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Form and function of negation in early developmental Cantonese*

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ABSTRACT

This study investigated the interface of form and function in the acquisition of negation in Cantonese-speaking children. The data, from the Hong Kong Cantonese Child Language Corpus, were longitudinal spontaneous samples of eight children aged 1;5 to 3;8. The main issues of the study were the sequence of emergence of negative markers mou_5, m_4 and mei_6 and the acquisition trend of 11 semantic categories of negation in children's expressive language. The acquisition trend of the semantic categories matched Bloom's (1970, 1991a) finding that Non-existence preceded Rejection and Denial.

INTRODUCTION

Acquisition of negation in children was a popular topic of investigation in the 1960s and 1970s when researchers reported on the form and function of negation in several languages, for example English (Bloom, 1970) Japanese (McNeill & McNeill, 1968), Finnish (Bowerman, 1973) and German (Wode, 1976; Park, 1979). At that time, the research focus was on the semantic diversity of lexemes encoding negation and the syntactic frames in which negation occurred. Subsequently, similar frameworks were applied to Mandarin and Tamil (T. Lee, 1982; Vaidyanathan, 1991) and, in a cross-linguistic study, to French, English and Korean (Choi, 1988). More recently, discourse paradigms have been applied to old questions to explain the syntactic location and semantics of negative markers in English. For example, Drozd (1995) espoused a metalinguistic explanation of English children's use of nonanaphoric pre-sentential negation. The general trend in investigations of developmental negation has been an examination of the form/function interface across development, followed by elucidation of the

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syntactic contexts of negation in children's language. Here we briefly review the findings on the interface of form and function, before exploring this interface in Cantonese, a dialect of Chinese.

A general conclusion from studies of developmental sentence negation is that the semantic categories of negation are learnt in the sequence of nonexistence > rejection > denial, as described by Bloom (1970, 1991a) for children aged between 1;6 and 2;1. Despite the employment of a range of semantic categories, this general trend can be distilled from most studies, for a range of languages. For example, in a case study of the development of Japanese, McNeill & McNeill (1968) found three semantic categories of negation, i.e. nonexistence, lack of internal desire and nonentailing denial (coded by the authors as Existence-Truth, Internal-External, and Entailment-Non-entailment), which Bloom (1970, 1991a) interpreted as basically equivalent to nonexistence, rejection, and denial. The same general result is believed to hold for Tamil, once the confound of including negation at the single word stage of development is removed (Bloom, 1991b). When the confound is included, the order of development of Tamil negation is rejection > non-existence > prohibition > denial, for children aged 0;9 to 2;9 (Vaidyanathan, 1991). As the age range under investigation increases, so too does the range of semantic categories and the likelihood of individual variability. In a cross-linguistic study of French, English and Korean, the order of emergence of negation was reported as Phase 1: (nonexistence), prohibition, rejection, (failure) > Phase 2: denial, (inability, epistemic negation) > Phase 3: normative negation, inferential negation, where brackets indicate that some children used these categories at the given stage, while other children used them in the next stage (Choi, 1988).

T. Lee (1982) studied the development of negation in a Mandarin-speaking child aged 1;5 to 1;11. His nine semantic categories were nonexistence of object, nonrecurrence of object, negative volition, negative imperative, denial of object identity, nonoccurrence of event, nonrecurrence of event, nonexistence of state or quality of object and inability. Lee found a trend for Mandarin that was slightly different from that suggested for other languages, *viz* a trend of rejection > nonexistence > denial. Given the generally universal trend of nonexistence > rejection > denial, and the slightly different findings for Mandarin, we investigated which direction the development of Cantonese would follow. In line with previous work, it would be instructive to know how the form/function interface changes over time for Cantonese.

Cantonese

There are four markers of negation in Cantonese; they are mou_5, m_4, $mai_2/mai_5/mai_6$ and mei_6. (The numbers are used to mark Cantonese tones as follows: 1 = high level, 2 = high rising, 3 = mid level, 4 = low falling, 5 =

low rising, 6 = low level.) These four markers have their own features. For example, mou_5 is the antonym of jau_5 (have), meaning *have not*. The form m_4 means *not* and is used as a prefix for words from certain categories (verbs, adjectives and some adverbs), according to Yip (1988) to form various negative words, e.g. m_4hou_2 (not good), m_4leng_3 (not beautiful). The form *mai* can be pronounced as tone 2, 5 or 6, all of which carry a negative meaning in Cantonese. When it is pronounced as tone 2 and 5, it also carries an imperative meaning, *don't*, while in tone 6, it serves as a marker in a question, e.g. A-not-A questions and yes/no question. Lastly, the form mei_6 means *not yet* or *not complete*. Most of these negative markers are of low tone, that is, tone 4, 5 or 6, with the exception of mai_2 (Matthews & Yip, 1994).

