictive focus is psycholinguistically more complex than additive focus. It is unlikely that the relatively higher input frequency of additive focus particles compared to restrictive particles should be the decisive factor affecting the temporal order of their emergence.

We observed that an important learning task for the child would be to acquire the range properties of various focus particles. This task is all the more urgent for a language like Cantonese, which delimits the range of focus more by means of lexical encoding and context than by means of pitch prominence. Our examination of the distribution of additive and restrictive focus particles in the adult input reveals that the learning task could have been facilitated by the overt syntactic marking, made possible by the possibility of argument drop in the language. In other words, one clue to the range of focus particles may lie in adults' tendency to make it transparent syntactically, so that subject focus is correlated with a full sentence, whereas VP focus typically co-occurs with verb phrase fragments. Learners may have a principle to the effect that focused elements should be made phonologically overt, unless evidence is available to the contrary.

A third issue we examined was whether children’s focus representations might be different from those of the adult. Our data on both additive and restrictive focus indicate an overwhelming preference to make the focused constituents overt, suggesting that children may have a default assumption that focused phrases are phonologically overt (cf. 45). It was also found that children’s early uses of restrictive focus were primarily denials of specific alternatives and comments on the residue of a presupposed set. These uses represented contrast rather than exhaustive exclusivity (see 42-43). If, as we have observed earlier, nominal universal quantification is evidenced in children’s language around three and a half years old, for both English and Chinese, three-year-olds should be able to build bound variable representations. If so, the paucity and delimited use of restrictive focus even among the older of our
subjects cannot be attributed to a problem of handling universal quantification and syntactic bound variables. Restrictive focus representations like (2) have a propositional complexity that goes beyond their use of universal quantification. The difficulty of mastering these formulas may be partly related to one’s quantificational competence, and partly related to one’s ability in determining the alternative set contextually.

Notes

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1 Particles such as also and only are regarded as logical operators as they enter into scope relations with other quantifiers such as frequency adverbs, as can be seen from the difference between He also drinks whisky very rarely and Very rarely does he also drink whisky (cf. König 1991: 30).

2 The range of a focus particle is the domain in which it can interact with a focused constituent. For example, the particle also placed between the subject and the VP can interact with a focused subject or any focused constituent inside the verb phrase. On the other hand, the particle only in a similar position can interact only with a constituent in the VP. Rooth (1985: 96) uses the term range to refer to this restriction, but others use the term scope (von Stechow 1991: 806). I will adopt Rooth’s terminology here.

3 It should be noted that in the formula (2), while C is an open variable, P is a bound variable. Thus formulas of this kind involve bound semantic variables. The question of whether bound syntactic variables underlie the properties of focus-sensitive operators like only will depend on whether the focused constituent moves to an adjoined position by a rule such as quantifier raising. As is well-known, the approach of Rooth (1985, 1992) assumes that focused phrases do not move.

4 Rooth (1992) does not give a detailed formulation for also. But the formula given here is consistent with the strategy of his approach.

5 Other approaches such as the Structured Meaning approach of von Stechow (1991) and Krifka (1992) posit syntactic variables in focus representations, which are created by means of the rule of Quantifier Raising, which moves focused phrases to adjoined positions.

6 Philips’s claim that children’s quantifiers operate over events rather than individuals have been challenged by Crain et al (1996).

7 The structural configuration does not account in a straightforward way how maai4 can have scope over the subject when the verb is intransitive.

8 In the English translations of the Cantonese examples, the phrase in upper case represents the constituent the focus-sensitive particle associates with. This constituent may, but need not, have pitch prominence.

9 See Lee (1995a) for further discussion of the non-focus uses of the preverbal additive particles.

10 Scholars differ on whether they think that the final particle zaa3 can have the subject within its range. Thus Tang (1998) argues that the particle can only operate on VP. But the acceptability of sentences such as the following clearly permits subject focus by zaa3.
Kei4taa1 jan4 mou5 maa15 syu1, Aa3 John maa15 zo zaa3.

other person not-perf buy book, John buy PERF only

"Others didn't buy books; only JOHN bought books".

11 As observed in Lee (1995b), the verb dak1 may also function as a verb suffix meaning "only" as shown in sentences such as below. In such uses, the focused object must carry a quantity-denoting determiner.

Aa3 John jeng4 dak1 saam1 baak3 man1.

John win only three hundred dollar

"John only won THREE HUNDRED DOLLARS (and not more)"

12 In sentences (24a,b), the other meanings that these sentences may have are not included, since the discussion here centers on the availability of scalar interpretation. The reader may refer to examples (18-19) for the other readings.

13 The oldest child LLY was not included for the study of additive focus particles, as the data showed that these particles occurred shortly after 2;0 but the recording for this child did not begin until 2;08.

14 The discrepancy between the German and Cantonese child data may be due to differences in how German and Cantonese mark focus. It may also be related to the fact that Heinzel’s subject was recorded from a much earlier age than the Cantonese children. Thus her focus data may have included utterances of an earlier stage of development which were not available in the Cantonese corpus.

15 One may also analyze (31) as an instance of verb focus, since the object NPs in this and the preceding utterances of the child are the same.

16 It should be noted that the vast majority of the object focus uses involving zung6 were in sentences with the existential verb jau5 ("have"). If the child only produced the sequence zung6 jau5 ("also have"), the occurrence would not be included in our focus counts, since the child may well have been producing the sequence as a formulaic expression.

17 For details of the properties of the elaboration particle aalmaa3 and its use in early Cantonese, see Lee and Law (2000,2001).

18 In the following exchange, the null subject of Speaker B's utterance is given by the prior context. Additive focus can operate on a null subject, but clearly the situational information must be adequate for the hearer to recover the focused constituent.

Speaker A: Aa3 John lei4 zo5

John arrive perf

"John has arrived"

Speaker B: _ dou1 heoi3 paa1ti4 aa4?

also go party q-sfp

"(Is he, in addition to us) also going to the party?"

References


Cheung, S. H.-N. (1972) Hoeng1gong2 Jyu6Jyu2 Jyu2faat3 dik1 jin4gau3 (Studies on the grammar of Hong Kong Cantonese), Hong Kong, Chinese University of Hong Kong.


