

# Corpus Collection and Annotation to Oral Communication of Caregivers Interacting with Children

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## Abstract

The oral communication of caregivers will affect the language proficiency and pragmatic ability of children. The analysis of relations between language proficiency and oral communication skills can be provided to enhance the effective oral communication skills of caregiver and help children to learn a language. The goal of this paper is to design an oral communication based corpus. The cross-sectional method is applied to select caregiver and child pairs. Observational method is used to collect the conversation corpus. In this task, caregiver-child interactions including reading a book and playing toys were recorded by two cameras and contained video and audio streams. The Child Language Data Exchange System (CHIDES) is used to transcribe and code the recordings into machine-readable text. For each caregiver and child pair, there are three headers: obligatory headers, constant headers, and changeable headers and two capital letters used to indicate the status of the speaker. \*CHI is the child and \*MOT the mother. Besides, the five dependent tiers used in this corpus are %WRD: words, %POS: part-of-speech code, %SPA: speech acts, %ICG: interchange, and %PFX: pragmatic flexibility. The collected corpus had been preliminary analysed and will be applied to find the relations between child's language ability and caregiver's oral communication skills.

## 1 Introduction

Language proficiency and pragmatic ability of children from two to six are affected by the oral

communication of caregivers (Ninio and Snow, 1996, Hoff-Ginsberg, 2003, Zhou, 2002, Tauber, 1979). Tauber showed that child's oral communication behavior was similar to caregiver. Thus, a caregivers with effective oral communication skills can help children to learn a language. Therefore, the analysis of relations between language proficiency and oral communication skills is very important to help caregivers in early child education.

Moreover, oral communication skills can be represented as pragmatic flexibility, interchange, and speech acts (Ninio and Snow, 1996). Pragmatic flexibility can be applied to evaluate the language proficiency and pragmatic ability. It can also be represented as pragmatic strategies, which can be divided into sociocultural strategies and language strategies. Sociocultural strategies are to understand the sociocultural norms of behavior underlying the speech act. Language strategies are to understanding the appropriate language behavior (e.g., grammar, vocabulary, structures) for performing the communicative act. Recently, researchers focus on development of oral speech act for a child (Zhou, 2006, Zhou, 2002, Snow et al., 1996). These researchers also believe that children's developing capacity to express communicative intentions verbally reflects developments in their cognitive abilities and their social understandings, as well as more strictly linguistic skills.

However, these researches in education, speech evaluation, and language training need a corpus of oral communication. The oral communication of caregivers is used to interact with children. Using this corpus, the researcher can understand the relations of oral communication between child and caregiver. He/she can give useful recommendation

to provide quality environment of language learning.

The goal of this paper is to design an oral communication corpus for the interaction between child and caregiver. The cross-sectional method is applied to select subjects (children and caregiver pairs). Observational method is used to collect the conversation corpus. Using CHILDES, the speech data can be transcribed and coded the recordings into machine-readable text.

## **2 Materials and Methods**

### **2.1 Subjects**

The cross-sectional method is applied to select subjects including children and caregivers. There were twelve child (6 male and 6 female) and caregiver pairs. We chose to analyze the children to match the cross-sectional groups at 2, 3, and 4 years and thus each group have 2 males and 2 females.

### **2.2 Data Collection**

Caregiver-child pairs were brought to a laboratory set up as a kindergarten classroom. It was easier for the children to warm up and participate in the interactions. Observational method is used to collect the oral communication corpus. We recorded each caregiver-child pair using two cameras located in corner of the room. One faces child and another faces caregiver. The investigator was in the room but was not involved in the conversation between child and caregiver. There was a warm-up period at the beginning, during which the child and caregiver were in the room with a collection of toys and the caregiver was instructed to take a few minutes to let his/her child become accustomed to the setting. After the warm-up period, three activities were applied to ask caregiver and child to play together. The three activities contained:

- (a) A picture book with stories in Chinese, for initiating communication between caregiver and child about reading, looking, talking, and discussing related topics.
- (b) A role playing game with a toy is used to encourage the caregiver and child talk and play together.
- (c) A manipulation toy is also used to encourage the caregiver and child talk and play together.

