<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>How well can the Chinese Communicative Development Inventories (CCDI) tell toddlers' expressive language ability?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author(s)</strong></td>
<td>Au, Hing-yee; 區慶頤</td>
</tr>
<tr>
<td><strong>Citation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Issued Date</strong></td>
<td>2010</td>
</tr>
<tr>
<td><strong>URL</strong></td>
<td><a href="http://hdl.handle.net/10722/173695">http://hdl.handle.net/10722/173695</a></td>
</tr>
<tr>
<td><strong>Rights</strong></td>
<td>Creative Commons: Attribution 3.0 Hong Kong License</td>
</tr>
</tbody>
</table>
How well can the Chinese Communicative Development Inventories (CCDI) tell toddlers’ expressive language ability?

Au Hing Yee Natalie

A dissertation submitted in partial fulfillment of the requirements for the Bachelor of Science (Speech and Hearing Sciences), The University of Hong Kong, 30 June 2010.
Abstract

The first aim of this study is to investigate the criterion validity of the Chinese Communicative Development Inventories (CCDI) using direct measures of the children’s language. The direct measures were the Expressive score of the Reynell Developmental Language Scales (E-RDLS) and mean length of utterance (MLU). Twenty-seven parents and their children aged between 25 and 30 months old participated. The children’s CCDI scores were moderately correlated with their E-RDLS scores and MLUs, indicating that CCDI demonstrated adequate criterion validity. The second aim of the study is to examine CCDI’s screening accuracy in 11 children with normal language and 3 children with language delay. These children’s language status was defined by their performance in E-RDLS and MLU. CCDI’s sensitivity and specificity was 33% and 91% respectively, suggesting that CCDI could accurately screen children with normal language but not language delay in this small sample. Clinical implications of these findings are discussed.
Introduction

Importance of Early Language Screening

Receptive and expressive language starts to develop since early childhood. Children speak their first words between the age of 9 and 18 months and demonstrate understanding of words and simple utterances in context before that (Paul, 2007; Heep Hong Society, 1995). Neglect of delay in language development in the preschool stage could lead to poorer academic results and degraded social interaction with peers in later school years (Laing, Law, Levin, & Logan, 2002). These account for the importance of screening children for language impairment at an early stage.

When is the most suitable time for screening? In Hong Kong, the Maternal and Child Health Centres (MCHC) administer the Developmental Surveillance Scheme which screens children for early developmental problems, including language delay, at 2, 4, 6, 12, 18 and 48 months (Leung, 2008). However, it is noted that the language performance of children between 12 and 24 months is variable and unstable (Fenson, Bates, Dale, Goodman, Reznick, & Thal, 2000). Hence, this study proposes to perform screening on toddlers between 24 and 30 months old for two reasons. Firstly, signs of language delay can be observed as early as age 2. Failure to produce 50 words or a comprehension-production gap exceeding 6 months generally predicts language delay (Ellis Wesimer & Murray-Branch, 1998, and see Olswang, Rodriguez & Timler, 1998 for a review). Secondly, early identification of language problems at
around the age of 2 allows earlier commencement of intervention. Billeaud (2003) mentioned that early intervention before the age of three may alleviate the severity of language delay and its negative consequences on the children. In light of these issues, screening at around 2 years old is recommended.

*Parent Report as a Screening Tool*

A child’s language ability can be screened by direct testing or indirect reports obtained from his/her parents. According to Dale (1996), parent reports have a number of advantages over direct testing of young children. Firstly, parents observe and interact with their children on a daily basis. Compared with structured language tests, the results obtained from parents’ perspective will be more extensive and representative of children’s true ability. Secondly, parent reports are cost-effective as time and effort of professionals for clinical evaluation are conserved. Thirdly, young children may not interact proactively with strangers because of reluctance or timidity. Thus, their ability may be underestimated in direct tests and parent reports can overcome this limitation.

However, some criticisms arise regarding the use of parent reports. Dale (1996) reported that parents’ ability to provide accurate information of their children can be doubtful owing to parental bias or lack of experience with normal developing children. Parents may hold high expectations for and take great pride in their children,
leading to overestimation of their abilities. Besides, as parent reports are in written form, the parents’ education and literacy levels may influence the result. Hence, to account for parents’ reliability, it is necessary to note their characteristics such as educational background and parental concern on children’s language development.

