



<b>Title</b>	<b>The effects of parental input on the early development of bei2 dative constructions in Cantonese children</b>
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<b>Citation</b>	
<b>Issued Date</b>	<b>2005</b>
<b>URL</b>	<b><a href="http://hdl.handle.net/10722/56222">http://hdl.handle.net/10722/56222</a></b>
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**The effects of parental input on the early development of *bei2* dative constructions in  
Cantonese children**

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A dissertation submitted in partial fulfillment of the requirements for the Bachelor of Science  
(Speech and Hearing Sciences), The University of Hong Kong, May 6, 2005.

## Abstract

This study examined the effects of parental input on the early development of *bei2* dative constructions in Cantonese children. One hundred and one children between ages 3;01 and 4;07 were studied. One hundred and forty-six *bei2* datives from the children group and 664 *bei2* datives from the parent group were examined. The *bei2* dative constructions were described as either full or non-full and canonical or non-canonical. Both the children and parent groups used full canonical and non-full canonical forms more than 90% of the time, at a level that was much more frequent than full non-canonical forms. The parents used more full canonical than non-full canonical forms and it was the other way around for the children. However, the discrepancy between the two forms was only about 10% in both the children and parent groups. Results were interpreted in relation to the input frequency and input properties effects.

According to the usage-based approach (Tomasello, 2000), children are not born with adult knowledge of abstract syntactic categories like ‘verb’ and ‘object’ or abstract constructional schemas like ‘VOO’. Initially, their constructions are concrete and item-based. They restricted the use of verbs and objects to a particular construction type (e.g. Give me an apple) they heard from adults and are not able to generalize the construction to other linguistic units (e.g. Buy her an orange). Gradually, they construct abstract constructional schemas through exposure and schematization. Schematization is a psycholinguistic process. It states that when individual “repeatedly use the same particular and concrete linguistic symbols to make utterances to one another in “similar” situations, what may emerge over time is a pattern of language use, schematized in the minds of users as one or another kind of linguistic category or construction” (Tomasello, 2003: 99). An example will help here. In the usage-based approach, adult input plays a heavy role in explaining the course of language development. There are at least two aspects of input. Firstly, children use the constructions they hear more frequently from adults first and with higher frequency. This refers to the input frequency effect. Secondly, the schematization and acquisition of linguistic constructions will be more effective if the linguistic items occurred consistently at the same slots in those constructions. This refers to the input properties effect. Input properties effect was discussed in Chan (2003), which was derived from the usage-based approach described by Tomasello (2003).

### Literature Review

According to Pinker (1989), a dative verb is used when “...it denotes a giver having some object and then causing it to enter into the possession of a recipient...” (p. 110). The prototypical dative verbs are verbs of ‘giving’. In English, they include give, pass and pay.

There are two major types of dative constructions in English:

(A) Double object construction (DOC): ‘verb (V) - indirect object (O<sub>i</sub>) - direct object (O<sub>d</sub>)’

(e.g. I give John a book)

(B) Prepositional dative construction (PDC): ‘V - O<sub>d</sub> - preposition - O<sub>i</sub>’. The two sub-types

of PDC are to-dative (e.g. I give a book to John) and for-dative (e.g. I baked a cake for John).

In Cantonese, dative verbs of ‘giving’ include *bei2* ((give) = to give), *sing2* ((give) = to give as a present), *sung3* ((give) = to give as a present), etc. Tang (1998) has delineated three patterns of dative constructions in Cantonese:

(C) DOC: ‘V - O<sub>i</sub>(Recipient) - O<sub>d</sub>(Theme)’ (V-R-T) (e.g. *gaau3* (teach) *keoi5* (he/she)

*jing1man2* (English) = to teach him/her English)

(D) Inverted DOC (IDOC): ‘V - O<sub>d</sub>(Theme) - O<sub>i</sub>(Recipient)’ (V-T-R) (e.g. *bei2* (give) *zi2*

(paper) *nei5* (you) = to give you some paper)

(E) PDC: ‘V - O<sub>d</sub>(Theme) - dative marker (*bei2*) - O<sub>i</sub>(Recipient)’ (V-T-*bei2*-R) (e.g. *maai5*

(buy) *lai5mat6* (gift) *bei2* (give) *keoi5* (he/she) = to buy a present for him/her).

This and subsequent examples of Cantonese are written according to the JyutPing Romanization system developed by the Linguistic Society of Hong Kong (1994). Subscripted numbers following each syllable mark the tone. Abbreviations used for function words include CL (classifier), DET (determiner) and PRT (particle).

Pattern (D) is considered as the basic canonical form of double object construction in Cantonese. It is called inverted DOC as it includes the same elements as pattern (C) DOC except that the positions of the arguments R (recipient) and T (theme) are switched. The dative marker '*bei2*' in pattern (E) acts like the English preposition 'for' in introducing the recipient and so it is considered a PDC.