The main issues of this study are the developmental order of negative markers mou_5, m_4, $mai_2/mai_5/mai_6$ and mei_6 and the semantic acquisition trend of negation. Furthermore, the intersection of those negative markers and semantic categories will be explored, because when each negative marker combines with different morphemes or within a specific context, the semantics of negation vary. Therefore, each negative marker can carry more than one meaning.

METHOD

Data

Data came from The Hong Kong Cantonese Child Language Corpus (Lee, Wong, Leung, Man, Cheung, Szeto & Wong, 1994). The database contains longitudinal data on the spontaneous language of eight children (four males and four females). The children were visited at their homes, approximately twice per month, for about one year, generating 171 data files. The data consisted of adult–child conversation during daily activities. The average sampling time was one hour. The youngest child was 1;5 and the oldest 2;8 when recording began, resulting in samples from 1;5 to 3;8 years. Table 1 shows the background information of the eight children.

Stages for analysis

The transcriptions were typed into CHAT computer files in the format of the Child Language Exchange System (CHILDES) project. The MLU of the first 100 utterances of all computer files was calculated by the CLAN programmes. The MLU of all files in the corpus was between 1·125 and 4·170. Bloom's (1970) analysis of developmental negation was based on data from three children, with MLUs between 1·19 and 2·83. To allow comparison with Bloom's findings, we selected files that had comparable MLUs, from 1·360 to 2·960. By plotting the distribution of MLU, four stages of development were identified. The first stage was 1·360–1·560, followed by a gap of 0·2 MLU, giving Stage II an MLU of 1·760–1·960. Stage III covered

TABLE 1. *Background information of the children*

Name	Sex	Age at which recording began and ended	Language(s) used at home	Sibling
WBH	F	2;3.23–3;4.8	Cantonese	1 younger brother
CGK	F	1;11.1–2;9.9	Cantonese	–
MHZ	M	1;7.0–2;8.6	Cantonese	–
CKT	M	1;5.22–2;7.22	Cantonese, parents occasionally introduce English terms to the child	–
LTF	F	2;2.10–3;2.18	Cantonese except when speaking to the Filipino helper	1 elder sister
HHC	M	2;4.8–3;4.14	Cantonese, Filipino helper speaks some Cantonese & English to the child	1elder brother & 1 elder sister
LLY	F	2;8.10–3;8.9	Cantonese, family employs a Thai helper who speaks Cantonese to the child	1 elder sister
CCC	M	1;10.8–2;10.27		–

TABLE 2. *MLU and number of files of the four stages*

Stage	MLU	Number of files	Age (months) mean (and S.D.)
I	1·36–1·56	21	24 (2·9)
II	1·76–1·96	17	28 (3·3)
III	2·21–2·41	18	31 (5·1)
IV	2·76–2·96	14	35 (4·1)

the range 2·21 to 2·41 (a step up of 0·25 MLU), and Stage IV covered the range 2·76–2·96 (a step up of 0·35 MLU). Table 2 shows the stages and MLUs for the selected 70 files and the mean ages of the children per stage.

Rules for negative utterance selection

The following rules were used to select negative utterances from the corpus.

Utterances including negative markers AND carrying a negative semantic role were included in the analysis. (According to Lahey (1988), negation is coded only if the child's utterance involved an overt negative marker.)

Include only complete utterances, including single words *mou*$_5$, *mai*$_2$/*mai*$_5$/*mai*$_6$ as elliptical expressions are very common in Cantonese but

accept the single nasal m_4 only where it occurs as a prefix, for example m_4hou_2 (not good), as m_4 cannot stand alone.

Exclude utterances involving a negative marker that does not carry a negative semantic role. In Cantonese, it is common to find negative markers in question forms, such as A-not-A question, for example

1. nei_5 sik_6 m_4 sik_6 $beng_2$ aa_3?
   You eat not eat biscuit sentence final particle
   do you want to eat a biscuit?

and yes–no questions

2. $yauh_5$ mou_5 jam_2
   have not drink
   do you have a drink?

However, these questions do not carry a negative meaning.

Exclude non-verbal expressions (e.g. head-shaking by the child).

Exclude mazes, false starts, repetitions, or reformulations in an utterance (Miller & Chapman, 1993).

Exclude utterances with unintelligible words.

Exclude children's repeated utterances because repeated utterances would carry the same semantic meaning as the previous utterance.

Example: The mother asks the child to drink milk

3. Child: m_4 jam_2
   not drink
   m_4 jam_2
   not drink

Repeated utterances that were probed by the listener.

