

Input Ambiguity and Head Directionality in early Hong Kong Sign Language

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Outline

1. **Research questions**
2. **Theoretical background**
3. **Head directionality in HKSL**
4. **Functional elements in early HKSL**
5. **Discussion**
6. **Concluding remarks**

1. Research Questions

- The modals in early HKSL may appear in two different positions while the modals produced by adults tend to appear in clause-final position.
- To what extent the input, or more specifically, ambiguous input, plays a role in the acquisition of the syntax of functional elements?
- Is the early phrase structure head-initial or head-final?

2. Theoretical background: Input Ambiguity

- The notion of input ambiguity (Gibson and Wexler 1994, Fodor 1998, 2001, Müller 1998, Fodor and Crowther 2002, among others)
 - Parametric ambiguity/ cross-grammar ambiguity
 - John kisses Mary
 - (V2 parameter or head parameter?)
 - Within-grammar ambiguity
 - Ich mag Nebensätze, weil sie so kompliziert sind.
I like subordinate clauses because they that complicated are.
'I like subordinate clauses because they are so complicated.'
 - Ich mag Nebensätze, weil sie sind so kompliziert.
I like subordinate clauses because they are that complicated.
'I like subordinate clauses because they are so complicated.'

2. Theoretical Background: Head Directionality

- **Head-initial:**

- **English**

[v' [V⁰ eat] [Y^{max} apple]] (Fukui 1993:401)

- **Head-final:**

- **Japanese**

[v' [Y^{max} ringo-o] [V⁰ tabe-ru]] (Fukui 1993:401)

apple-ACC eat-NONPAST

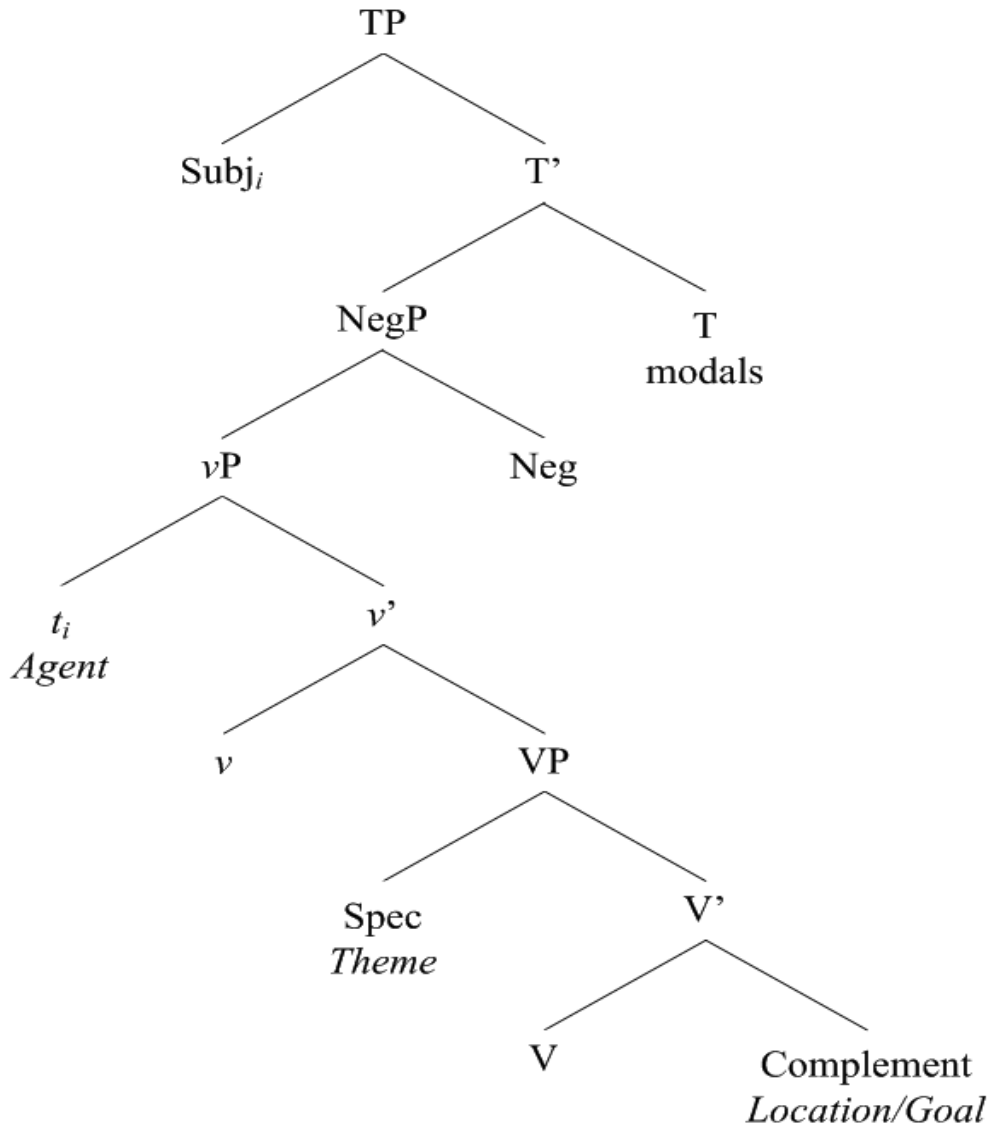
'eat an apple'

