Bimodal and bilingual development of discourse referencing in deaf/hard of hearing children

Felix Sze, Gladys Tang

Centre for Sign Linguistics and Deaf Studies

The Chinese University of Hong Kong

賽馬會手語雙語共融教育計劃
JOCKEY CLUB SIGN BILINGUALISM AND CO-ENROLMENT IN DEAF EDUCATION PROGRAMME

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Purpose of this study

- This paper investigates the bimodal and bilingual development of discourse referencing in the Cantonese and Hong Kong Sign Language (HKSL) narratives of 15 Deaf/hard-and-hearing d/hh) children.

- The d/hh children study in a sign-bilingual (i.e., sign and spoken language) co-enrolment (i.e., D/hh and hearing students) programme in which Hong Kong Sign Language and Cantonese are the two major teaching languages.

Outline

- Literature Review
- Research questions
- Methodology
- Findings
- Discussion

Literature Review: Bimodal Bilingualism

- Bimodal bilingualism - 2 types of bilinguals:
  - unimodal bilinguals – bilinguals with two spoken languages or two sign languages.
  - Bimodal bilinguals - bilinguals who use a spoken language and a sign language.
- Issues commonly addressed in bilingual studies:
  - How separate are the bilingual child's languages?
  - Can one language influence the other in the course of development?

(Lillo-Martin et al. 2009)

Bimodal Bilingualism

- Previous studies on bimodal bilingualism mostly focused on children who are native users of the spoken and sign languages (e.g. hearing children of deaf adults).
- Very few have looked at the bimodal and bilingual development of d/hh children from hearing families who have limited auditory input and whose access to sign language is delayed. These d/hh children, however, represent the majority in the deaf population.
- This study aims to look at the development of discourse referencing of a group of 15 d/hh, most of them growing up in hearing families.

Discourse referencing in narratives

- How different characters are introduced, maintained and reintroduced by nominal expressions in a narrative discourse.

- Levelt (1989):
  - Decisions about which nominal expressions are used in the discourse are based on the speaker's presupposition about the listener's knowledge of the referents.

Discourse referencing in narratives

- Referencing strategies in English:

Referential functions	Types of nominal expressions
Introduction	Indefinite noun phrases e.g. a cat, a bird
Maintenance	Definite noun phrases e.g. he, she, the cat, that dog, null NPs
Reintroduction	Definite noun phrases e.g. that cat, the dog

Discourse referencing in narratives

- Referencing strategies in Cantonese:

	Preverbal position	Postverbal position
Dem + cl + n 呢本書	**Definite (deictic)** *呢本書*好好睇	**Definite (deictic)** 我睇過*呢本書*
num + cl + n 三本書	They can occur but don't yield a specific reading.	**Indefinite** 我睇過三*本書*
cl + n 本書	**Definite** *本書*好好睇	**Indefinite / Definite** 我想買*本書*
bare noun 書	**Generic** *書*係知識的寶庫	**Indefinite / Generic** 我想買*書*

Classifiers in Cantonese: important for marking definiteness in nominal expressions.

Dem = demonstrative; num = numeral; cl = classifier ; n = head noun

Bare noun = noun phrases without dem, num and cl.

Development of discourse referencing in narratives

- Encoding reference with appropriate nominal expressions is a late-acquired skill among hearing children (e.g. Warden1976, Bamberg 1987, Wigglesworth 1990, Wong & Johnston 2004, To 2006, etc).

Younger children (e.g. age 5 or below)

- Tend to misuse definite nominal expressions for referent introduction.
- Ambiguous use of pronominals for referents switching.
- Better performance in referent maintenance and reintroduction due to more correct use of definite forms.

Development of discourse referencing in narratives

Older children (age 6 or above):

- Age 6: begin to use indefinite nominal expressions appropriately for referent introduction.
- Age 8: Begin to use syntactically full-fledged nominal expressions to introduce referents.
- Age 10 or above: complete mastery of discourse referencing (i.e. appropriate introduction, reintroduction and maintenance).