Campell & Tomasello (2001) investigated the effect of parental input frequency on the acquisition of DOC and PDC in English-speaking children. They analyzed language samples from seven children and their parents that are available in the CHILDES database (MacWhinney, 1995). These children were between ages 1;6 and 5;0. The use of all dative verbs in the utterances of both the children and parents was counted and the constructions in which each occurred were identified. DOC was found to be used before PDC by most of the children. This order of acquisition was attributed to the higher frequency of input on DOC than PDC from the parents.

Chan (2003) studied the development of *bei2* dative constructions using language samples from CANCORP (Lee, Wong & Leung, 1996), a longitudinal database of eight

Cantonese-speaking children. These children were between 1;05 and 2;08 years at the beginning of data collection and were observed for about one year until they were between ages 2;07 and 3;08. Chan (2003) identified the following forms of *bei2* dative constructions:

- (F) Full canonical: ‘*bei2*-T-R’ (IDOC) (e.g. *bei2* (give) *zi2* (paper) *nei5* (you) = to give you some paper)
- (G) Full non-canonical: ‘*bei2*-R-T’ (DOC) (e.g. *bei2* (give) *nei5* (you) *zi2* (paper)), ‘T-*bei2*-R’ (e.g. *zi2* (paper) *bei2* (give) *nei5* (you)) and ‘*bei2*-T-*bei2*-R’ (e.g. *bei2* (give) *zi2* (paper) *bei2* (give) *nei5* (you)). Each of these was translated as ‘to give you some paper’.
- (H) Non-full canonical: ‘*bei2*-R’ (e.g. *bei2* (give) *nei5* (you) = to give you), ‘*bei2*-T’ (e.g. *bei2* (give) *zi2* (paper) = to give some paper) and ‘*bei2*’ ((give) = to give)

Canonical forms are forms that are considered appropriate from the perspective of an adult native speaker of Cantonese. Non-canonical forms are forms that an adult Cantonese speaker considers unacceptable. Full forms are forms that include *bei2* and its two arguments T (theme) and R (recipient). Non-full forms are forms that omit either T (theme) and/or R (recipient).

The total number of tokens of *bei2* dative constructions was 1880 for adults and the number was not reported for children. She found that the early emergence of the non-full canonical form ‘*bei2*-R’ in children was attributed to its frequent use in adult input, which

accounted for 48.6% of the adults' *bei2* dative constructions. However, the input frequency effect failed to explain the earlier and more frequent use of full non-canonical forms (G) relative to the full canonical forms (F) in children. The tokens of full forms (canonical and non-canonical) used by children before age three were 48 and after age three were 14. Full non-canonical forms (G) were used only 20.94% by adults among the full forms and 7.82% of the time among all the *bei2* dative constructions. However, these forms were used 80.65% by children among all the full forms. Despite the fact that full canonical forms (F) were used at the second highest frequency in the adults (29.25%), they were only used infrequently (seven times) in 2/8 of the children before age three.

Chan (2003) also tried to explain the findings by using input properties hypothesis. Chan (2003) argued that the late emergence and infrequent use of full canonical forms (F) in the children was attributed to a substantial number of non-canonical forms with the T (theme) omitted or displaced in adult input (63.78%). For example, in the most frequent non-full form in the adult input '*bei2*-R', the T (theme) was absent (omitted 'theme'); in '*bei2*-R-T' and 'T-*bei2*-R', the T (theme) were not placed right after the verb '*bei2*' (displaced 'theme'), as in the full canonical form (F). It was suggested that the inconsistent presence and placement of the T (theme) in the adult input made the schematization of the full canonical form (F) in children more difficult.

Wong (2003) examined five constructions with the verb *bei2* from a different



perspective. The updated version of CANCELP (Fletcher, Leung, Stokes & Weizman, 2000) was used for the analyses. The language samples used were the same as those reported in Chan (2003) except that those children younger than 1;11 years were excluded. These samples were from eight monolingual children aged between 1;11 and 3;05. Among the five constructions with the verb *bei2* examined, three of them were dative constructions:

- (I) Transfer: same as IDOC in (D) and (F) (e.g. *bei2* (give) *zi2* (paper) *nei5* (you) = to give you some paper)
- (J) Dative: same as PDC in (E) (e.g. *maai5* (buy) *lai5mat6* (gift) *bei2* (give) *keoi5* (her) = to buy a present for her)
- (K) Extended dative: V-T-*bei2*-R-V (e.g. *coeng3* (sing) *go1* (song) *bei2* (give) *ngo5* (I) *teng1* (listen) = sing a song for me)

Transfer (I) was found to emerge first and used most frequently by children, followed by dative (J) and then extended dative (K). Analyses of the adult utterances, however, revealed that extended dative (K) was used the most frequently, followed by transfer (I) and dative (J) was used the least frequently. It was clear that input frequency effect alone did not account for the development of these *bei2* dative constructions. Wong (2003) presented an analysis of the complexity of the constructions based on their cognitive demands, syntactic and semantic complexity. According to this analysis, transfer (I) was the least complex construction, followed by dative (J) and extended dative (K) was the most complex construction. The

order of development of these *bei2* dative constructions was determined by a convergence of the frequency and complexity factors. For example, transfer (I) was emerged first and used most frequently by children because it received the second most frequent input and was the least complex construction. Even though extended dative (K) received the most frequent input, it was the most complex construction. Therefore, it was emerged the latest and used least frequently by children.