- **Mixed head directionality**

- **German (Poeppel and Wexler 1993)**

head-final vP and head-initial IP, CP

3. Head directionality in HKSL



- vP and VP are head-initial
- TP and NegP are head-final (Lam (2009))

Syntactic position of Negators in HKSL (Lee 2006)

- JAFI GO_HOME NOT.
'Jafi didn't go home.'
- INDEX-_{3s} SAD NOT.
'She isn't sad.'
- INDEX-_{3s} GO_OUT_ON_DATES NOT_HAVE.
'He has't gone out on dates.'
- INDEX-_{1s} SEE_A_MOVIE NEVER
'I have never seen a movie.'

Syntactic position of modals in HKSL (Lee 2006)

BRING_ALONG_SHOULDER_BAG HAVE_TO. (pro) STEAL WILL.
'You have to bring along your shoulder bag. It is possible (for) it to be stolen.'

INDEX-1s GO_HOME TELEVISION WILL.
'I will go home and watch the television broadcast.'

INDEX-1s ACCOMPANY (pro) NEED_TO.
'I have to accompany (my father).'

Negative Modal

TOMORROW INDEX-1s HIKING CAN'T. LEG HURT
'I can't go hiking tomorrow. My leg hurts.'

Syntactic position of HAVE_{exist} in HKSL

- **YESTERDAY/TODAY FELIX BUY CANDY HAVE_{exist}/NOT_HAVE.**
'It is/isn't the case that Felix bought some candy yesterday/today.'
- ***TOMORROW FELIX BUY CANDY HAVE_{exist}/NOT_HAVE.**
'It is/isn't the case that Felix bought some candy tomorrow.'

In sum,

- **Functional elements (modals, negators and auxiliaries) are clause-final in HKSL**
- **It is hypothesized that TP and NegP are head-final in the HKSL phrase structure.**

3. Functional elements in early HKSL

- **Method**
 - 32 sessions of longitudinal data of a deaf child named CC from the Child HKSL Corpus
 - CC was diagnosed as having severe hearing loss.
 - Variable input: **non-native input** from the parents, **native input** from Deaf researchers, **mixed utterances** (Signed Chinese, speech, HKSL) from both parents and Deaf researchers and **limited access to speech** from hearing grandmother and relatives
 - **Age of first use** : the age at which a child first used a clear, novel example of a construction (Stromswold 1996:45)

3. Functional elements in early HKSL

- **Modals and auxiliaries (Lam (2009))**
 - **Modals: HAVE-TO, CAN, CANNOT**
 - **Auxiliaries: HAVE_{exist}, NOT-HAVE, NOT-HAVE@f**

	Number of Utterances	First Clear Use
Modals		
HAVE-TO	1	4;2.25
CAN	7	3;10.28
CANNOT	20	3;6.28
Auxiliaries		
HAVE _{exist}	68	2;8.18
NOT-HAVE	18	3;8.19
NOT-HAVE@f	36	2;1.9

No. of occurrences of modals/auxiliaries in different syntactic positions

	Preverbal		Clause -initial		Clause -final	
Modals						
HAVE-TO	4;2.25	1	0	0	0	0
CAN	3;9.24	1	4;2.25	1	3;10.28	1
CANNOT	0	0	0	0	3;7.13	15
Auxiliaries						
HAVE _{exist}	2;8.18	15	0	0	2;11.21	7
NOT-HAVE	0	0	0	0	4;4.13	1
NOT-HAVE @f	3;8.19	5	0	0	2;1.9	9
Total	22/56 (39.29%)		1/56 (1.79%)		33/56 (58.93%)	

Syntactic positions of modals/auxiliaries in early HKSL

- **Preverbal position**

CAN PLAY.

‘(I) can play (at the play room).’

(3;9.24)

- **Clause-final position**

EAT-NOODLES CAN?