Discourse referencing in sign languages

In sign languages, referential strategies include:

- Different types of nominal expressions
  - Full noun phrases
  - Indexing (i.e. pointing signs) (Morgan 1996)

- Other aspects of grammar that can provide clues for discourse referencing (i.e. help identifying the referents):
  - Verb agreement (VA)
  - Role shift (RS)
  - Classifier predicates (particularly semantic classifiers) (CL)
  - Locus
  - Eyegaze
- (Engberg-Pedersen 1995, 2004; Morgan 1996, 2005)

Discourse referencing in sign languages

- Many of these strategies involve the use of space:
  - Lexical nouns
  - Pronominal (pointing)
  - Null arguments
  - Determiner (pointing) + noun/classifier
  - Verb agreement (VA)
  - Role shift (RS)
  - Classifier predicates (CL)
  - Locus
  - Eyegaze

Development of discourse referencing in sign languages

Study on British Sign Language (BSL) (Morgan 2005):

12 deaf children aged between 4-13 years old were elicited to tell a story “Frog Where Are You? ” by BSL.

Group 1 (aged 4-6)

- do not show the ability to use appropriate forms for different referential function, like using the classifier in maintenance without specifying the referents.
- focus on referencing on the level of sentence but fail to balance the demand of larger unit of the discourse.

Development of discourse referencing in sign languages

Group 2 (aged 7-10)

- show the developmental improvement by using the noun phrase more appropriately for referential function.

Group 3 (aged 11-13)

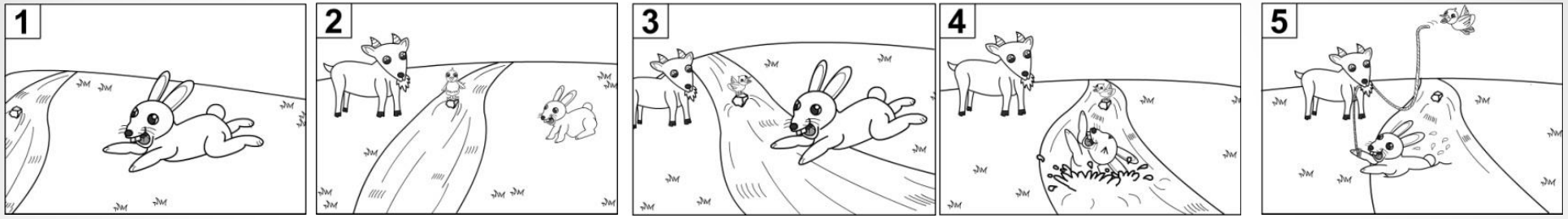
- show the ability to map different ways for referencing with different referential functions. Noun phrase is the main strategy for introduction and reintroduction (90-100%) whereas classifiers and role-shift compose the majority in maintenance (over 70%) among the children aged 11-13.

Research questions

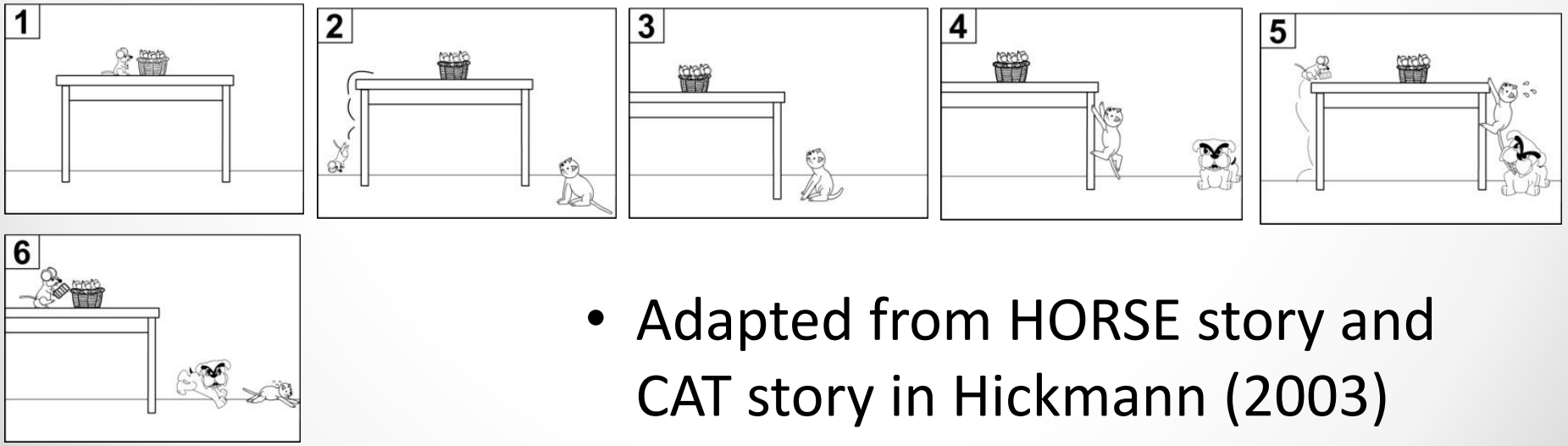
- What referential strategies do d/hh children adopt in their HKSL narratives? Are they approximating adult grammar as their signing proficiency improves?
- What referential strategies do d/hh children adopt in their development of discourse referencing in Cantonese? Are they approximating adult grammar as their speech proficiency improves ?
- Can the d/hh children distinguish the two language systems? Would there be any interlinguistic transfers? If yes, what are the transfer patterns? What are the possible contributing factors?