Example: The child wanted to search for his comb

4. Child: m_4 gin_3 zo_2
   not see aspect marker
   lost it
   Investigator: lei_5 $soeng_2$ wan_2 me_1 aa_3
   You want search for what sentence final particle
   What do you want to search for?
   Child: m_4 gin_3 zo_2
   not see aspect marker
   lost it

Semantic analysis

In this study, the analysis of semantic categories of negation was initially based on T. Lee's (1982) classification for Mandarin because this classification of semantics was sufficiently detailed to capture the range of

TABLE 3. *Definition and example of semantic categories (1–9 adapted from T. Lee, 1982)*

Semantic categories	Definition	Examples
Nonexistence		
Nonexistence of object	The speaker expects the existence of an object, animate or inanimate, at a certain place; or the speaker believes that the listener has suggested in a previous utterance the existence of the object.	Inv: jau_5 mou_5 ap_2 have not duck? Is there any duck? Chi: mou_5 have not no
Nonrecurrence of object	The speaker expects the reappearance of an object (whose existence has been perceived by the speaker prior to the negation), or of another object of a similar kind.	The child finishes all the chips in his hand Chi: mou_5 have not all gone
Nonoccurrence of event	The speaker expects the occurrence of an event at a certain time and place; or the speaker believes that the listener has suggested in a previous utterance the occurrence of an event.	Chi: ba_4ba_1 mou_5 dai_3 ce_1 Father have not bring umbrella Father has not brought an umbrella
Nonrecurrence of event	The speaker expects a continuation of an event whose occurrence he has perceived.	The tape recorder stops Chi: m_4 juk_1 not move doesn't move
Nonexistence of state or quality of object	The speaker expects to find an object in a certain state or possessing a certain quality; or the speaker believes that the listener has suggested in a previous utterance that the object may be in a certain state or possess a certain quality.	Chi: m_4 $tung_3$ not pain (I'm) not hurt
Rejection		
Negative volition	The speaker assumes that the listener wants to impose an object or an action on him; this assumption stems from the child's own perception of the situation, or from a verbal suggestion in a previous utterance of the listener.	The investigator asks the child if she would like to read a book. Inv: $soeng_2$ m_4 $soeng_2$ tai_2 sy_1 Want not want see book Do you want to read book? Chi: m_4 $soeng_2$ not want no (I) don't want to don't read

Negative imperative	The speaker believes that the listener is carrying out or about to carry out an action. In this case, the action intended or carried out is not directed toward the speaker.	The mother wants to read the story book Chi: m_4 bei_2 not allow don't read (the book)
Denial		
Denial of object identity	The speaker assumes that the listener has suggested in a previous utterance that the name of an object is X.	The investigator holds a taxi Inv: hai_6 m_4 hai_6 ba_1 si_2? be not be bus? Is this a bus? Chi: m_4 hai_6 not be no
Inability	The speaker believes that he may be able to perform a certain physical or mental task.	The child cannot reach for the toy that on the shelf. Chi: lo_2 m_4 tou_2 take not can can't reach it
Denial of happening of event	The speaker denial denies the happening of an event that has happened.	The child is drooling Inv: lau_4 hau_2 $soei_2$ flow mouth water (you're) drooling Chi: mou_5 have not I'm not
Denial of object function	The speaker believes the function of an object; or the speaker believes that the listener has suggested in a previous utterance the function of the object.	The investigator points to a cooking spatula Inv: hai_6 m_4 hai_6 $jung_6$ lai_4 da_2 bo_1 Be not be used for play ball? Is this used for playing ball? Chi: m_4 hai_6 $jung_6$ lai_4 zy_2 je_6 sik_6 Not be, used for cook thing eat no, it's used for cooking things to eat

Inv, investigator; Chi, child.

meanings in Cantonese. Also, Mandarin shares linguistic characteristics with Cantonese. According to T. Lee's (1982) classification system there are nine semantic categories: nonexistence of object, nonrecurrence of object, negative volition, negative imperative, denial of object identity, nonoccurrence of event, nonrecurrence of event, nonexistence of state or quality of object and inability. Other than these nine categories, two more semantic categories are proposed by the authors: denial of happening of event and denial of object function. These categories were added because there were instances in the conversations where it was clear that the child was expressing additional categories of denial. For example, when the adult stated that the child was drooling, saying

5. lau_4 hau_2 $soei_2$
   flow mouth water
   (you're) drooling

the child denied the event, replying '*mou*$_5$' (not). A further category was shown in denial of the adult's suggested use of an object. For example, in one sample the adult showed the child a cooking spatula and asked

6. hai_6 m_4 hai_6 $jung_6$ lai_4 da_2 bo_1
   be not be use for play ball
   is this for playing ball?

to which the child replied

7. m_4 hai_6 $jung_5$ lai_4 zy_2 je_5 sik_6
   not be use for cook thing eat
   no, it's used for cooking things to eat

The definitions and examples of these semantic categories are shown in Table 3. To facilitate comparison with the development of English, these categories were then collapsed into three commonly used categories (Bloom, 1991a), which capture the main semantic sense of each category, that is nonexistence (nonexistence of object, nonrecurrence of object, nonocurrence of event, nonrecurrence of event and nonexistence of state or quality of object), rejection (negative volition and negative imperative), and denial (denial of object identity, inability, denial of happening of event and denial of object function).