We collected the oral communicative data in the form of spontaneous speech and video, unstructured caregiver-child interactions. In each session, child was recorded about 20 minutes, interacting with caregiver in free play situation.

### **2.3 Data Annotation**

We transcribed cross-sectional data onto

computer files and formatted in machine-readable text. Regarding the format, the CHILDES is used to transcribe the data (MacWhinney and Snow, 1985, 1990, MacWhinney, 1991). We verified transcripts between the first and a second transcriber, both for content and for adherence to the transcription conventions.

CHILDES had been widely accepted as the standard system for child language data. CHILDES includes a transcription system, CHAT, and a set of programs, CLAN, for various analyses. The main components of the CHILDES format are headers and tiers. There are three kinds of headers: obligatory headers, constant headers, and changeable headers. There is a main tier and several dependent tiers for each utterance. The main tier, marked with \*, is the speech of the speaker. Two capital letters indicate the status of the speaker, e.g., \*CHI is the child and \*MOT the mother. The additional information is given in dependent tiers that are marked with % at the beginning of a new line. The five dependent tiers used in this corpus are %WRD: words, %POS: part-of-speech code, %SPA: speech acts, %ICG: interchange, and %PFX: pragmatic flexibility.

In this paper, the speech acts and interchange are coded by the Inventory of Communicative Acts-Abridged (INCA-A) system (Ninio et al., 1994). The INCA-A is designed to code communicative intentions both at the utterance level and at the social interchange level. Hence, INCA-A codes children's and caregivers' communicative acts at these levels. First, there is the social interchange, which refers to communicative intentions, including negotiations, markings, discussions, performs, and so on. Parts of codes for interchange are shown in Table 1. Second, there is the speech act, which codes the communicative function of an utterance. Each of those illocutionary acts has own unique communicative meaning and parts of codes for speech acts are shown in Table 2. The code can be divided into 11 categories: directives and responses, commitments and responses, declarations and responses, markings and responses, statements and responses, questions and responses, performances, evaluations, demands for clarification, text editing, and vocalizations. Third, there is the pragmatic flexibility, which is the combination of speech act and interchange.

## **3 Results**

In this study, the activities were recorded by two cameras with two angles. One faces child and another faces caregiver. Moreover, a sensitive microphone was also applied to record the longitudinal interactions. An example of recorded result is shown in Figure 1. With those data, the

spontaneous speech can be easily identified and transcribed into text. Besides, a friendly interface is also designed to annotate the corpus and shown in Figure 2. With video data and the interface, the manual annotation of speech acts and interchange can be easily finished. Besides, the words and part-of-speech can also be automatically identified. Using words and part-of-speech, the language proficiency can be objective evaluated. With speech acts, interchange, and pragmatic flexibility, the pragmatic ability can also be evaluated. Therefore, the relation between language ability and oral communication skills can be analyzed. In this corpus, the most frequent speech acts are QN, SA, and ST. For interchange, the most frequent interchanges are DJF, DNP, and DHS. Parts of annotated results are shown as follow:

```

@Begin
@Age of child: 3y
@Birth date of child: 2006/9/XX
@Filename: ChenXXXXXXXX01
@Language: Mandarin
@Sex of child: Feale
@Transcriber: Lin
*MOT:今天想要穿什麼樣的衣服到學校去?
%WRD:今天 想要 穿 什麼樣的 衣服 到
      學校 去
%POS: Ndabd VC2 Nv1 DM DE Nab Caa
      Nab Dbab
%SPA: QN
%ING: DJF
%PFX: DJF:
*CHI:穿熊熊的衣服.
%WRD:穿 熊熊 的 衣服
%POS: Nv1 Nad DE Nab)
%SPA: SA
%ING: DJF
%PFX: DJF:SA
*MOT:哪一件熊熊的衣服啊?
%WRD:哪 一 件 熊 熊 的 衣 服 啊?
%POS: Dbb DM Nad DE Nab I
%SPA: QN
%ING: DJF
%PFX: DJF:QN
*CHI:這一件.
%WRD:這 一 件
%POS: DM
%SPA: SA
%ING: DJF
%PFX: DJF:PFX
...
@END