Methodology

- 2 picture-based stories for elicitation
- BUNNY Story



- MOUSE Story



- Adapted from HORSE story and CAT story in Hickmann (2003)

Methodology – d/hh children

- 15 d/hh kindergarten and primary school children (age between 5;5 and 9;11) who were studying in the sign bilingual co-enrolment programme.

- Sign bilingual: emphasizes the use of spoken language and natural Hong Kong Sign Language in classes
- Co-enrolment: d/hh and hearing children study in the same class (6 d/hh + 15 – 25 hearing classmates)

Methodology – d/hh children

- These 15 d/hh children are grouped into four levels of spoken Cantonese proficiency according to their language age measured by Reynell Developmental Language Scales – Cantonese version (the Expressive Scale).

Levels of proficiency	Spoken Language age	No. of d/hh children
Level 1	below 4	2
Level 2	4 – 4;11	4
Level 3	5 – 5;11	4
Level 4	6 or above	5

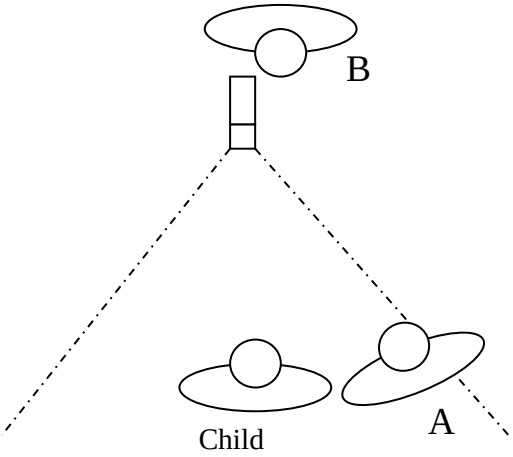
Methodology – d/hh children

- They are also grouped into different sign language proficiency levels basing on an evaluation of their narratives along several parameters (e.g. content, grammar, lexical items, non-manual, use of space).

Levels of proficiency	No. of children
Level 1 (lowest)	3
Level 2	5
Level 3	4
Level 4 (highest)	3

Methodology: narrative elicitation

- Hickmann (2003):



- Story telling task:
  - Each child was given time to look at the pictures
  - Each child was asked to tell the story to the addressee, so that the latter could re-tell the story to the child

Methodology

- Baseline data collected for comparison:
  - HKSL signing narrative data:
    - 4 HKSL native signers (2M & 2F).
  - Cantonese spoken narrative data
    - 6 native speakers of Cantonese (5F & 1 M).
    - 14 hearing children:

Levels	Chronological age	No. of hearing children
Level 1	below 4	2
Level 2	4 – 4;11	4
Level 3	5 – 5;11	4
Level 4	6 or above	4

Findings: HKSL narratives (adults)

- Adult HKSL users:

	Lexical noun	Lexical noun + IX	Pronominals	Null arguments	Total
Introduction	16 (55%)	13 (45%)			29 (100%)
Maintenance	13 (5%)	20 (7%)	16 (6%)	229 (82%)	278 (100%)
reintroduction	17 (28%)	34 (56%)	5(8%)	5 (8%)	61 (100%)