To ensure the reliability of the analysis, intra- and inter-rater reliability was determined. Ten percent of all utterances were re-coded by the first author and a point-by-point comparison was made with a second coder. The agreements of both inter- and intra-rater reliability measures were over 90%. The remaining disagreements were resolved to ensure the accuracy of analysis.

TABLE 4. *Lexical markers and the semantic categories they encode at each stage of development for each child.*

	Stage											
	I			II			III			IV		
Child	NE	Rej	Den	NE	Rej	Den	NE	Rej	Den	NE	Rej	Den
CCC	mou_5 m_4	m_4	m_4				mou_5 m_4 mei_6	mou_5 m_4 mei_6	m_4			
CGK				mou_5 m_4	m_4	m_4	mou_5 m_4	m_4	m_4	mou_5 m_4	m_4	mou_5 m_4
CKT	mou_5 m_4			mou_5 m_4 mei_6	mou_5 m_4	m_4						
HHC	mou_5	mou_5 m_4					mou_5 m_4 mei_6	mou_5 m_4		mou_5 m_4 mei_6	mou_5 m_4	m_4
LLY				mou_5 m_4 mei_6	mou_5 m_4 mei_6	m_4	mou_5 m_4 mei_6	mou_5 m_4	m_4	mou_5 m_4 mei_6	m_4	mou_5 m_4
LTF				mou_5 m_4	m_4	m_4	mou_5 m_4 mei_6	m_4	mou_5 m_4			
MHZ	mou_5 m_4	mou_5 m_4	m_4	mou_5 m_4 mei_6	mou_5 m_4	m_4 mei_6	mou_5 m_4	m_4	m_4	mou_5 m_4	m_4	m_4
WBH	mou_5	m_4		m_4	m_4	m_4	mou_5 m_4 mei_6	m_4	m_4	mou_5 m_4 mei_6	m_4	m_4

NE, Nonexistence; Rej, Rejection; Den, Denial; I, Stage I; II, Stage II; III, Stage III; IV, Stage IV; subscript indicates tone marker.

RESULTS

The 70 CHAT files of all eight children's data contained a total of 27 530 utterances and a total of 2684 negative utterances. The form m_4 was the most common negative marker in the children's utterances. The form mou_5 was the second most common negative marker and the third most frequent form was mei_6. The forms mai_2, mai_5 and mai_6 were not commonly found in the data. This is because the most frequent use of these three markers is in the form of yes/no questions and tag questions, so they do not carry a negative meaning. All of these questions were not included in the data analysis. The form mai_5 occurred once for the meaning of negative imperative, which is not sufficiently representative for inclusion in the analysis. Therefore, the study focused on the forms mou_5, m_4 and mei_6. Developmental order of the form of negation is reported first, followed by the functions.

Sequence of emergence of negative markers (*form*)

The negatives mou_5 and m_4 were already in use at the beginning of the sampling period, with mei_6 emerging in Stages II–III. As not all children fell into each sampling stage, we can only estimate the stage of emergence of mei_6. For example, of the six children with Stage II data, three used mei_6 at Stage II (CKT, LLY and MHZ) and two children who had data at Stages II and III first used mei_6 at Stage III (LTF and WBH). Two children who did not have Stage II data showed use of mei_6 at Stage III (CCC and HHC) and the remaining child did not use mei_6 at all throughout the sampling period (CGK). (See Table 4.)

Distribution of semantic categories (*content*)

Frequency of use of each semantic category for each stage of development (group data) is shown in Table 5. The first row under the headings

TABLE 5. *Percentage of occurrence of semantic categories across stages and for the total sample of negative utterances.*

	Stage of development				
Semantic category	I	II	III	IV	Total
Nonexistence					
Number	211	332	369	238	1150
Percentage of Stage	48	43	41	43	
Percentage of Database	7	12	14	9	43
Rejection					
Number	186	267	236	168	857
Percentage of Stage	43	34	26	30	
Percentage of Database	7	10	9	6	32
Denial					
Number	37	178	297	153	665
Percentage of Stage	8	23	33	27	
Percentage of Database	1	7	11	6	25
Unanalysed (number)	1	7	1	3	12
Total	435	784	903	562	2684
Percentage of stage	100	100	100	100	
Percentage of database	15	29	34	21	