Although there is reservation for parent reports, their benefits override their drawbacks. Therefore, it is still worthwhile to employ parent reports for early screening.

Parent report measures such as the Language Development Survey (LDS; Rescorla, 1989) and the MacArthur-Bates Communicative Development Inventories (CDI; Fenson, Marchman, Thal, Dale, Reznick, & Bates, 2007) are widely used in western countries. CDI has been adapted to 20 different versions including Finnish, French, Chinese and Swedish (CDI Advisory Board, 2009). CDI is generally accepted and extensively used with English-speaking children (Heilmann, Weismer, Evans & Hollar, 2005). For CDI: Words and Sentence (CDI:WS), it showed high concurrent validity (r=0.86 for vocabulary) with the Expressive One Word Vocabulary Test (Thal, Tobias & Morrison, 1991). Reese and Read (2000) replicated this finding and found excellent reliability (r=0.81, p<0.01 for vocabulary; r=0.59, p<0.01 for complexity and r=0.51, p<0.01 for maximum sentence length) and good predictive validity (ranged from r=0.33 to 0.85 with median =0.61) for MCDI: WS
against Expressive Vocabulary Test (Williams, 1997). Heilmann et al. (2005) also showed the good sensitivity (0.68), specificity (0.98), positive predictive value (0.96) and negative predictive value (0.81) of CDI:WS with the Preschool Language Scale-Third Edition (Zimmerman, Steiner, & Pond, 1992) and language sample measures. These research studies suggest that CDI has good agreement with direct language measures and thus is useful and effective for language screening of children in western countries.

*Early Language Screening in Hong Kong*

Looking back into the current situation in Hong Kong, there is as yet any documentation of the reliability and sensitivity of the Developmental Surveillance Scheme in screening children with language delay or the criteria adopted for the Surveillance. In 2008, the Cantonese version of the CDI was published (CCDI, Tardif, Fletcher, Zhang, Liang & Zuo, 2008). Preliminary evidence on 57 children from the norming sample suggests that CCDI has a criterion validity of 0.86 with RDLS-C for expressive vocabulary (Tardif et al., 2008). Potentially, CCDI can be used as a language screening tool for infants and toddlers in Hong Kong. To do that, CCDI has to be examined further in terms of its criterion validity and screening accuracy. In this context, criterion validity refers to how well CCDI correlates with direct measures of children’s language and vocabulary in particular, and screening accuracy refers to
How well can how accurate CCDI is in identifying children who actually have language impairment according to a “gold standard”.

The Reynell Developmental Language Scales, Cantonese (Hong Kong) Version (RDLS-C; Hong Kong Society for Child Health and Development, 1987) is used to examine the validity of CCDI. The RDLS-C is chosen for language screening as it is the only broad-based test available for Cantonese-speaking children under the age of 5 (Klee, Wong, Stokes, Fletcher, & Leonard, 2009), despite the inadequacy of its psychometric properties including small sample size, low concurrent validity and test-retest reliability (Klee et al., 2009). It is also important to examine validity using language sample measures. Language sample measures such as Mean Length of Utterance (MLU) and Lexical Diversity (D) have been suggested for their higher ecological validity (Owens, 2008; Paul, 2007) and sensitivity to emerging grammar of young children (Rispoli & Hadley, 2001). In this study, language sample measure of MLU is collected to supplement the standardized test for determining the criterion validity of CCDI.

Recall that CDI is a parent report of infants and toddlers’ language abilities. Despite the presence of abundant research studies regarding the use of CDI for English-speaking children as screening tools (Thal et al., 1992; Zimmerman et al., 1992), Tardif et al. (2008) warned that results of western research studies may not be
directly applicable for Cantonese-speaking children due to possible differences in the
demographic characteristics of parents, including their educational experience on
general language and child development, and their expectations of child learning. All
these may affect parents’ perceptual judgment of children’s abilities. For these
reasons, research is needed to examine the criterion validity and screening accuracy
of CCDI.

_Purposes of Study_

This study aims to answer two questions.

1) What is the criterion validity of CCDI:WS (Tardif et al., 2008)?

2) What is the accuracy of CCDI in screening children with and without language
delays?