Introduction

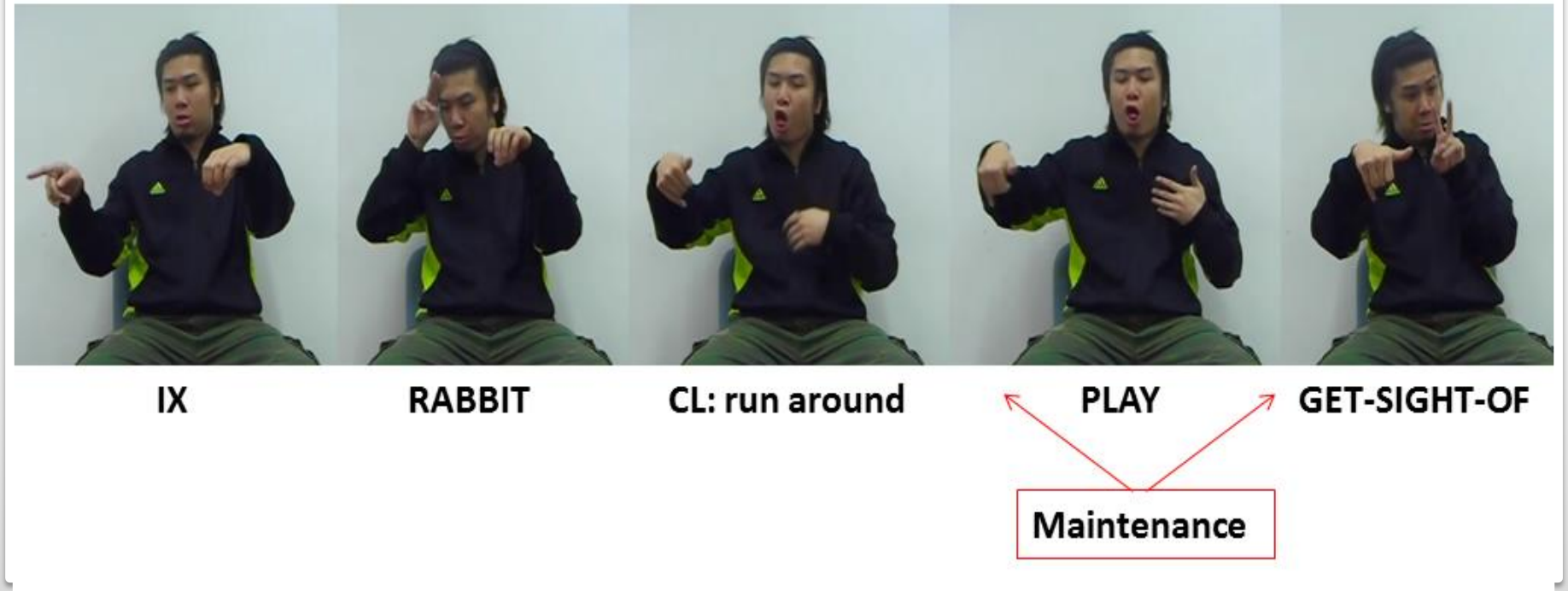
- Lexical noun / lexical noun + IX; obligatory gaze at addressee.
- Anchoring the newly introduced referents in the signing space by:
  - indexical pointing within the nominal expression.
  - a semantic/entity classifier predicate that follows the nominal expression.

"A rabbit played and ran across (the grass)."

(introduction: bare noun + gaze at addressee + SemCL)

Maintenance

- Mainly null arguments; some pronominals or IX + N.
- Among 317 tokens with null arguments for maintenance, 53% are followed by role-shift, 38% are followed by semantic/entity classifier predicates; 32% are followed by agreement verbs → provide clues for reference tracking.



(maintenance: null argument + SemCL + verb agreement)

Reintroduction

- Strong preference to use overt NPs.
- In a minority of cases where no overt NPs are used, clues are available from classifier predicates, verb agreement, role shift, etc.

(reintroduction: bare noun only)

Findings: HKSL narratives (d/hh children)

Linguistic forms	introduction		maintenance		reintroduction		Total	
n	86	(76.8%)	75	(31.8%)	136	(82.9%)	297	(58.6%)
HAVE + n	14	(12.5%)			1	(0.6%)	15	(3%)
IX (correct direction)			9	(3.8%)	3	(1.8%)	12	(2.4%)
IX (unclear/incorrect direction)			1	(0.4%)			1	(0.2%)
IX + n (unclear/incorrect direction)	1	(0.9%)	2	(0.8%)	1	(0.6%)	4	(0.8%)
IX + n (correct direction)	5	(4.5%)	2	(0.8%)	5	(3%)	12	(2.4%)
IX + CL			1	(0.4%)			1	(0.2%)
Null forms	1	(0.9%)	146	(61.9%)	18	(11%)	165	(32.5%)
	112		236		164		507	

- D/hh children use fewer pointing signs (IX as determiners or pronouns, 5.9%) than adults do (24%).
- Bare nouns predominate across all discourse contexts (ranging from 30 to 80%).