#### *Purposes of the Present Study*

Although Chan (2003) and Wong (2003) reported on the developmental pattern of *bei2* dative constructions, the findings were limited as only one child was examined up to 3;08. Major findings were that IDOC (I), PDC (J) and extended *bei2* datives (K) were used infrequently by 3;08. Children at that age have not yet acquired the full canonical forms (F). Therefore, the purpose of this study was to extend the investigation of the developmental pattern to children aged between 3;01 and 4;07. Both Chan (2003) and Wong (2003) used language samples from CANCORP, which were collected while children were engaged in conversation with adult researchers instead of their parents. Language input from parents should be more reflective of the factors that determine the developmental course of children's language development. In this study, language samples with parent-child interaction were used.

#### *Hypotheses of the Present Study*

The frequency and the pattern of use of *bei2* dative constructions in parents were examined to look for possible influence on children's development. Based on the input frequency hypothesis, I predicted that children would use the *bei2* dative construction more frequently if they received more input of that construction from parents. Based on the input properties hypothesis, I predicted that children would use the *bei2* dative construction more frequently if the linguistic items in that construction from parents occurred consistently at the same slots.

## Method

### *Corpus Data*

The present study made use of a cross-sectional database which was collected for a longitudinal project on the development of language and early literacy in Cantonese-speaking children in Hong Kong (McBride, C., Tardif, T., Fletcher, F., Shu, H. & Wong, A. M.-Y., 2003-2008). A 10-15 minute language sample was collected from each of the 268 monolingual Cantonese children. All language samples were collected during parent-child interaction with a standard set of toys, including a cook set with very elaborate items, two cars, and some building blocks. Parents were told to play and speak with their children in the same way as they normally would. No parents of these children ever reported concern with their children's language development and none of these children were diagnosed as language-impaired or having developmental disabilities. For this study, 101

samples from 44 girls and 57 boys, aged between 3;01 and 4;07, were transcribed orthographically and entered in the CHAT (Codes for the Human Analysis of Transcripts) format by a group of trained research assistants. CHAT is a standardized format of transcription for language samples (MacWhinney, 2000). Among the 101 samples, ninety-six were collected at children's homes, three at Maternal and Child Health Centres, one at the Chinese University of Hong Kong and one at the grandmother's home. The author and another student who used this database cleaned up format errors and each transcribed four samples from children who were previously identified as late-talkers as a contribution to the larger database.

#### *Procedures of Generating Target Utterances*

All comprehensible utterances with the verb *bei2* from the children and their parents were searched via commands in the CLAN (Child Language Tools for Analyzing Talk) computer program (MacWhinney, 2000) (Appendix A). One hundred and seventy-nine child utterances with the verb *bei2* were extracted from the samples. Thirty-three of them were excluded (Appendix B). These utterances were either incomplete, partly un-transcribed, semantically unclear, passive constructions, permissive constructions or partial repetition of the adult forms. When the child utterance was exactly the same as the adult utterance that came immediately before it, it was considered an exact repetition. When it was partly the same as the adult utterance, it was considered a partial repetition. A total of 146 *bei2* dative

constructions from the children were included for subsequent analysis. Six hundred and ninety adult utterances with the verb *bei2* were extracted from the samples. Twenty-six of them were excluded because of incomplete, partly un-transcribed, passive or permissive constructions (Appendix B). A total of 664 *bei2* dative constructions from the parents were included for subsequent analysis.

### *Data Analyses*

All *bei2* dative constructions were classified into full canonical, full non-canonical and non-full canonical forms manually (Appendix C). The classification scheme was based on the work of Chan (2003), Tang (1998), Wong (2003) and the author's intuition as a native Cantonese speaker. Forms (1), (6)-(8) and (13)-(15) are the same as Chan's (2003) defined forms (F) to (H). Form (3) is the same as Tang's (1998) defined form (E). Form (4) is the same as Wong's (2003) defined form (K). Form (2) is the extended form of (1) with the addition of a 'V' and form (9) is the extended form of (8) with the addition of a 'V'. Forms (16)-(18) are the simplified forms of (2)-(4) with the omission of T (theme). Forms (5), (10)-(12) and (19)-(20) were classified according to the author's intuition. Please note that (12) '*bei2*-R-V-T' and (16) '*bei2*-R-V' were considered dative constructions and differentiated from passive and permissive forms. They retained the function of transferring possession. Conversational context was considered in differentiating these dative constructions from passive or permissive forms.

Since the children in this study were older than the ones reported in Chan (2003) and Wong (2003), a more diverse and adult-like set of *bei2* dative constructions was expected. PDC (3) ('V-T-*bei2*-R') and extended datives (4) ('V-T-*bei2*-R-V'), which were not reported in Chan's (2003) study, were important for the present analysis.

As a reliability testing, ten percent of the samples were re-analyzed according to the classification scheme described earlier for all the adult and child utterances with the verb *bei2* by a fourth year Speech and Hearing Sciences student. The inter-rater reliability was measured by percentage agreement, which was 97.30%.