```

#### 4Conclusions

In this paper, a corpus for oral communication of

caregiver and child was designed and collected. The activities for caregiver-child pair had been designed to collect cross-sectional data. The spontaneous speech had been also manually transcribed and annotated into CHIDLES. Words, part-of-speech, speech acts, interchange, and pragmatic flexibility had been used to annotate the behaviour of oral communication. Therefore, the relations between child's language ability and caregiver's oral communication skills can be analyzed and applied to enhance the oral communication skills of caregivers. Besides, the data had been recorded in two directions and can be applied to emotion recognition via speech or video.

#### 5Acknowledgements

The authors would like to thank the National Science Council, R.O.C. and Industrial Technology Research Institute, for its financial support of this work, under Contract No. NSC 97-2221-E-218-043 and No. B200-97CT2.

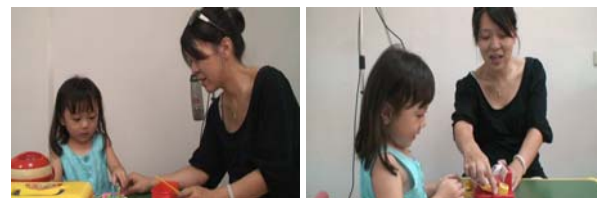


Fig. 1 The recorded results with two different directions

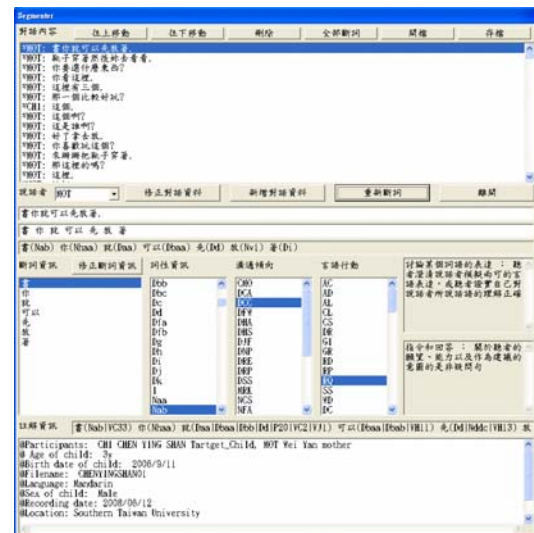


Fig. 2 The manual labelling interface

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Code	Category	Function
NCS	Negotiate co-presence and separation	To manage the transition between co-presence and separation
DHA	Directing Hearer's attention	To achieve joint focus of attention by directing hearer's attention to objects, persons and events in the environment
DJF	Discussing a joint focus of attention	To hold a conversation about something in the environment that both participants are attending to, e.q., objects; persons; ongoing actions of hearer and speaker; ongoing events
DRP	Discussing the related-to-present	To discuss non-observable attributes of objects or persons present in the environment or to discuss past or future events related to those referents
DNP	Discussing the non-present	To hold a conversion about topics which are not observable in the environment, e.g., past and future events and actions, distant objects and persons, abstract matters (Excluding conversations about hearer's and speaker's inner states.)
DHS	Discussing hearer's thoughts and feelings	To hold a conversation about hearer's non-observable thoughts and feelings

Table 1: Interchange for INCA-A

Code	Function
Questions and responses	
QN	Ask a product-question (Wh-question)
YQ	Ask a yes/no question
TQ	Ask a limited-alternative yes/no question
EQ	Eliciting question (e.q. hmmm?)
SA	Answer a Wh-question by a statement
AA	Answer in the affirmation to a yes/no question
Directives and responses	
RP	Request/proposes/suggest action for hearer, or for hearer and speaker
RQ	Yes/no question about hearer's wishes and intentions which functions as a suggestion
DR	Dare or challenge hearer to perform action
Statements and responses	
ST	State or make a declarative statement
AP	Agree with proposition expressed by previous speaker
DW	Disagree with proposition expressed by previous speaker

Table 2: Speech acts for INCA-A