Findings: HKSL narratives (d/hh children)

Linguistic forms	introduction		maintenance		reintroduction		Total	
n	86	(76.8%)	75	(31.8%)	136	(82.9%)	297	(58.6%)
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Null forms	1	(0.9%)	146	(61.9%)	18	(11%)	165	(32.5%)
	112		236		164		507	

- Distributional patterns suggest that they are aware of the mapping between nominal forms and referential functions.
- Pronouns are only found in definite contexts. Null forms mainly used for maintenance.

Linguistic forms of NPs for referencing purposes	Proficiency levels (highest----------lowest)								Total (n=1)
	4th (n=3)		3rd (n=4)		2nd (n=5)		1st (n=3)		
n	61	(37%)	77	(57%)	110	(72%)	49	(91%)	297
HAVE + n			5	(4%)	8	(5%)	2	(4%)	15
IX (correct direction)	10	(6%)	2	(1%)					12
IX (unclear/incorrect direction)			1	(1%)					1
IX + n (correct direction)	9	(5%)	2	(1%)	1	(1%)			12
IX + n (unclear/incorrect direction)	1	(1%)	2	(1%)	1	(1%)			4
IX + CL	1	(1%)							1
Null forms	84	(51%)	46	(34%)	32	(21%)	3	(6%)	165
	166		135		152		54		507

- Some influence from spoken Cantonese, as evidenced by some instances of using the sign HAVE for introducing referents.
- As signing proficiency improves, d/hh children produce:
  - Fewer bare nouns, more pointing signs and more null
  - forms, most of which in appropriate contexts.

Linguistic forms of NPs for referencing purposes	Proficiency levels (highest----------lowest)								Total (n=1)
	4th (n=3)		3rd (n=4)		2nd (n=5)		1st (n=3)		
n	61	(37%)	77	(57%)	110	(72%)	49	(91%)	297
HAVE + n			5	(4%)	8	(5%)	2	(4%)	15
IX (correct direction)	10	(6%)	2	(1%)					12
IX (unclear/incorrect direction)			1	(1%)					1
IX + n (correct direction)	9	(5%)	2	(1%)	1	(1%)			12
IX + n (unclear/incorrect direction)	1	(1%)	2	(1%)	1	(1%)			4
IX + CL	1	(1%)							1
Null forms	84	(51%)	46	(34%)	32	(21%)	3	(6%)	165
	166		135		152		54		507

- The production of IX (pronouns) and IX + n (determiner + noun) provide evidence that the d/hh children have acquired the nominal structure by the time they reach the highest level of signing proficiency within this data set.
- D/hh children are approaching adult grammar in their development of nominal structures and referencing skills.

Findings: Cantonese narratives (adult)

Referential properties	Types of Norminal Expressions	Hearing Adults, n = 6					
		Introduction (%)		Maintenance (%)		Reintroduction (%)	
Indefinite	Existential constructions	31	77.5%				
	(num)+ CL + N (postverbal)	3	7.5%				
	Num + cl + n (as object)	2	5%				
Indefinite/Definite	CL + N (as object)			8	7%	16	25%
Definite	CL + N (as subject)	3	7.5%	15	13%	23	35%
	CL + N (as topic)					1	2%
	det + (num) + cl + n (as subj)			1	1%		
	det + (num) + cl + n (as obj)			1		2	3%
	Null form			42	38%		
	pronouns			34	30%	6	9%
	Ah + N					2	3%
Definite if interpreted as proper names	Bare NP (subj)	1	2.5%	9	8%	14	22%
	Bare NP (obj)			2	2%	1	2%

Hearing adults:

- Referent introduction:
  - most frequent - existential constructions (e.g. 有隻兔仔) (77.5%).
- Referent maintenance:
  - null forms (38%) and pronominals (e.g. 佢)(30%) predominate.
  - Some use of definite [cL+n] (e.g. 隻兔仔)and bare NPs (e.g.兔仔).
- Referent reintroduction:
  - Definite [cl + N] (e.g. 隻兔仔)(65%) is most frequent, followed by bare NPs (e.g.兔仔).
  - Pronominals (e.g. 佢) are less preferred (9%).