### Results

Table 1 shows the tokens and percentage use of *bei2* dative constructions in child and parent utterances. Children used full canonical forms, full non-canonical forms and non-full canonical forms with 41.08%, 8.21% and 50.67% respectively. Parents used full canonical forms, full non-canonical forms and non-full canonical forms with 53.91%, 3.15% and 42.92% respectively. The distribution of use of the three forms (full canonical, full non-canonical and non-full canonical) generally agreed among parents and children. Both of them used canonical forms (full and non-full) with more than 90% of the time. Also, both of them used non-canonical forms least of time and much less than the canonical forms (full and non-full).

However, some discrepancies between the parents and the children were observed.

Table 1

*Tokens and percentage use of bei2 dative constructions in child and parent utterances*

Dative construction	Children	Parents
Full Canonical Forms		
(1) <i>bei2</i> - T - R	21 (14.38%)	38 (5.72%)
(2) <i>bei2</i> - T - R - V	1 (0.68%)	15 (2.26%)
(3) V - T - <i>bei2</i> - R	17 (11.64%)	71 (10.69%)
(4) V - T - <i>bei2</i> - R - V	21 (14.38%)	181 (27.26%)
(5) V - <i>bei2</i> - R - V - T	0 (0%)	53 (7.98%)
	Total = 60 (41.08%)	Total = 358 (53.91%)
Full Non-canonical Forms		
(6) <i>bei2</i> - R - T	1 (0.68%)	2 (0.30%)
(7) T - <i>bei2</i> - R	6 (4.11%)	4 (0.60%)
(8) <i>bei2</i> - T - <i>bei2</i> - R	2 (1.37%)	1 (0.15%)
(9) <i>bei2</i> - T - <i>bei2</i> - R - V	0 (0%)	1 (0.15%)
(10) T - V - <i>bei2</i> - R	2 (1.37%)	2 (0.30%)
(11) T - <i>bei2</i> - R - V	0 (0%)	7 (1.05%)
(12) <i>bei2</i> - R - V - T	1 (0.68%)	4 (0.60%)
	Total = 12 (8.21%)	Total = 21 (3.15%)

Dative construction	Children	Parents
Non-full Canonical Forms		
(13) <i>bei2</i>	1 (0.68%)	6 (0.90%)
(14) <i>bei2</i> - T	7 (4.79%)	32 (4.82%)
(15) <i>bei2</i> - R	24 (16.44%)	34 (5.12%)
(16) <i>bei2</i> - R - V	21 (14.38%)	48 (7.23%)
(17) V - <i>bei2</i> - R	8 (5.48%)	31 (4.67%)
(18) V - <i>bei2</i> - R - V	11 (7.35%)	123 (18.52%)
(19) <i>bei2</i> - T - V	2 (1.37%)	9 (1.36%)
(20) V - <i>bei2</i> - T - V	0 (0%)	2 (0.30%)
	Total = 74 (50.67%)	Total = 285 (42.92%)

Parents used more full canonical (53.91%) than non-full canonical (42.92%) forms. While it was the other way around for children, who used full canonical and non-full canonical forms 41.08% and 50.67% of the time respectively. But the discrepancy between the two forms was only about 10% in both children and parents. Besides, children also used more full non-canonical forms than parents (8.21% compared to 3.15%). There were also discrepancies in the specific forms within each category. For example, (4) ‘V-T-*bei2*-R-V’ was used only half of the time by children (14.38%) than in adults (27.26%) and (18) ‘V-*bei2*-R-V’ was used less than half of the time by children (7.53%) than in adults



(18.52%).

As predicted, children in this study used more adult-like *bei2* dative constructions than those reported in earlier studies. Like adults, a majority of the children's dative constructions were canonical forms. Also, they used a substantial amount of full canonical forms like (1) '*bei2*-T-R', (3) 'V-T-*bei2*-R' and (4) 'V-T-*bei2*-R-V' and these forms were used with similar frequency.

### *Summary of Findings*

Both the children and parents used canonical forms more than 90% of the time, which were much more frequently than non-canonical forms. The parents used more full canonical than non-full canonical forms and it was the other way around for children. However, the discrepancy between the two forms was only about 10% in both the children and parents. Children also used more full non-canonical forms than parents.

## Discussion

### *Input Frequency*

Data on *bei2* dative constructions provided support for the input frequency hypothesis. Full and non-full canonical forms occurred most frequently in the input (96.83%), and these forms were used most frequently by the children (91.75%). On the other hand, full non-canonical forms occurred the least frequently in the input (3.15%), and these forms were used the least often by the children (8.21%).