_Methodology_

_Participants_

The sample consists of 27 native Cantonese-speaking parents and their children
aged between 25 and 30 months (20 males and 7 females). The children were
recruited through two local nurseries, one church, one Early Education Training
Centre (EETC) and personal contacts with no prior exclusion based on language
developmental status. Among these 27 children, 4 were born pre-term. A majority of
the children, 21 of them, came from monolingual Cantonese background, whereas the
How well can others had additional English or Putongua exposure. Six parents indicated concern for their children’s language development. Thirteen children were cared for primarily by their parents. The mother of 17 children had to work outside home. Parents’ educational background ranged from primary to tertiary level, suggesting that this sample came from rather diverse socioeconomic backgrounds. Their detailed demographic data is summarized in Table 1.

Instruments

There are two forms of CCDI (Tardif et al., 2008), namely the Chinese Communicative Development Inventory: Words and Gestures (CCDI: WG) and Chinese Communicative Development Inventory: Words and Sentences (CCDI: WS). For practical considerations like time constraints and the lack of motivation of parents, the short form of the CCDI: WS was used. This form is designed for toddlers between the age of 16 and 30 months with norms only up to 28 months. The short form contains 134 vocabulary items, early grammar and MLU. Compared to the long form, which consists of 800 vocabulary items, the short form is normed on a smaller sample of 300 children. Typically children who scored at or below the 10th percentile were considered to have language delay (Tardif et al., 2008; Ellis Weismer & Evans, 2002).

The RDLS-C has both receptive and expressive subscales. The expressive
subscale contains sections of vocabulary, sentence structure and content. Since the
CCDI:WS measures the production ability of children with no regard for their
comprehension ability, only the expressive subscale of the RDLS-C (E-RDLS) was
used for comparison. Children who scored below 1SD in E-RDLS were considered to
have failed the assessment. The benchmark of -1SD was employed as it is a
conventional and generally acceptable cutoff point for language assessment.

For the children’s language samples, 50 complete and intelligible utterances
excluding mazes (e.g., partial revision of what was just said) were chosen as the
sample length as they provide an adequate evaluation of the children’s language
development and were most commonly used in previous studies (Paul, 2007; Lee,
1974). MLU was calculated from these 50 utterances as it was commonly used to
assess early grammatical development of children (Bates et al., 1995). Children
between 25 and 30 months old who showed less than 1.75 MLU would be regarded
as having failed (Klee, Stokes, Wong, Fletcher & Gavin, 2004). The cut-off of 1.75
was the mean MLU of the 27 to 30 months old group in the Klee et al. (2004) study.
The group included only 10 children, but there was no other published report of MLU
of toddlers of this age. Given that neither of the direct measures had very strong
psychometric properties, failure in both the E-RDLS and MLU was adopted as a
stringent criterion for language delay.
A simple case history adapted from Fenson et al. (2007) and Wong, Dollaghan, and Campbell (2008) was also given to the parents to fill in. It was about the demographic information such as the child’s birth condition, language background, parental concern of his/her child’s language development, the parent’s occupation as well as their educational background.

*Procedures*

All 27 children were tested individually at their nursery school, Early Education Training Centre, church or home. The whole session took about 60 minutes and was audio tape-recorded using Samsung YP-U3. The session included two phases. The first phrase involved language sampling. A bath set with baby doll was provided to the toddlers (Klee et al, 1998). Both the parent(s) and the investigator played with the toddlers for about 15 minutes. In the second phase, the toddlers were tested using RDLS-C. At the same time, the parents were asked to fill in the CCDI:WS and a case history while their child was completing the tasks with the examiner. Hence, the investigator was blind to the result of the CCDI:WS.

*Data and Statistical Analysis*

The language samples obtained were transcribed orthographically and segmented manually. The utterance segmentation method was based on Klee et al. (2004). Then, the language samples were analyzed using Child Language Analyses
How well can (CLAN) (MacWhinney, 2003) for the MLU. Caution has to be taken for the conversion of raw score to percentile scores of the CCDI. Scores of children aged between 29 and 30 months were referred to the norms for 28 months old since norms for these children were not available for the short form.

The relationships between the CCDI, E-RDLS and MLU in the language sample were explored. Pearson’s correlation coefficient \( r \) was used to measure the relationship between CCDI and E-RDLS with 27 participants. The non-parametric spearman’s rho was employed to measure the correlation between language sample (MLU) with CCDI, CCDI (MLU) and E-RDLS as there were only 14 participants fulfilling the requirement of producing 50 utterances in their language sample. The CCDI (MLU) was calculated based on the average MLU of the three longest utterances provided by the parents on their children. Given that the reference MLU data from Klee et al. (2004) was taken from only a very small sample of children, the children’s raw scores, instead of standard scores, were used in the correlation analyses.