Nonexistence, Rejection and Denial shows the number of occurrences of these categories within each stage of development. The second row shows the relative frequency of occurrence of the categories. For example, at Stage I, Nonexistence = 48 means that 48% of all negations at Stage I were Nonexistence. The early use of Nonexistence and Rejection is seen in the percentage of use of these categories at Stage I

(48 % and 43 % respectively), relative to that for Denial (8 %). This relationship changes over time as Denial was used more frequently to encode negation as language ability increased. At Stage II the relative frequency for Nonexistence, Rejection and Denial was 43 %, 34 % and 23 %; at Stage III it was 41 %, 26 % and 33 %; at Stage IV it was 43 %, 30 % and 27 %. As is reflected by these percentages, the use of Nonexistence remained constant as an expression of negation, whereas Rejection decreased from 43 % of Stage I negation to 30 % of Stage IV negation as the use of Denial increased from 8 % of all negative utterances at Stage I to 27 % at Stage IV.

In terms of the proportion of the whole negation database, Nonexistence comprised 43 % of all of the 2,684 negative utterances expressed throughout the sampling period, as shown in the Totals column of Table 5. Rejection comprised 32 % of all negative utterances, and Denial 25 %. Negation was encoded most frequently in Stage III of development (Stage I = 435 negative utterances, Stage II = 784, Stage III = 903 and Stage IV = 562). Although these data provide an overview of group performance, these results do not show which of the subordinate categories were used within these superordinate categories of Nonexistence, Rejection and Denial.

General patterns of development of the subordinate categories

Recall that within the three superordinate categories of negation, Nonexistence, Rejection and Denial, there were five subordinate categories for Nonexistence (nonexistence of object, nonrecurrence of object, nonoccurrence of event, nonrecurrence of event and nonexistence of state or quality of object), two for Rejection (negative volition and negative imperative) and four for Denial (denial of object identity, inability, denial of happening of event and denial of object function). Table 6 shows the

TABLE 6. *Percentage of children using each subordinate semantic category at each stage of development*

Stage	Semantic categories										
	Nonexistence					Rejection			Denial		
	1	2	3	4	5	6	7	8	9	10	11
I (n = 5)	100	80	60	0	80	100	100	60	60	20	0
II (n = 6)	83	83	100	33	83	100	83	83	83	66	16
III (n = 7)	100	88	100	14	88	100	88	88	88	66	28
IV (n = 5)	100	80	100	66	80	100	100	100	100	66	40

1, nonexistence of object; 2, nonrecurrence of object; 3, nonoccurrence of event; 4, nonrecurrence of event; 5, nonexistence of state or quality of object; 6, negative volition; 7, negative imperative; 8, denial of object identity; 9, inability; 10, denial of happening of event; 11, denial of object function. I, Stage I; II, Stage II; III, Stage III; IV, Stage IV.

percentage of children using each subordinate semantic category at each developmental stage (Stages I to IV). The number of children using each of these subordinate categories increased across the developmental period from Stage I to Stage IV. Particularly noteworthy was the increase in the proportion of children encoding 'nonrecurrence of event' (#4) from 0% at Stage I to 66% at Stage IV, 'denial of object identity (#8) from 60% to 100%, 'inability' (#9) from 60% to 100%, and 'denial of object function' (#11) from 0% to 40%. Of interest is how these differences pattern as a function of stage of development.

Nonexistence. At Stage I, while all subjects encoded the superordinate category Nonexistence, the expression of subordinate categories varied across subjects. That is, while all five subjects expressed 'nonexistence of object', all except WBH also expressed 'nonrecurrence of object' and 'nonexistence of state or quality of object'. Three of the five children encoded 'nonoccurrence of event' (CKT, HHC and MHZ) but none of the children encoded 'nonrecurrence of event'. At Stage II, WBH continued to encode very few categories of negation, adding only 'nonrecurrence of object' and 'nonoccurrence of event'. Unlike WBH, all other subjects sampled at this stage (n = 6) encoded 'nonexistence of object' and 'nonexistence of state or quality of object' and two subjects expressed 'nonrecurrence of event' (LLY and LTF). This is the first use of 'nonrecurrence of event' among the children.

At Stage III WBH began to mark all but one of the categories of Nonexistence, the one not encoded was 'nonrecurrence of event' which at this stage of development was encoded only by CCC. By stage III all children encoded almost all of the categories of Nonexistence, except that there was no record of CGK using 'nonrecurrence of object' or 'nonexistence of state or quality of object'. By Stage IV MHZ and WBH still had not encoded 'nonrecurrence of event', but encoded all other categories of Nonexistence, as did every other subject.

Rejection. The percentage of children encoding Rejection remained steady across the four stages, with all children encoding this category at all stages, however, as with Nonexistence, WBH showed the weakest encoding of negation, and did not encode the subordinate category 'negative imperative' in Stages II and III, but used it 24 times at Stage IV.