Findings: Cantonese narratives (d/hh children)

Referential properties	Types of nominal expressions	All deaf/hard-of-hearing children, n=15					
		Introduction		Maintenance		Reintroduction	
Indefinite	Existential constructions	25	29%	1	1%	2	2%
	Num + cl + n (as object)	3	3%	1	1%		
indefinite/definite	CL + N (as object)			1	1%	4	3%
Definite	CL + N (as subject)	5	6%	3	2%	6	5%
	det + (num) + cl + n (as subj)	1	1%				
	det + (num) + cl + n (as topic)					1	1%
	possessive					1	1%
	Null form			72	44%	14	11%
	pronouns			19	12%	4	3%
Definite if interpreted as proper names	Bare NP (subj)	40	46%	50	30%	60	48%
	Bare NP (obj)	12	14%	17	10%	31	25%
	Bare NP (topic)			1	1%	2	2%
Ungrammatical	Num + cl + n (as subj)	1	1%				

Referential properties	Types of nominal expressions	All deaf/hard-of-hearing children, n=15					
		Introduction		Maintenance		Reintroduction	
Indefinite	Existential constructions	25	29%	1	1%	2	2%
	Num + cl + n (as object)	3	3%	1	1%		
indefinite/definite	CL + N (as object)			1	1%	4	3%
Definite	CL + N (as subject)	5	6%	3	2%	6	5%
	det + (num) + cl + n (as subj)	1	1%				
	det + (num) + cl + n (as topic)					1	1%
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	Null form			72	44%	14	11%
	pronouns			19	12%	4	3%
Definite if interpreted as proper names	Bare NP (subj)	40	46%	50	30%	60	48%
	Bare NP (obj)	12	14%	17	10%	31	25%
	Bare NP (topic)			1	1%	2	2%
Ungrammatical	Num + cl + n (as subj)	1	1%				

Referent introduction:

Most frequent means: bare NPs (e.g. 兔仔)(46%+14%= 60%)

Existential constructions (less than 30%)

Referential properties	Types of nominal expressions	All deaf/hard-of-hearing children, n=15					
		Introduction		Maintenance		Reintroduction	
Indefinite	Existential constructions	25	29%	1	1%	2	2%
	Num + cl + n (as object)	3	3%	1	1%		
indefinite/definite	CL + N (as object)			1	1%	4	3%
Definite	CL + N (as subject)	5	6%	3	2%	6	5%
	det + (num) + cl + n (as subj)	1	1%				
	det + (num) + cl + n (as topic)					1	1%
	possessive					1	1%
	Null form			72	44%	14	11%
	pronouns			19	12%	4	3%
Definite if interpreted as proper names	Bare NP (subj)	40	46%	50	30%	60	48%
	Bare NP (obj)	12	14%	17	10%	31	25%
	Bare NP (topic)			1	1%	2	2%
Ungrammatical	Num + cl + n (as subj)	1	1%				

Referent maintenance:

Null forms predominate (44%) → similar to hearing adults

A high % of bare NPs (41%) → outnumber pronominals (12%)

Referential properties	Types of nominal expressions	All deaf/hard-of-hearing children, n=15					
		Introduction		Maintenance		Reintroduction	
Indefinite	Existential constructions	25	29%	1	1%	2	2%
	Num + cl + n (as object)	3	3%	1	1%		
indefinite/definite	CL + N (as object)			1	1%	4	3%
Definite	CL + N (as subject)	5	6%	3	2%	6	5%
	det + (num) + cl + n (as subj)	1	1%				
	det + (num) + cl + n (as topic)					1	1%
	possessive					1	1%
	Null form			72	44%	14	11%
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Definite if interpreted as proper names	Bare NP (subj)	40	46%	50	30%	60	48%
	Bare NP (obj)	12	14%	17	10%	31	25%
	Bare NP (topic)			1	1%	2	2%
Ungrammatical	Num + cl + n (as subj)	1	1%				

Referent reintroduction:

Bare NPs predominate: 75%; lower % of null forms (11%) and pronominals (3%); very few instances of classifiers.

Findings: Cantonese narratives (d/hh children)

- d/hh children can basically map existential constructions, null forms, pronominals and definite NPs with classifiers with the appropriate discourse situations.
- Very few pronouns or definite expressions containing classifiers and determiners are observed. → nominal structures not yet fully developed by the d/hh children of the highest level of proficiency in this study.
- Predominance of bare NPs across three discourse contexts.