Reliability

The intra-rater and inter-rater reliability was measured by reviewing 10 percent of the results in both E-RDLS and MLU. It was found that the intra-rater reliability was consistent as 100% throughout the scoring and transcription while the inter-rater
reliability was no lower than 96%. These implied that a good agreement was revealed during procedures of scoring of E-RDLS and the transcription of language sample.

Results

In this section, the criterion validity of CCDI and the relationship between language sample (MLU) and CCDI (MLU) as well as E-RDLS will be reported first. The screening accuracy of CCDI will then be examined.

Criterion Validity of CCDI

The criterion validity of CCDI was examined using correlation analysis. Each child’s score in CCDI was examined first with their expressive score of RDLS-C and then with their MLU. On the CCDI:WS, the children’s scores ranged from 3 to 99 percentile, indicating substantial individual variability.

Figure 1. A scatter plot showing the correlation between CCDI:WS and RDLS-C (Expressive Scores)

Figure 2. A scatter plot showing the correlation between CCDI:WS and language sample (MLU)

Figure 1 reveals a moderate, positive and statistically significant relationship
between CCDI: WS and RDLS-C (Expressive Scores) \( (r=0.546, N=27, p<0.01) \). The result indicates that children who received a high score on the CCDI generally show good performance in their E-RDLS, vice versa.

Figure 2 reveals a moderate partial correlation between CCDI: WS and MLU with age as the controlling variable \( (r=0.493, N=14, p<0.05) \). Recall that only 14 children produced more than 50 complete and intelligible utterances were included in this analysis involving MLU, it is noted that one child performed extremely poor in his MLU and also demonstrated very few vocabularies in his CCDI:WS.

To take a deeper look at the relationship between language sample (MLU) and other variables, other correlation analyses are performed and described below.

![Figure 3](image1.png)  ![Figure 4](image2.png)

Figure 3. A scatter plot showing the correlation between CCDI (MLU) and language sample (MLU) illustrate a moderate, positive and statistically significant correlation with age partialed out \( (r=0.502, N=14, p<0.05) \). All
the mean MLU rated by caregiver on the CCDI is higher than that of the language sample. However, two children who scored the lowest mean MLU (2.33) on the CCDI were also found to have nearly the lowest mean MLU (1.38 and 1.58) in their language samples. The longest utterance on the CCDI was produced by a 25-month-old girl with 8 MLU, saying “柔柔唔識痾/wi1//wi1/，Elmo 識呀！” (meaning Yau Yau (the child’s name) does not know how to go to the toilet but Elmo knows). Conversely, the shortest utterance on the CCDI was produced by a 28-month-old boy with 1 MLU only, saying “街街” (street street) with no word combination. It was also observed from Figure 3 that one child who failed in the language sample with MLU (1.38) was rated to have high MLU (5.33) by her parent in the CCDI.

Figure 4 reveals a moderate, positive correlation between language sample (MLU) and raw scores of RDLS-C (Expressive scores) with age partialed out (r=0.555, N=14, p<0.05).

Screening Accuracy of CCDI

The participants were classified into “Language Delay” (LD) or “Normal language” (NL) based on their performance on the E-RDLS and MLU. Four out of fourteen participants scored less than the cut-off of 1.75 MLU in their language sample and among these four, three also scored at or below 1 SD in their E-RDLS.
Taking the failing criteria of -1.75 on MLU and -1 SD in E-RDLS, three out of 14 children could be regarded as having a “Language Delay” (LD) while the remaining 11 children were identified as having “Normal language” (NL).

Of the three children who were considered as having a language delay, two of them received a pass on their CCDI, scoring 35th and 43rd percentile. However, the remaining one failed in his CCDI and scored 3rd percentile. For the 11 children who had normal language, one of them failed in the CCDI while the other 10 passed. The screening accuracy of CCDI can be indicated by its sensitivity and specificity. The sensitivity of CCDI was 33% (1/3), indicating that it could not identify children with language delay adequately. The specificity of CCDI was 91% (10/11), suggesting that most of the children who had normal language passed the screening.

Discussion

In the ensuing paragraphs, the criterion validity of CCDI using E-RDLS and MLU will be evaluated. Besides, the low sensitivity of CCDI will be examined and the implications of the fair responses on the direct language measures of children who have “language delay” will be discussed.