Denial. At Stage I only CCC, CKT and MHZ encoded Denial, and these took the forms of 'denial of object identity' and 'denial of ability', with MHZ also encoding 'denial of object function'. At Stage II WBH was again the weakest, encoding only 'denial of happening of event', as did CKT, LLY and MHZ. All subjects except WBH encoded 'denial of object identity' and 'inability' and only LLY encoded 'denial of object function'. At Stage III HHC (also sampled at Stage I) still had not encoded Denial. All other subjects encoded 'denial of object identity' and 'inability', CCC, LLY, LTF

and WBH encoded 'denial of happening of event' and only LTF and WBH encoded 'denial of object function'. At Stage IV, coding of 'denial of object identity' and 'inability' was firmly established, and used by all subjects. 'Denial of happening of event' and 'denial of object function' continued to be used sparingly, and were used by CGK, HHC and LLY, and MHZ and WBH respectively.

Individual developmental patterns

The children who were sampled in at least three of the four stages (CGK, HHC, LLY, MHZ and WBH) provide some information about individual developmental patterns. Two of the children had steady growth patterns across the four Stages (HHC and WBH). Two children (LLY and CGK) had consistent use of negation throughout the developmental period with LLY having the highest rate of use of all five children, and CGK the lowest. The remaining child (MHZ) had a steady decline in the use of negation with increasing syntactic complexity. Thus there was no overall trend for the group, suggesting the need to consider individual differences, and indicating caution in drawing conclusions from a small sample of children.

Intersection of negative markers (*form*), *semantic categories* (*content*) *and stage of development*

Table 4 showed the negative markers used by each subject at each stage of development, in terms of the semantic categories encoded by each marker. For the five subjects sampled at Stage I only m_4 was used to encode Denial (and was encoded only by two subjects) whereas both Nonexistence and Rejection were encoded by mou_5 and m_4. At Stage II Denial was encoded by m_4 and mei_6 (the latter by one subject only); Nonexistence and Rejection were both encoded by all three forms, mou_5, m_4 and mei_6 (with the latter being used for Rejection by one subject only, but not the same subject who used mei_6 for Denial). At Stage III Denial was encoded mostly by m_4 and mou_5 (the latter used by one subject only), and like Stage II, both Nonexistence and Rejection were encoded by all three forms, mou_5, m_4 and mei_6. Again the latter was used for Rejection by one subject only (and not the same subject as previously). At Stage IV, Denial was still encoded by m_4 and mou_5, Nonexistence was encoded by all three forms, and Rejection was encoded predominantly by m_4, with one child continuing to use mou_5.

There was a steady use of mou_5 and m_4 to encode Nonexistence across all four developmental stages, with the gradual addition of mei_6 to encode Nonexistence (used by 50% of children at Stage II, 71% of children at Stage III and 60% of children at Stage IV). Rejection was initially coded by m_4 and mou_5 with a steady decrease of mou_5 until only m_4 was used to encode Rejection (with the exception of one subject). Denial was initially encoded

with m_4 only, and other forms were used by few children across the four stages. That is, MHZ used *mei*$_6$ for Denial at Stage II, LTF used *mou*$_5$ for Denial at Stage III and CGK and LLY used *mou*$_5$ for Denial at stage IV. It is worth noting that only CGK did not use *mei*$_6$ at all, however he was not the youngest subject, with his last sample taken at the age of 2;8, the same as MHZ and similar to CCC (2;10) and CKT (2;5). In summary, the developmental pattern, distilled from group data was as shown in Table 7.

TABLE 7. *Intersection of grammatical markers, semantic roles and stage of development*

Grammatical marker	Stage I	Stage II	Stage III	Stage IV
mou$_5$	Nonexistence Rejection	Nonexistence Rejection	Nonexistence Rejection	Nonexistence
m$_4$	Nonexistence Rejection Denial	Nonexistence Rejection Denial	Nonexistence Rejection Denial	Nonexistence Rejection Denial
mei$_4$	–	Nonexistence	Nonexistence	Nonexistence

DISCUSSION

Frequency of occurrence of markers

The form m_4 was the most commonly occurring negative marker in early developmental Cantonese. The intersection of negative markers and semantic categories and the syntactic form of the markers may explain this finding. The marker m_4 could be used for all of the subordinate semantic categories. Therefore, the frequency of use of m_4 was higher than that of the other markers. The marker *mou*$_5$ was the second most frequent in occurrence and served eight subordinate semantic categories. The third marker, *mei*$_6$ served five subordinate semantic categories. The more semantic categories a marker served, the more frequently the marker occurred within normal conversation and the higher the learnability of the form, such that m_4 comes at the foreground of representation within the negative system. Besides, as m_4 is the prefix of a word or a particle, it can combine with different words and particles to form negative verbs and adjectives (Matthews & Yip, 1994). When compared with the number of possible combinations of the three markers, m_4 is the most flexible.