	Hearing Adults	**Hearing children**	**D/hh children**
% of bare NPs in all contexts	12.3%	19.7%	55.6%

Findings: Cantonese narratives (d/hh children)

- Such predominance of bare NPs does not appear to decrease with spoken language proficiency.

NP forms by d/hh children	Levels of Cantonese proficiency (lowest ----------highest)							
	1st		2nd		3rd		4th	
Non-bare NPs	2	(4.3%)	18	(15.8%)	16	(15.5%)	42	(37.2%)
bare NPs	33	(71.7%)	59	(51.8%)	63	(61.2%)	58	(51.3%)
Null forms	11	(23.9%)	37	(32.5%)	24	(23.3%)	13	(11.5%)
Grand Total	46		114		103		113	

- What factor(s) contribute(s) to the persistence of bare NPs in the Cantonese narratives by d/hh children? Is this developmental in nature? Or is it a transfer effect from HKSL, given that bare NPs can occur in both definite and indefinite contexts in HKSL?

Summary

- In both signing and spoken narratives, the d/hh children demonstrate the awareness of the mapping between different types of nominal expressions and discourse functions. For example,
  - Null forms and pronouns are mostly used in maintenance contexts.
  - Full lexical nominal expressions are far more likely than pronouns to be used for reintroductions.

- In both signing and speech, d/hh children of the lowest language proficiency produce a high % of bare NPs (i.e. no pointing determiners/demonstratives/classifiers).

Discussion

- For signing narratives, this predominance of bare NPs decreases gradually as the signing proficiency improves:
  - % of bare NPs and signing proficiency are significantly correlated ($r = -0.937$, $p<0.05$, two-tailed)

- However, for spoken narratives, the predominance of bare NPs persists despite improvements in spoken language proficiency:
  - % of bare NPs and spoken proficiency are moderately correlated ($r = -0.639$, $p<0.05$, two tailed)
  - This suggests that the predominance of bare NPs is NOT *merely developmental*.

Discussion

- What factor(s) may contribute to the persistence of bare NPs in the Cantonese narratives of the d/hh children?

- If this is an effect of interlinguistic transfer from HKSL, we might see:

1. a correlation between % of bare NPs in Cantonese and the signing proficiency of HKSL

2. a correlation between % of bare NPs in Cantonese and the % of bare NPs in their signing production.

Discussion

- No correlation between % of bare NPs in Cantonese narratives and signing proficiency.

  (r = - 0.090129, $p>0.05$, not significant).

- No correlation between % of bare NPs in the Cantonese narratives and the % of bare NPs in the HKSL narratives.

  (r = - 0.001212, $p>0.05$, not significant)

Discussion

- Regarding the internal word order of NPs in spoken Cantonese narratives, there is no evidence of HKSL transfer either.
  - Cantonese: [DET NUM CL N] (e.g. 呢三隻兔仔)
  - HKSL: [IX-det N NUM] / [N NUM IX-det]
- In the Cantonese narrative data, we found not even one instance of deviant NP-internal word order. Apparently d/hh children have already had a sound knowledge of NP-internal word order of Cantonese by the time they produce these NPs.
- Hence, it is RATHER UNLIKELY that the predominance of bare NPs is an interlinguistic transfer effect from sign language.

Discussion

- Another possible factor is the influence of written Chinese which is based on Mandarin grammar.
- Unlike Cantonese, Mandarin makes use of bare NPs in both definite and indefinite contexts.
- In fact, previous studies on discourse referencing in Mandarin indeed reported a high percentage of bare nouns in both adult and children data (Hickmann & Liang, 1990; Hickmann, 2003).
- Yiu (2012): observed that the d/hh children's acquisition of double object constructions in Cantonese is influenced by the corresponding structures in Mandarin.

Discussion

- Hu (2014):
  - a study on the acquisition of written Mandarin of 22 d/hh children of the same co-enrolment programme (subject pool included some of the d/hh children of this study)
  - Evidence of the acquisition of NP structures by Primary Two.
- Given that written Mandarin is visually accessible, and that the d/hh children have daily exposure to it in school across all subjects except the English lessons, their knowledge of written Mandarin might have been transferred to their Cantonese speech data.
- Unfortunately we don't have the corresponding written Chinese data from these d/hh children. Future research is needed to evaluate the effect of transfer from Mandarin Chinese.

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