Criterion validity of CCDI

The criterion validity of CCDI was examined with reference to E-RDLS and a moderate correlation of 0.546 was found. Tardif et al. (2008) also validated the
CCDI: WS using E-RDLS and reported a higher correlation (0.86). A higher mean E-RDLS was calculated for the present study (28.44, SD=7.71) than her study (25.16, SD=11.78). When age was partialed out, the correlation between RDLS-C (Vocabulary) and CCDI for her study was 0.60 while that of this study was 0.541. Compared with Tardif et al.’s study and the present one, there were 30 more participants in her study (57) yet only 27 participants in this study. The participants aged between, 18, 24 and 30 months in her study while the participants in the current study had a smaller age range from 25 to 30 months. In contrast to her study, the short form of CCDI with fewer vocabulary items of 134 (compared to 800 in the long form) was used for this project. The less significant correlation between E-RDLS and CCDI found in the present study may be attributed to methodological differences including the smaller sample size and the use of different CCDI forms mentioned above.

To the best of our knowledge, this is the first time parents’ report of children’s vocabulary production and MLU using the CCDI was examined with children’s actual language production. A positive and moderate correlation of 0.493 was found between MLU in the language sample and raw scores of CCDI. It supported the notion that MLU in the language sample generally increased with the vocabulary observed by caregivers.

It was also discovered that 100% of the 14 caregivers stated higher mean MLU
How well can

of their children (M=4.81) on CCDI compared with the MLU obtained in the

language sample (M=2.33). Difference in sampling is the main reason for this
discrepancy. The mean MLU on CCDI was calculated based on parents’ observation
of the three longest utterances produced by their children. However, the mean MLU
in the language sample was determined by the 50 utterances from the children in
around 15-minute free play. Yet, it is interesting to note that one of the children had a
large gap between her mean MLU on CCDI (5.33) and that in her language sample
(1.38). Two possible reasons might explain this. Firstly, this child was too shy to
interact with the investigator. Dale (1996) pointed out that some children may be too
shy to respond or react as usual with the presence of an unfamiliar person. In the
language sample of this child, the investigator had to use A-not-A “有冇洗乾淨啲手
指架？(Do you wash the fingers thoroughly?)” or What “咩啲嘢嚟嘅？(What is it?)”
questions to elicit her production. Consequently, she might produce single word to
answer the questions, reducing the MLU in the language sample. Secondly, she was
not very interested in the bath set and informed the investigator that she had finished
bathing the baby frequently. Therefore, she might produce simpler and shorter
utterances due to lack of interest of the toy, leading to reduced MLU.

The correlation between CCDI and MLU was not as strong as that between

CCDI and E-RDLS. One possible reason was that MLU measures word combinations
while CCDI focuses solely on the number of vocabulary production. Hence, some children may produce a fair number of expressive vocabularies but fail to combine these vocabularies into utterances. Despite the less significant correlation observed, this pioneer study provides information to compare the utility of CCDI with naturalistic measure of MLU. To a certain extent, both the correlation obtained from E-RDLS and MLU with CCDI confirms the criterion validity of CCDI, suggesting that CCDI is a valid measure of language development for toddlers.

**Screening accuracy of CCDI**

CCDI’s sensitivity is poor (33%) while its specificity is excellent (91%) (Vance and Plante, 1994), suggesting that it can adequately screen children with normal language but not those with language delays. The discouraging sensitivity of CCDI may be explained by a number of factors including the recruitment of participants mainly with normal language, the young age of these participants, the validity of the diagnostic criterion of MLU and the overestimation of children’s ability by their parents.

In this study, our participant recruitment exercise was not able to target children with clinically-identified language delay for two reasons. First, given the young age of the children, many parents would not actively pursue clinical assessment of their children’s suspected language delay, especially when they did not have any concerns
of their children’s general development. Second, young children with suspected
language delays could be on waitlist for follow-up at MCHC or Child Assessment
Centre (CAC), and the investigator had no access to these children. In this case, the
small number of possible language delay cases makes the sensitivity of CCDI
vulnerable.