‘Can (I) have the noodles [i.e. biscuits]?’

(3;10.28)

- **Clause-initial position**

IX-obj MONKEY IX-obj,
(assume the role of the monkey)

CAN MATCHES GIVE1o,

(assume the role of the monkey’s mother)

CANNOT, NOT, FIRE.

‘This (picture), monkey, this (picture), can you give me the matches? You cannot play with the matches, no, (it would cause) fire.’

(4;2.25)

- If we group the negative modals and auxiliaries into a group against the remaining T-elements, the following pattern can be seen:

	Preverbal	Clause-final
Positive T-elements	68.00% (17/25)	32.00% (8/25)
Negative T-elements	16.67% (5/30)	83.33% (25/30)

Negators in early HKSL

- **Clausal-final position**

CL:DRAW_ON_WALL NOT .

‘(You do) not draw on the wall.’ (2;11.21)

- **Preverbal position**

NOT HIT_a.

‘(You) do not hit (me).’ (3;1.15)

	Preverbal	Clause-final
NOT	12	38
NOT_HAVE	0	1
NOT_HAVE @f	5	9

In sum,

- **Preverbal and clause-final functional elements co-occur in child HKSL.**
- **Negators and Negative modals and auxiliaries tend to occur in a clause-final positions while positive functional elements may appear in various syntactic positions.**

4. Discussion

Research Questions

- **To what extent the input, or more specifically, ambiguous input, plays a role in the acquisition of the syntax of functional elements?**
- **Is the early phrase structure head-initial or head-final?**

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Input ambiguity and the emergence of the early phrase structure

- **HKSL**

Functional elements (modals, auxiliaries and negators) are generally **clause-final**.

- **Cantonese**

- **Head-initial TP**

- Cheung (2005) Dislocation Focus Construction in Cantonese

- **Head-initial NegP**

- Lee (1994)

- **Head-initial ModP**

- Lee, Wong and Wong (1995), Wong (1998)

- Preverbal and postverbal modal auxiliaries (*wui5* 'can, will', *ho2ji5* 'can, may' versus *dak1* 'can')
- Preverbal modal auxiliaries are analyzed as subject control verbs
- Postverbal modal auxiliary *dak1* is viewed as a canonical modal which is projected as a ModP.

Input ambiguity and the emergence of the early phrase structure

- **Signed Cantonese**

Functional elements are placed at **preverbal** positions

IX-1p ELDER-SISTER WAIT NEXT-TIME GO BUY BATTERY,

CL:PUT_BATTERY_INTO_BATTERY_COMPARTMENT **CAN PLAY**

YES-NO-YES?

‘Wait, I will go to buy some batteries next time, then (we) can play (this toy), ok?’

REMEMBER LAST-TIME MOTHER **HAVE_{exist} TAKE**

CL:SHRIMP_BISCUIT, ORANGE, CL:SHRIMP_BISCUIT

CL:BREAK_THE_SHRIMP_BISCUIT

IX-obj. ‘Remember the last time when mother took a shrimp biscuit, (it is) orange, (I) break the shrimp biscuit, that’s this.’

• Modals/auxiliaries

	Preverbal		Clause-final	
	Child	Adult	Child	Adult
Modals				
HAVE-TO	1	7	0	0
CAN	1	6	1	66
CANNOT	0	0	15	44
Auxiliaries				
HAVE _{exist}	15	22	7	23
NOT-HAVE	0	0	1	74
NOT-HAVE@f	5	0	9	11
Total	22/55	35/253	33/55	218/253
	(40.00%)	(13.83%)	(60.00%)	(86.17%)

- **Negators, negative auxiliaries and negative modals**

	Preverbal		Clause-final	
	Child	Adult	Child	Adult
CANNOT	0	0	15	44
NOT-HAVE	0	0	1	74
NOT-HAVE@f	5	0	9	11
NOT	12	1	38	235