The marker *mai* occurred only once for the meaning of negative imperative. This may be due to the role of this marker in Cantonese and sociolinguistic factors. The most important function of *mai* from the children's language samples was its role as a marker in a question. Although *mai* could serve to introduce negative commands, it is comparatively less common than m_4hou_2 in Cantonese for the same meaning. As described by Matthews & Yip (1994),

both *mai* and m_4hou_5 mean *don't*. The form m_4hou_2 is commonly used to express *don't* as *mai* is an impolite form used mostly within peer groups. In the process of recording, children interacted with their parents, relatives and investigators and, because of politeness requirements and the social status of the children, they rarely produced this marker in their language. Besides, as observed from the adults' language samples from the corpus, the frequency of *mai* as a meaning of negative imperative is uncommon in adults too. Some of the parents and relatives of the children did not use this marker in their language. Therefore, the input frequency of *mai* is comparatively less than that of the other markers, perhaps providing another reason why *mai* is rare in all eight children's samples.

Frequency of use of superordinate categories

The most frequently used category was Nonexistence (43 % of all negative utterances) followed by Rejection (32 %) and Denial (25 %) (Table 5). Although the frequency of use of Nonexistence remained steady over the sampling period, the frequency of Rejection decreased as Denial increased. This relationship may reflect changes in cognitive or pragmatic abilities with increasing age, or it may reflect the type of competition among elements of a cognitive system described by van Geert (1993) whereby growth or increase in one element may result in a decline or decrease in another. As was noted in Table 5, negation was encoded most frequently at Stage III of development, with less frequent use at earlier and later stages of development, (Stage I = 435 negative utterances of 7464 utterances, Stage II = 784 negative utterances of 7308 utterances, Stage III = 903 negative utterances of 8725 utterances and Stage IV = 562 negative utterances of 5122 utterances). This pattern is possibly reminiscent of an S-pattern of growth that has been identified previously in vocabulary development (Dromi, 1986) although there is more drop off at the end of the sampling period than one would expect in a typical S-shaped pattern. Nonetheless, the rapid acceleration from Stage I to Stage II, the slower acceleration to Stage III and then the falling off of growth at Stage IV, perhaps as a trade-off with increasing syntactic ability, may reflect typical patterns of cognitive growth which include periods of variation in growth rate as well as variations in timing of growth spurts (van Geert, 1993).

Developmental order of the subordinate categories

The developmental order of the subordinate semantic categories can be explained in terms of children's cognitive development. For example, Nelson (1985) noted that children are initially aware of the existence of objects in their environment, but only later build concepts of event structure. This may explain why the semantic categories of 'nonexistence of object' and 'nonrecurrence of object' appear in the very early stages. The developmental

order of 'nonoccurrence/nonrecurrence of event' would occur later, because children attend to objects before actions and events. This interaction between conceptual development and language development may be accounted for by the notion of minimal growth – that some conditions must exist before growth commences or is accelerated (van Geert, 1993). In this specific case of negation, the conceptual foundations of object permanence exist as conditions for encoding the language of 'nonexistence' and/or 'occurrence' before 'reoccurrence', and subsequently the concept of event knowledge must exist before children can encode language functions such as 'denial of happening of event'. Furthermore, the average age for comprehension of adjectives and object functions is 2;0 to 3;6 (Owens, 1988) so the acquisition of 'nonexistence of state' or 'quality of object', and 'denial of object function' is later in the sequence.

As noted above, developmental differences in the encoding of superordinate categories, and here subordinate categories, probably reflect cognitive and/or pragmatic advances with increasing age, not only increasing linguistic sophistication. For example, one might suppose that the ability to express simple 'occurrence of event' (e.g. ball bounce) would be substantially easier to encode than 'nonrecurrence of event' (not bounce now/again/yet) where an element of expectation is also encoded along with a linguistic marker of time. Expression of 'denial of object identity' and expression of 'denial of object function' may both require the child to contradict the adult, dependent on context. Encoding 'inability' requires that the child expresses ability to perform, for example, 'can jump' or 'can't jump' which may be a later cognitive development in terms of sense of identity than simple expressions of Nonexistence for example.

Individual differences in the use of semantic categories

The pattern of use of the superordinate semantic categories suggests that results from small-scale longitudinal studies be interpreted cautiously. While WBH had a clear, and expected developmental pattern of increasing use of all three semantic categories over time, he was the only child of the five children sampled at more than one data point to do so. HHC had a similar, though not identical pattern of development, with a steady use of Nonexistence from Stage I to Stage III and then a sharp increase in encoding at Stage IV. This same pattern applied to Rejection and Denial, although Denial was not used at all by HHC until Stage IV. Both LLY and CGK had consistent unchanging use of all three categories. LLY had high use of Nonexistence across the period but a low use of Rejection and a slightly higher use of Denial. CGK had very little encoding of negation overall. MHZ posed the greatest puzzle of all the children. He had a gradual reduction in the use of negation over time (as a function of all utterances in his samples). It is possible that changing pragmatic functions and discourse

requirements resulted in this pattern, although this hypothesis can not be validated without a complete classification of all of his 5295 utterances.