In addition, Bates et al. (1995) warned of the large variabilities in young
children’s language development. This view is also held by Thal, O’Hanlon,
Clemmons, & Fralin (1999), suggesting that children under the age of 3 were difficult
to be judged clinically due to large variabilities and uncertainties. Therefore, the
participants in their young age of 25-30 months are still variable and their
performances may fluctuate from time to time. The large variabilities of young
children poses practical difficulty for the identification of true language delays,
leading to lower sensitivity of CCDI.

Another possible reason for the low sensitivity of CCDI is that the diagnostic
criteria adopted in this study may not accurately identify children with language
delays. One of the diagnostic criteria was the MLU below 1.75. This cut-off point in
fact was taken from 10 participants aged between 27 and 30 months in Klee et al.’s
study (2004). The small sample size of 10 participants may not adequately represent
the children in the general population. Hence, the diagnostic criterion of MLU
adopted in this study may not sufficiently identify children with actual language impairment, resulting in low sensitivity of CCDI.

To elucidate the low sensitivity of CCDI, parental overestimation of their children’s ability should also be taken into consideration. Out of the two children who might have language delays yet passed their CCDI, one of them scored 43rd percentile on his CCDI. According to Dale (1996), parents may have natural pride of their children, thus overestimating their abilities. Thus, it was hypothesized that the parental bias might overrate the children’s abilities, reducing the sensitivity of CCDI.

However, parental concern of their children’s language development should not be ignored. Though another child with possible language delay had a pass on her CCDI (35th percentile), her caregiver indicated concern on the questionnaire regarding her child’s poor expressive language ability. Olswang et al. (1998) warned that parental concern was a risk factor for language impairment. As a result, the importance of parental concern should not be overlooked and needs to be taken in account in screening.

To conclude, the fact that participants recruited were mainly with normal language development, large variabilities of young participants, inadequacy of diagnostic criterion of MLU and parental bias of children’s language development are potential contributing factors for the low sensitivity of CCDI. Besides, parental
concern as a risk factor of language impairment should also be noted in screening.

Responses on Direct Language Measures of Children who Considered to Have Language Delays but Passed the Screening

Two children who were labeled to have “language delay” but still received a pass in their CCDI are worth mentioning. Examination of their responses on E-RDLS and MLU suggests that the influence of English learning and phonological development of the children may affect the diagnosis and should not be ignored.

The children’s responses in the E-RDLS speak to the influence of English learning. It so happened that these two children who failed in the E-RDLS named the objects or pictures in English four times despite being prompted by the investigator to give a Chinese label. This may lower the overall score of the children on E-RDLS, where only Cantonese production of the items was accepted, contributing to failure of the test. With the finding that these children produced Chinese words in sentences for picture description task as well as language sample, a possible hypothesis is that their parents may emphasize the training of vocabulary using flash cards in English.

Based on the case history, the 2 children were mainly exposed to Cantonese. However, English-speaking domestic helpers were employed to look after them. In addition, it was observed that parents of these children mixed codes during their conversation with their children, for instance “嘉嘉同 duck duck 洗洗丫” (meaning
Ka Ka (the name of the child) helps to wash the duck). In other words, children as young as age 2 might be exposed to English words through educational materials, their helpers and parents in Hong Kong nowadays. The influence of exposure to the English language on children should not be ignored.

Secondly, the phonological development of children may affect their vocabulary growth. It was observed that one of the children with language delay produced unintelligible sound sequences more than the other children. Fletcher, Chan, Wong, Stokes, Tardif, & Leung (2004) stressed that children with immature phonological development may have fewer expressive vocabulary. While the CCDI gives credits to the approximation of sound for the expressive vocabulary, only intelligible and meaningful utterances in the language sample were included for the analysis of MLU. Thus, the poor phonological development of children may hinder their language performance and underestimate their true language abilities, leading to great difficulty in making accurate diagnosis.

To conclude, a review of these two cases suggests that the children’s English learning environment and their phonological development may affect their diagnosis at young age and should be carefully considered in screening.

**Clinical Implications**

This project contributes to the current and future clinical practice in three ways.
Firstly, it provides insight for the effectiveness of using CCDI for screening purpose.

Secondly, follow up measures can be provided for children who are at risk of language impairment. Recommendations will be made for those with language delay in the study. Thirdly, this project is also applicable to the Cantonese population as there is little literature on the employment of CCDI for screening of Cantonese toddlers.