However, the discrepancies in using the three categories of forms (full canonical, full non-canonical and non-full canonical) among parents and children indicated that children were still on their way to acquiring the adult pattern. Compared to parents, they used fewer full-canonical forms, more full non-canonical and more non-full canonical forms. Their preference over non-full canonical forms might show that they have not fully understood contexts under which full forms were needed, and when non-full forms were acceptable without causing communication breakdown. This is related to the pragmatic effect on using full and non-full canonical forms. Cantonese is a pro-drop language. When the entity which the argument referred to is present in the context, or when the entity has been introduced in previous sentences in the discourse, it can be omitted in the surface form (Yip & Matthews, 2005). This applies to the T (theme) or R (recipient) in the *bei2* dative constructions. For example, when the object to be transferred is holding by the parent, the speaker may use ‘*bei2*-R’ instead of ‘*bei2*-T-R’ because the listener can recover the object T (theme) from the conversational context.

To illustrate, let’s examine the difference between young children and parents in their use of non-full forms from the language samples used in the present study:

#### Example 1

MOT: *ngo5* (I) *cit3* (cut) *di1* (some) *hoeng1coeng2* (sausage) *bei2* (give) *nei5* (you) *sin1*

(first). = Let me cut some sausage for you.

CHI: *gam2joeng2* (like this) *lo1* (PRT). = Like this.

MOT: *laa4* (PRT), *bei2* (give) *nei5* (you) *aa1* (PRT). = Give you.

CHI: *ng4* (no) *hou2* (good) *aa3* (PRT). = Please don't.

MOT: *dim2* (spot) *gaai2* (untie) *aa3* (PRT)? = Why?

CHI: xx.

CHI: *nei5* (you) *sai3* (small) *go3* (CL) *gaa3* (PRT). = You are small.

### Example 2

MOT: *o6* (PRT), *maa1mi4* (mother) *sik6* (eat) *jyun4* (finish) *laa3* (PRT) *wo3* (PRT). =

Mother has finished the meal.

CHI: *ngo5* (I) *gaa3* (CL) *ce1* (car) *hai2* (at) *bin1dou6* (where) *aa3* (PRT)? = Where is  
my car?

MOT: *ngo5* (I) *baau2* (full) *lo3* (PRT). = I'm full.

MOT: *hik1* (PRT), *hai6* (yes) *aa3* (PRT). = Yes.

CHI: *bei2* (give) *ngo5* (me). = Give me

CHI: *ng4* (no) *hai6* (yes) *aa3* (PRT). = No.

CHI: *bak6sik1* (white) *ce1* (car) *hai2* (at) *bin1dou6* (where)? = Where's the white car?

MOT: *hai6* (yes) *aa4* (PRT)? = Is it?

MOT: *nei5* (you) *soeng2* (want) *waan2* (play) *ce1ce1* (car) *aa4* (PRT)? = You want to  
play the car?

MOT: *waan2* (play) *jyun4* (finish) *zyu2* (cook) *faan6* (rice) *zai2* (boy) *laa4* (PRT)? = You have played with the cook set?

In example 1, the mother used the non-full canonical ‘*bei2-R*’ (*bei2 nei5*). The omission of T (theme) was legitimate under this context because the T (theme) ‘*hoeng1 coeng2*’ was used by the mother in her previous utterance. So the T (theme) was already established in the discourse as known information before the non-full canonical ‘*bei2-R*’ form was produced and could therefore be easily recovered from the linguistic context. On the other hand, the child in example 2 omitted T ‘*ce1*’ without providing adequate contextual information for the mother to identify what the T (theme) was in his non-full canonical ‘*bei2-R*’ (*bei2 ngo5*) form. Food and car were both potential candidates for the T (theme). The mother failed to comprehend the object requested by the child and so did not respond. The child has to clarify the theme in his subsequent utterance ‘*bak6sik1 ce1 hai2 bin1dou6*’. This example suggested that young children do not have the cognitive ability to identify the legitimate contexts for the omission of T (theme) in *bei2* dative constructions.

Besides, children used more full non-canonical forms than parents (8.21% compared to 3.15%). This might indicate their limited cognitive resources available for planning and producing the order of the linguistic items ‘*bei2*’, T (theme), R (recipient) and V (verb). However, comparing to Chan (2003), given the age of the children in this study, the use of such non-canonical forms was minimal. They now used canonical forms, either in full or

non-full forms, most of the time.

Looking at the frequency of use of forms within the categories of full and non-full canonical forms (Table 1), it was clear that children used more simpler forms relative to the parents. For example, in full canonical forms, the children used much more (1) '*bei2-T-R*', while the parents used a lot more (3) '*V-T-bei2-R*' and (4) '*V-T-bei2-R-V*'. In non-full canonical forms, the children used much more (15) '*bei2-R*' and (16) '*bei2-R-V*', while parents used a lot more (18) '*V-bei2-R-V*'. This might reflect children's limited cognitive ability to extract and process all the input from parents, including V (verb), T (theme) and R (recipient). Besides, when they used *bei2* dative constructions, they failed to manage the more extended dative form and resorted to the simpler forms during sentence production.

The inadequacy of using input frequency as the only factor to explain the pattern of *bei2* dative development in children was consistent with Chan's (2003) findings. She claimed that the earlier emergence of '*bei2-R*' than '*bei2-T*' in the children was attributed to the high percentage input (48.46%) of '*bei2-R*' from the adults. However, the children used full non-canonical more frequently than full canonical forms, while it was just the opposite for the adults. Input frequency failed to explain this finding. Therefore, input properties effect will also be investigated.