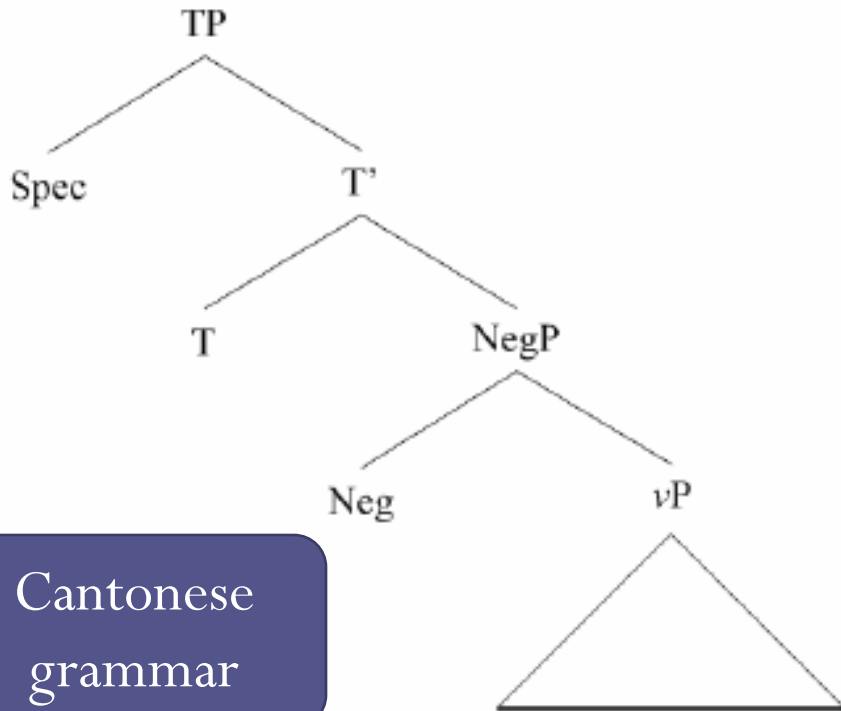
In sum,

- **The co-occurrence of preverbal and clause-final modals and auxiliaries in child data can be explained by ambiguous input.**
- **Negative elements in adult data, however, occur more consistently in a clause-final position. Still CC produces both preverbal and clause-final negative elements. Even though the negative elements are not ambiguous in the input data, CC may treat all functional elements as a group. Hence the functional elements appear in two syntactic positions.**

- **Is the early phrase structure head-initial or head-final?**

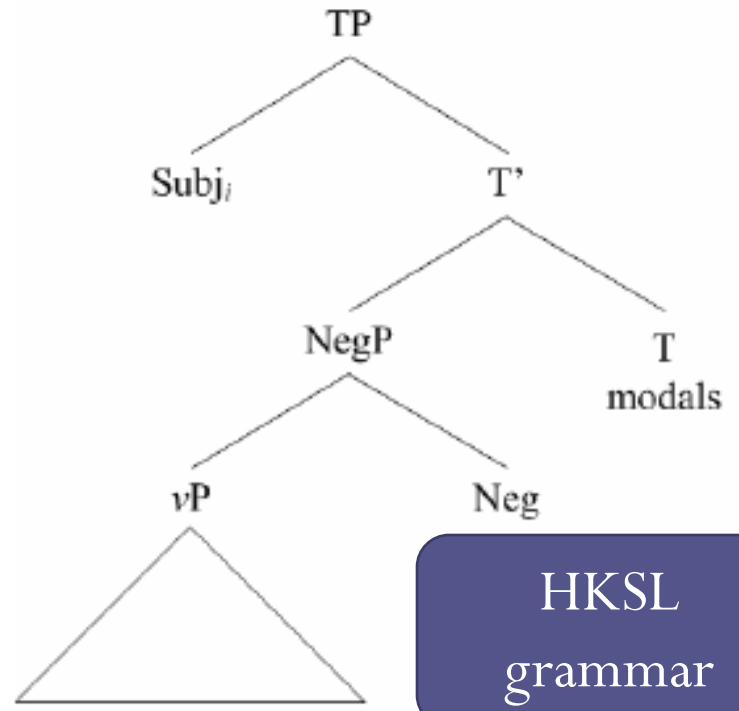
One structure or two structures?

a. Head-initial



Cantonese
grammar

b. Head-final



HKSL
grammar

CC's grammar

- The preverbal functional elements in the child data conform to the Cantonese grammar presented to CC in the form of Signed Chinese. The structure is head-initial.
- The clause-final functional elements conform to the HKSL grammar. The structure is head-final.
- Analysis 1: CC assumes that preverbal and clause-final position are variants in HKSL given the ambiguous input.
- Analysis 2: CC has two grammars: Cantonese and HKSL. The preverbal and clause-final positions of functional elements represent two different structures in two different grammars.

5. Concluding remarks

- **CC is exposed to both HKSL and Signed Cantonese.**
- **CC produces both preverbal and clause-final functional elements.**
- **Native signers in the corpus also produce both preverbal and clause-final functional elements (i.e. input ambiguity).**
- **Preverbal and clause-final functional elements may represent two different syntactic structures in two different grammars (i.e. Head-initial TP in Signed Cantonese and head-final TP in HKSL).**