**Research Implications**

This study shows that the sensitivity of CCDI is poor. Further investigation of the sensitivity and specificity of CCDI with a larger sample size is warranted. Secondly, this research only examines the criterion validity of CCDI with E-RDLS and MLU. Other direct language measures may be employed to validate CCDI as a useful instrument for language screening. Thirdly, this research permits a longitudinal study to trace the ongoing expressive language development of the participants and the predicative validity of CCDI at different age-intervals.

**Limitations**

This study has two main limitations: the small sample size and the instruments employed. In this study, only a small number of participants were recruited and the results were not representative enough to be generalized to the whole population. Besides, due to time constraints, the short form of CCDI was used. However, the
How well can decreased number of vocabulary items may reduce the reliability and validity of CCDI. Furthermore, the standardized test RDLS-C has its own limitations with regard of psychometric properties such as small sample size, low concurrent validity and test-retest reliability (Klee et al., 2009). Therefore, RDLS-C is not the ideal test to examine CCDI’s validity. To make things worse, the diagnostic criterion of MLU based on 10 participants may not be representative to the general population.

Conclusion

This study found a positive and moderate correlation between CCDI with E-RDLS and MLU, indicating that CCDI has adequate criterion validity and might be employed for language screening of toddlers aged between 25 and 30 months. The sensitivity of CCDI is found to be low but this finding is speculative due to a number of factors like the language status and young age of the participants, inadequate diagnostic criteria adopted and parental bias of children’s language abilities. On the contrary, the excellent specificity suggests that CCDI is able to screen children with normal language satisfactorily.
References


How well can
without SLI. *Journal of Speech, Language and Hearing Research, 47*(6), 1396–1410.


Olswang, L.B., Rodriguez, B., & Timler, G. (1998). Recommending intervention for toddlers with specific language learning difficulties: We may not have all the answers, but we know a lot. *American Journal of Speech-Language Pathology, 7*(1), 23-32.


## Appendix A

Table 1. Demographic data of participants

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Birth Order</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1st-born</td>
<td>2nd-born</td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>6</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>Parents</td>
<td>grandparents</td>
</tr>
<tr>
<td>Main caregiver</td>
<td>9</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Interaction time (a week)</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Cantonese</td>
<td>Cantonese and Putonghua</td>
<td>Cantonese and English</td>
</tr>
<tr>
<td>Language input</td>
<td>21</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Educational background</td>
<td>Primary education</td>
<td>Secondary education</td>
<td>Tertiary education</td>
</tr>
<tr>
<td>Mother</td>
<td>3</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>*Father</td>
<td>3</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Occupation</td>
<td>At work</td>
<td>Housewife</td>
<td>Unemployed/ not specified</td>
</tr>
<tr>
<td>Mother</td>
<td>17</td>
<td>10</td>
<td>/</td>
</tr>
<tr>
<td>*Father</td>
<td>25</td>
<td>/</td>
<td>2</td>
</tr>
</tbody>
</table>

* One father’s educational background and occupation status was not listed in the form.
Appendix B

Parent/ Guardian consent form

家長/監護人參與同意書

各位家長:

本人為香港大學教育學院言語及聽覺科學部四年級學生。現正進行一項了解家長對其兩至兩歲半子女的言語發展的認識的研究。現誠邀閣下和貴子女一起參與。是項研究將有助我們了解以家長報告鑑別有溝通問題的幼童的可行性。

是項研究將會在貴子女的中心或家中進行一次的個別會見。在會見過程中，貴子女要完成一個標準化的語言測試和與本人對話。語言測試的內容包括辨識和命名物件、跟從指令、理解問題和形容圖畫。閣下則要回答一份簡單的問卷及填寫一份詞彙量表。問卷的項目包括幼童的基本資料和家長的職業與教育程度。量表則包括幼童的早期語言表達的能力。所有項目的在一小時內完成。為確保所得資料記錄正確及作詳細的分析，會見個程將會被錄音，所有錄音檔案會妥為保存，只供研究者使用。

此項研究對閣下及貴子女不會構成危險。貴子女完成所有項目後，會獲得一件小玩具作獎勵。除此之外，閣下將能進一步了解貴子女在言語理解及表達方面的能力。假若貴子女被發現有語言障礙的可能，我們樂意轉介貴子女予相關的跟進服務。我們亦願意透過貴子女的幼稚園與閣下分享集體研究所得的結果。閣下的參與純屬自願性質。我們只會在閣下及貴子女同意時才進行活動。若果貴子女疲倦或不感興趣，我們可隨時休息或停止活動。閣下亦可隨時終止參與是項研究而不受任何影響。是項研究所搜集的資料只作撰寫論文之用，貴子女的名字及資料將絕對保密。