Sequence of emergence of markers and their semantic roles

The sequence of emergence of *mou*$_5$ = m_4 > *mei*$_6$ in this study concurred with L. Lee's (1992) experimental study of comprehension with 27 children aged between 2;6 and 4;6. She attributed the developmental order to the development of cognitive ability and linguistic complexity. In this study, there was a relationship between the sequence of emergence of the form and the acquisition order of the semantic category. The earliest acquired semantic categories were Nonexistence and Rejection, both expressed by the markers *mou*$_5$ and m_4 for most of the children. For the form *mei*$_6$, the earliest meaning is nonoccurrence of event in most of the children. This suggests a tighter relationship between emergence order of the negative marker *mei*$_6$ and semantic categories than that for *mou*$_5$ and m_4. The late emergence of *mei*$_6$ may be related to cognitive development. The form *mei*$_6$ is unique among all negative markers in that it carries a temporal concept of 'not yet complete'. Thus, children need to not only acquire the negative meaning and learn how to use it, but also need to acquire the temporal concept before they could correctly use the marker in their language. Therefore, the developmental order of *mei*$_6$ is later than the other two markers.

Inappropriate use of markers

While children's use of the negative markers was mostly appropriate, there was some inappropriate usage of the negative markers in some of the utterances from the children's language samples. Inappropriate usage could be indicative of a period of transition between well-established and emerging markers. These transitional periods could further explain the developmental order of the negative markers. Most of the errors for m_4 were where the child used *mou*$_5$ to substitute for m_4 in the utterance. In the following example, the child wanted to express the semantic meaning of negative volition. Native Cantonese speakers would answer this by a negative word that starts with the negative marker m_4, e.g. m_4*hou*$_2$ or m_4*dak*$_1$.

Example:
The investigator asks the child to remove the clothes from the washing machine after washing them.

8. Inv:	sai$_2$	jyun$_4$	saam$_2$	zau$_6$	lo$_2$	di$_1$	saam$_1$	ceot$_1$	lei$_4$
	wash	post-verbal-particle	clothes	then	take	classifier	clothes	remove	sentence-final-particle

(you) take the clothes out when the washing is finished

Chi: mou$_5$
have not
no

However, in the same conversation, the child used *mou*$_5$ for most negative utterances and showed some correct use of *m*$_4$ as well. These types of errors are distinguished from those where the more advanced form does not appear in the child's lexicon. For example, there were examples where a child used *m*$_4$ instead of *mei*$_6$ in an utterance with no previous use of *mei*$_6$ in his language sample. This may be because the negative marker *mei*$_6$ was not yet established in the child's lexicon.

An interesting stereotypic use of a negative marker was seen in one child, who frequently produced *m*$_4$*hai*$_6$ in his data. The child used this negative utterance to change the topic (e.g. the investigator asked him some questions but he wanted to talk about another topic) or to seek the attention of the adult. Most Cantonese speakers would not use a negative utterance to serve these two pragmatic functions. This is unusual both developmentally and in adult form. For example when the investigator was talking to the mother the child said:

9. Chi: m$_4$ hai$_6$ aa$_3$
not be sentence final particle
don't

This is an example of attention-seeking. This phenomenon was only present in Stage I and early Stage II of the child's data.

Overall, the acquisition trend of semantic categories in this study matched Bloom's (1970, 1991a) findings that Nonexistence preceded Rejection and Denial. A further finding was that two markers, *mou*$_5$ and *m*$_4$ were used with equal facility at the earliest sampling periods, and *mei*$_6$ emerged later.

Further investigation

This study focused on the analysis of verbal lexical negation only, but negation can be expressed by non-verbal expression (e.g. shaking head) and utterances without an overt negative marker, that is via suprasegmental features of an utterance. For example, vowel prolongation and rising tone of the last word of an utterance could signal negative meaning in Cantonese, however it is not yet known how these features operate in adult Cantonese. It may be useful to investigate these two areas to determine the semantics of negation in both adult language and early language development. Besides, negative utterances may serve different pragmatic intents, such as greeting and indirect request. However, the pragmatics of negation in Cantonese have not been studied. Furthermore, as the syntactic form of negation may affect the emergence of negative markers and semantic categories, a syntactic analysis would complement the findings of this study.

That is, it may be informative to track a child's use of negation within noun phrase and verb phrase structures as these increase in complexity over time.

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