### *Input Properties*

Although parents used more full canonical (53.91%) than non-full canonical (42.92%)

forms, there was only a 10.99% difference between them. These two sets of forms made up a majority of *bei2* dative constructions. When the full canonical forms were heard five times, the non-full canonical forms were heard four times. Inconsistent presence of T (theme) or R (recipient) was noted in the input. Schematization and acquisition of linguistic constructions will be more effective if the linguistic items occurred consistently at the same slots in those constructions. The input properties of parents did not facilitate the schematization of full canonical forms and might explain children's relatively lower percentage of use of full canonical forms (41.08%).

Inconsistent input of linguistic items was also noted in specific *bei2* dative constructions. The two most frequent *bei2* dative constructions used by parents, (4) 'V-T-*bei2*-R-V' and (18) 'V-*bei2*-R-V', were examined in detail.

Although parents used (4) 'V-T-*bei2*-R-V' (e.g. *zyu2* (cook) *taai6* (big) *caan1* (meal) *bei2* (give) *ngo5* (me) *sik6* (eat) = make a big meal for me to eat) 27.26% of the time, they used a variety of similar forms 47.88 % of the time, in which one or two of the Vs (verbs) and/or T (theme) were omitted. These forms included (3) 'V-T-*bei2*-R' (e.g. *zyu2 taai6 caan1 bei2 ngo5*), (11) 'T-*bei2*-R-V' (e.g. *taai6 caan1 bei2 ngo5 sik6*), (7) 'T-*bei2*-R' (e.g. *taai6 caan1 bei2 ngo5*), (15) '*bei2*-R' (e.g. *bei2 ngo5*), (16) '*bei2*-R-V' (e.g. *bei2 ngo5 sik6*), (17) 'V-*bei2*-R' (e.g. *zyu2 bei2 ngo5*) and (18) 'V-*bei2*-R-V' (e.g. *zyu2 bei2 ngo5 sik6*). In the parent utterances, the T (theme) was either pre-posed or post-posed 17.46% of the time.

They included (1) ‘*bei2-T-R*’ (e.g. *bei2 taai6 caan1 ngo5*), (2) ‘*bei2-T-R-V*’ (e.g. *bei2 taai6 caan1 ngo5 sik6*), (5) ‘*V-bei2-R-V-T*’ (e.g. *waa6 bei2 ngo5 teng1 dim2joeng2 zyu2*), (6) ‘*bei2-R-T*’ (e.g. *bei2 ngo5 taai6 caan1*), (12) ‘*bei2-R-V-T*’ (e.g. *bei2 ngo5 sik6 taai6 caan1*), (8) ‘*bei2-T-bei2-R*’ (e.g. *bei2 taai6 caan1 bei2 ngo5*), (9) ‘*bei2-T-bei2-R-V*’ (e.g. *bei2 taai6 caan1 bei2 ngo5 sik6*) and (10) ‘*T-V-bei2-R*’ (e.g. *taai6 caan1 zyu2 bei2 ngo5*).

Schematization of a linguistic construction requires consistent positioning of the linguistic items in the same slots. With the omission of V (verb) or T (theme) and the inconsistent positioning of the functional items, the input properties of parents did not facilitate the schematization of (4) ‘*V-T-bei2-R-V*’. Thus children used (4) ‘*V-T-bei2-R-V*’ only half as frequently as the parents (14.38%). They resorted to simpler forms like (1) ‘*bei2-T-R*’, (15) ‘*bei2-R*’ and (16) ‘*bei2-R-V*’.

Another example could be drawn from the non-full canonical forms. Although parents used (18) ‘*V-bei2-R-V*’ (e.g. *zyu2* (cook) *bei2* (give) *ngo5* (me) *sik6* (eat) = cook for me to eat) 18.52% of the time, they used a variety of similar but simpler forms 17.02% as well, in which either the first or the last V was omitted in the structure. They included (15) ‘*bei2-R*’ (e.g. *bei2 ngo5*), (16) ‘*bei2-R-V*’ (e.g. *bei2 ngo5 sik6*) and (17) ‘*V-bei2-R*’ (e.g. *zyu2 bei2 ngo5*). V (verb) and/or R (recipient), were omitted 6.48% of the time. They included (14) ‘*bei2-T*’ (e.g. *bei2 taai6 caan1*), (19) ‘*bei2-T-V*’ (e.g. *bei2 jim4 lok6 hui3*) and (20) ‘*V-bei2-T-V*’ (e.g. *jiu3 bei2 jim4 lok6 hui3*). With the omission of V (verb) and R (recipient),

the input properties of parents did not facilitate the schematization of (18) ‘V-*bei2*-R-V’.

Thus children used (18) ‘V-*bei2*-R-V’ less than half as frequently as the parents (7.53%).

They resorted to simpler forms like (15) ‘*bei2*-R’ and (16) ‘*bei2*-R-V’.