希望閣下能對此研究給予支持，讓貴子女參與其中。如有任何查詢，請致電91266352或電郵auhingyee@gmail.com與本人聯絡。若閣下想知道更多有關研究參與者的權益，請聯絡「香港大學非臨床研究操守委員會」(2241-5267)。

倘蒙閣下俞允合作，深表謝意。

區慶頌謹啟
香港大學言語及聽覺科學系
四年級學生

二零一零年一月五日
家長/監護人參與同意書 -- 回條

幼童姓名：______________ 班別: ________ 學號：________

性別: **男/女** 幼童出生日期: __________ (日/月/年)

(一) 本人同意參與是項計劃，有關此計劃的資料以及要填寫的問卷調查和量表，已向我解釋清楚。

(二) 本人同意本人的子女參與是項計劃，有關此計劃的資料以及要完成的語言測試和對話，已向我解釋清楚。

(三) 本人確認：

1. 本人清楚是項計劃中的研究活動對本人及本人的子女帶來的影響；
2. 本人知道可以隨時終止參與是項計劃，以及有權要求撤銷本人曾提供過的資料；
3. 本人知道此項計劃所得的資料是用作研究/教學用途，非用作治療用途；
4. 本人知道本人所提供的資料將會絕對保密；
5. 本人同意參與此計劃的會見過程將會被錄音，本人知道可以隨時提出檢閱或撤銷這些錄音帶。本人知道這些錄音資料會被妥善保存，並於研究結果發表五年後被銷毀。

父/母/監護人姓名: ______________

父/母/監護人簽署: ______________

日間聯絡電話: ______________

日期: __________________________
Appendix C
Case history form

問卷調查
謝謝閣下的參與並同意回答一些有關自己和孩子的問題。倘若閣下對下列問題有任何疑問，可以即時向我提出。

甲. 孩子基本資料
姓名：_________ 性別：男/女
出生日期: __________ (日/月/年)
出生次序：A. 第一 B. 第二 C. 其他：____ (請註明) 家中孩子數目：__

乙. 健康狀況
1. 孩子的出生狀況：
   A. 足月 (37-42 週)
   B. 早產 (少於 37 週)
   C. 遲產 (42 週後)
   D. 不知道

2. 孩子在出生時出生後在健康上有沒有任何問題？
   A. 有 B. 沒有

3. 承上題，如有健康問題，請描述：(如疾病或意外)
   ________________________________

丙. 語言發展
4. 主要照顧孩子的人是：
   A. 爸爸
   B. 媽媽
   C. (外)祖父
   D. (外)祖母
   E. 其他：__________ (請註明)

5. 孩子通常聽到的語言為：
   A. 廣東話
   B. 英語
   C. 普通話
   D. 法語
   E. 其他：__________ (請註明)
6. 在語言發展上，你認為你的孩子與其他同齡的小孩有沒有分別？
A. 有    B. 否

7. 承上題，如有，請描述分別：

_________________________________________________________________
_________________________________________________________________

丁. 家長資料
8. 您與孩子的關係：
A. 爸爸
B. 媽媽
C. (外)祖父
D. (外)視母
E. 其他: __________ (請註明)

9. 在一星期內，您與孩子溝通和玩耍的時間約：
A. 少於 10 小時
B. 10-20 小時
C. 21-30 小時
D. 多於 30 小時

10. 職業狀況
母親職業：__________________
父親職業：__________________

11. 教育程度
母親：A. 小學程度    B. 中學程度    C. 大學程度
父親：A. 小學程度    B. 中學程度    C. 大學程度

謝謝你抽空回答問題！

References

Acknowledgements

I would like to express my heartfelt gratitude to my dissertation supervisor, Dr. Anita Wong, for initiating such an interesting topic and for providing endless guidance and support throughout this year. Thanks also go to the Shun Yan Lutheran Church, ELCHK Kin Ming Nursery School, Salvation Army Wah Fu Nursery, Tak Tin Early Education and Training Centre of SAHK and friends for their great help in subject recruitment. I also want to thank the parents and children who participated in this study by providing valuable data and spending the quality time with me. Last but not least, I want to say a big thank you to my family members, classmates and friends for their love and encouragement.