### *Summary*

The input frequency effect explained why children used full and non-full canonical forms much more frequently than full non-canonical forms. Children between ages 3;01 and 4;07 have yet to acquire the adult pattern of use of *bei2* dative constructions. This might be attributed to their limited cognitive resources to extract and process the input from parents as well as planning and producing the constructions. Besides, input properties were found to be ineffective for the schematization of *bei2* dative constructions.

### *Clinical Implications*

The present study suggests implications for the diagnosis and intervention of children with language impairment (LI). In diagnosis, therapists should be aware that children between ages 3;01 and 4;07 have yet to acquire some more complex *bei2* dative constructions. For example, in full canonical forms, they used (4) ‘V-T-*bei2*-R-V’ only half as frequently as adults. During intervention, the therapists and parents should provide a substantial amount of the target constructions for children as input frequency affects language learning. Besides, input properties of therapists and parents should also be controlled. Children with LI require more structured input compared to typically developing



(TD) children, since they have difficulties learning in the environment where TD children is exposed to. Therefore, therapists and parents should maintain consistent positioning and presence of each linguistic item in order to facilitate schematization. For example, if a child consistently pre-poses the T (theme) in (3) ‘V-T-*bei2*-R’ as (10) ‘T-V-*bei2*-R’, parents and therapists should provide input with correct positioning of the T (theme), including (10) ‘V-T-*bei2*-R’ and (4) ‘V-T-*bei2*-R-V’. Forms with a pre-posed T (theme) should be reduced or avoided.

#### *Further Research*

This study provided additional evidence for the effects of parental input on the acquisition of *bei2* dative constructions. This also extended to children between ages 3;01 and 4;07. Limitations of this study need to be noted for future research. In the present study, only 51.49% of the children used the *bei2* dative constructions at least once. The 10-15 minutes language sample of a child might not have provided sufficient opportunities for the children to use the *bei2* dative constructions. Data from each child-parent pair was not considered individually and so this study did not allow us to claim a direct correlation of the pattern of dative use between children and their parents. A child might not be using dative construction while his/her parent was using it in the sample. Besides, analysis on the types of forms used by individual child could not be done. For example, if we want to know the variety of ‘V-T-*bei2*-R-V’ forms used by a child, the limited language sample might not have

provided sufficient opportunities for the child to use these forms.

In light of these limitations, modifications to the present research method need to be considered. The sample density should be increased and longitudinal samples of at least one year should be used. The sample density (sampling hours per week) required in capturing one target in each child sample can be estimated by the following function (Tomasello & Stahl, 2004):

$$\text{Sample density (hours/week)} = \frac{1 \times \text{talking hours per week (i.e. 70)}}{\text{Number of targets per week}}$$

Assuming *bei2* dative constructions are relatively high-frequency phenomena (35 targets or 70 targets per week), 1 to 2 sampling hours per week is required to capture at least one target structure in each sample. Therefore, longitudinal samples on a small group of children from ages 3;1 to 4;7, each taken for 1 to 2 hours, should be used. We can then test the findings on each individual parent-child pair and examine the development of the various *bei2* dative constructions in depth over time.

#### Acknowledgments

I gratefully acknowledge the advice and guidance given by my supervisor, Dr. Anita Wong in the study. I would also like to acknowledge the support of the Research Grants Council of the Hong Kong Special Administrative Region (Project reference 4257/03H), and the Chou's Foundation Fund under the Student Campus Work Scheme 2004/05, The Chinese University of Hong Kong (Ref. No. C04154) for the data reported here in this project.

Thanks also given to Miss Ka-Wai Leung and her research colleagues at The Chinese University of Hong Kong for the transcription of the samples, and coordination of the transcription exercise.

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## Appendix A

CLAN commands used for searching utterances with the verb *bei2*

Target person	CLAN command used
Children	kwal +s'俾' +*CHI
Mother	kwal +s'俾' +*MOT
Father	kwal +s'俾' +*FAT
	kwal +s'俾' +*DAD

## Appendix B

Utterances with the verb *bei2* that were excluded from analysis

Utterance type	Example	No. of utterances excluded	
		<u>Children</u>	<u>Parents</u>
Incomplete	<i>ngo5</i> (I) <i>lo1</i> (take) <i>bei2</i> (give) +// = I take and give +//	5	8
Partly un-transcribed	<i>bei2</i> (give) <i>gau2</i> (dog) xx = give dog xx	5	9
Semantically unclear	<i>jiu3</i> (want) <i>hou2</i> (good) <i>do1</i> (many) <i>go3</i> (CL) <i>bei2</i> (give) <i>ge3</i> (PRT) = want many give	9	0
Passive construction	<i>le1dou6</i> (here) <i>le1</i> (PRT) <i>hai6</i> (is) <i>bei2</i> (give) <i>jan4</i> (people) <i>daap3</i> (ride) <i>baa1si2</i> (bus) <i>gaa3</i> (PRT) = this is a place for people to take the bus)	3	3
Permissive construction	<i>ng3</i> (not) <i>bei2</i> (allow) <i>nei5</i> (you) <i>hui3</i> (go) = you are not allowed to go	10	6
Partial repetition of adult forms	MOT: <i>ting4</i> (stop) <i>ce1</i> (car) <i>bei2</i> (give) <i>cin2</i> (money) <i>aal</i> (PRT), <i>ding6hai6</i> (or) <i>jat1</i> (one) <i>lo6</i> (road) <i>hoi1</i> (open) <i>ce1</i> (car) <i>jat1</i> (one) <i>lo6</i> (road) <i>bei2</i> (give) <i>cin2</i> (money) <i>gaa3</i> (PRT)? = pay with the car stopped or while driving it? CHI: <i>jat1</i> (one) <i>lo6</i> (road), <i>e6</i> (PRT), <i>jat1</i> (one) <i>dou6</i> (place) <i>hoi1</i> (open) <i>ce1</i> (car) <i>bei2</i> (give) <i>cin2</i> (money) <i>gaa3</i> (PRT) = while, pay while driving the car	1	0
Total		33	26

## Appendix C

Classification of *bei2* dative constructions

Category	Dative construction	Example
Full Canonical	(1) <i>bei2</i> - T - R	<i>bei2</i> (give) <i>gai1bei2</i> (drumstick) <i>ngo5</i> (me) = give me the drumstick
	(2) <i>bei2</i> - T - R - V	<i>bei2</i> (give) <i>gai1bei2</i> (drumstick) <i>ngo5</i> (me) <i>sik6</i> (eat) = give me the drumstick to eat
	(3) V - T - <i>bei2</i> - R	<i>zyu2</i> (cook) <i>taai6</i> (big) <i>caan1</i> (meal) <i>bei2</i> (give) <i>ngo5</i> (me) = make a big meal for me
	(4) V - T - <i>bei2</i> - R - V	<i>zyu2</i> (cook) <i>taai6</i> (big) <i>caan1</i> (meal) <i>bei2</i> (give) <i>ngo5</i> (me) <i>sik6</i> (eat) = make a big meal for me to eat
	(5) V - <i>bei2</i> - R - V - T	<i>waa6</i> (tell) <i>bei2</i> (give) <i>ngo5</i> (me) <i>teng1</i> (listen) <i>dim2joeng2</i> (how) <i>zyu2</i> (cook) = tell me how to cook
Full non-canonical	(6) <i>bei2</i> - R - T	<i>bei2</i> (give) <i>ngo5</i> (me) <i>gai1bei2</i> (drumstick) = give me the drumstick
	(7) T - <i>bei2</i> - R	<i>gai1bei2</i> (drumstick) <i>bei2</i> (give) <i>ngo5</i> (me) = give me the drumstick
	(8) <i>bei2</i> - T - <i>bei2</i> - R	<i>bei2</i> (give) <i>gai1bei2</i> (drumstick) <i>bei2</i> (give) <i>ngo5</i> (me) = give me the drumstick
	(9) <i>bei2</i> - T - <i>bei2</i> - R - V	<i>bei2</i> (give) <i>gai1bei2</i> (drumstick) <i>bei2</i> (give) <i>ngo5</i> (me) <i>sik6</i> (eat) = give me the drumstick to eat
	(10) T - V - <i>bei2</i> - R	<i>taai6</i> (big) <i>caan1</i> (meal) <i>zyu2</i> (cook) <i>bei2</i> (give) <i>ngo5</i> (me) = make a big meal for me
	(11) T - <i>bei2</i> - R - V	<i>taai6</i> (big) <i>caan1</i> (meal) <i>bei2</i> (give) <i>ngo5</i> (me) <i>sik6</i> (eat) = big meal for me to eat
	(12) <i>bei2</i> - R - V - T	<i>bei2</i> (give) <i>ngo5</i> (me) <i>sik6</i> (eat) <i>gai1bei2</i> (drumstick) = give me the drumstick to eat



Category	Dative construction	Example
Non-full canonical	(13) <i>bei2</i>	<i>bei2</i> (give) = to give
	(14) <i>bei2</i> - T	<i>bei2</i> (give) <i>gai1bei2</i> (drumstick) = give the drumstick
	(15) <i>bei2</i> - R	<i>bei2</i> (give) <i>ngo5</i> (me) = give me
	(16) <i>bei2</i> - R - V	<i>bei2</i> (give) <i>ngo5</i> (me) <i>sik6</i> (eat) = give me to eat
	(17) V - <i>bei2</i> - R	<i>zyu2</i> (cook) <i>bei2</i> (give) <i>ngo5</i> (me) = cook for me
	(18) V - <i>bei2</i> - R - V	<i>zyu2</i> (cook) <i>bei2</i> (give) <i>ngo5</i> (me) <i>sik6</i> (eat) = cook for me to eat
	(19) <i>bei2</i> - T - V	<i>bei2</i> (give) <i>jim4</i> (salt) <i>lok6</i> (down) <i>hui3</i> (go) = add some salts
	(20) V - <i>bei2</i> - T - V	<i>jiu3</i> (have) <i>bei2</i> (give) <i>jim4</i> (salt) <i>lok6</i> (down) <i>hui3</i> (go) = have to add some salts