

The Correlation of Family Responsiveness with Language and Cognitive Development in Infants and Toddlers

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BACKGROUND

➤ Factors influence child language and cognitive development

- **Home environment (Family Responsiveness)**
- **Socioeconomic status**
- **Birth defects**
- **Prenatal and perinatal factors**
- **Traumatic brain injury**
- **Gene**
- **.....**

BACKGROUND

➤ Main evaluations for language and cognition

– Scales

– Observation

– Transcription

unnatural

Time-
consuming

– Language Environment Analysis (LENA)

natural

efficient

OBJECTIVE

- **To investigate the characteristics of family responsiveness in infants and toddlers in China**
- **To test the correlation of family responsiveness with language and cognitive development in infants and toddlers whose native language is Chinese**
- **To explore LENA feasibility in evaluating child language and cognitive development in China**

METHODS

➤ The source and the selection of the sample

- *Shanghai Children's Medical Center*
- *Shanghai Luwan Early Childhood Education Consulting & Service Center*

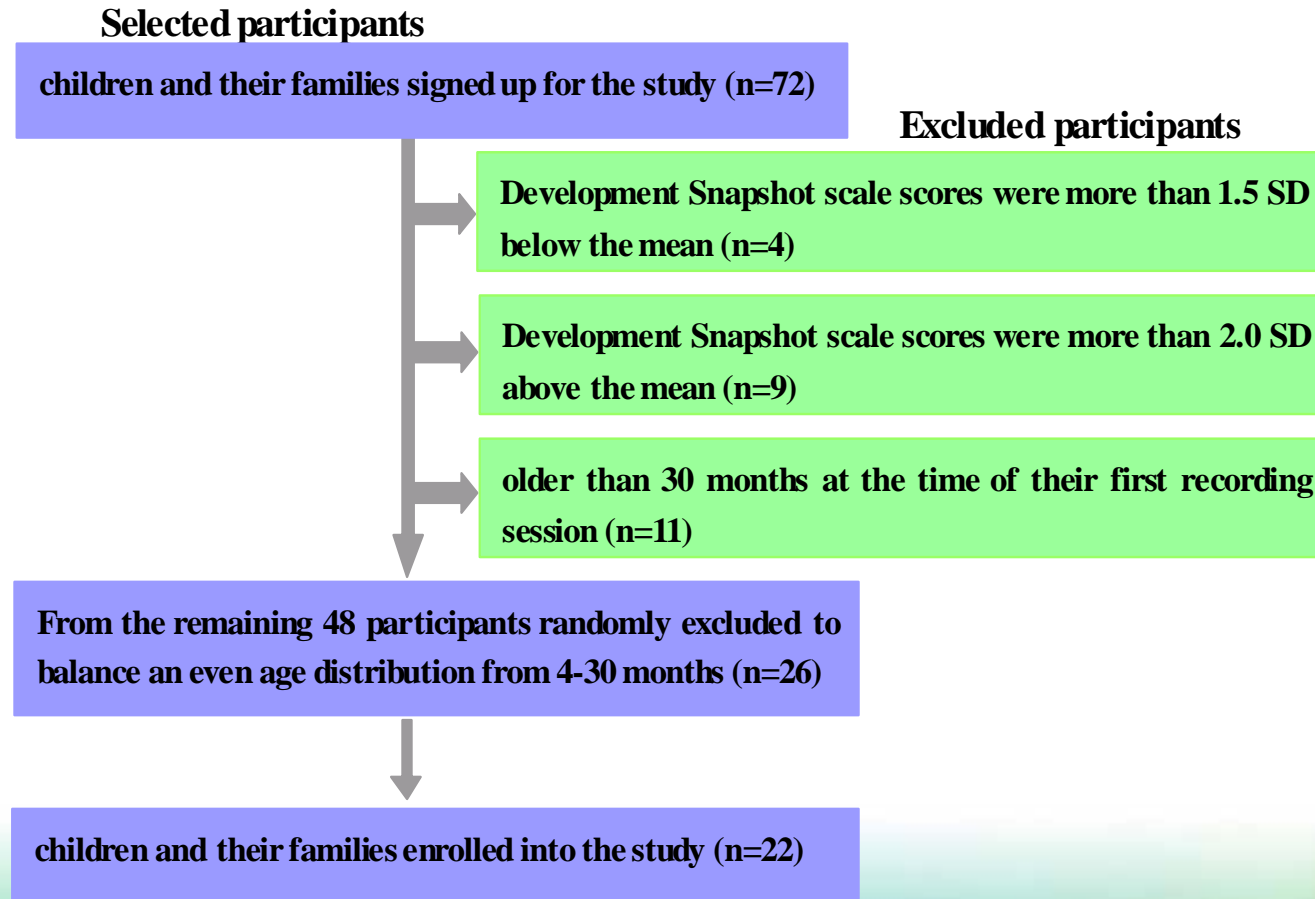


Fig 1 Flow chart of samples selection process

METHODS

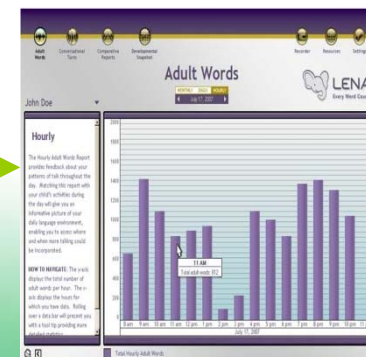
➤ Collection of language samples

3 days recordings (16h/day)

- ✓ LENA clothes
- ✓ Digital Language Processor (DLP)

➤ Major components of language samples

- ✓ Adult word counts
- ✓ Child vocalization counts
- ✓ Adult-child conversational turns
(includes Adult-initiated and Child-initiated)



METHODS

➤ **Language Developmental Screening Scales**

for Infants and toddlers

- ✓ **Language expression**
- ✓ **Language comprehension**
- ✓ **Nonverbal expression**

➤ **Bayley Scales of Infant Development**

- ✓ **Mental Developmental Index (MDI)**
- ✓ **Psychomotor Development Index (PDI)**

RESULTS

➤ children

– Age group

4 ~ 12months : 7

~ 24months : 9

~ 30months : 6

– Sex

Male:10

Female:12

➤ Parent's education

– Maternal

college: 14

master: 7

doctor: 1

– Paternal

college: 15

master: 7

RESULTS

Table 1 recording results & child language and cognitive development

Measure		range	Mean($\bar{x} \pm s$)
Language expression score/ equivalent age	22	7~26/ 10 ~ 36	13.9±7.5/ 18.0±9.7
Language comprehension score/ equivalent age		6~20/ 5~36	12.6±5.0/ 18.4±10.4
Nonverbal expression score/ equivalent age		8~13/ 8~20	11.6±1.8/ 14.8±5.0
Bayley MDI		72~150	101.5±17.0
Bayley PDI		67~117	92.59±12.8
Adult word counts	x3	9097.0~43067.0	21044.3±7665.8
Adult-Child conversational turns	x3	390.0~1259.0	748.3±285.3
Child vocalization counts	x3	892.0~4710.0	2147.4±883.0
Adult_initiated conversational turns	x3	145.7~704.3	346.4±145.0
Child_initiated conversational turns	x3	207.7~802.7	401.9±163.0

We see remarkable between- and within-family differences in Adult word counts, Child vocalization counts and Adult-child conversational turns.

RESULTS

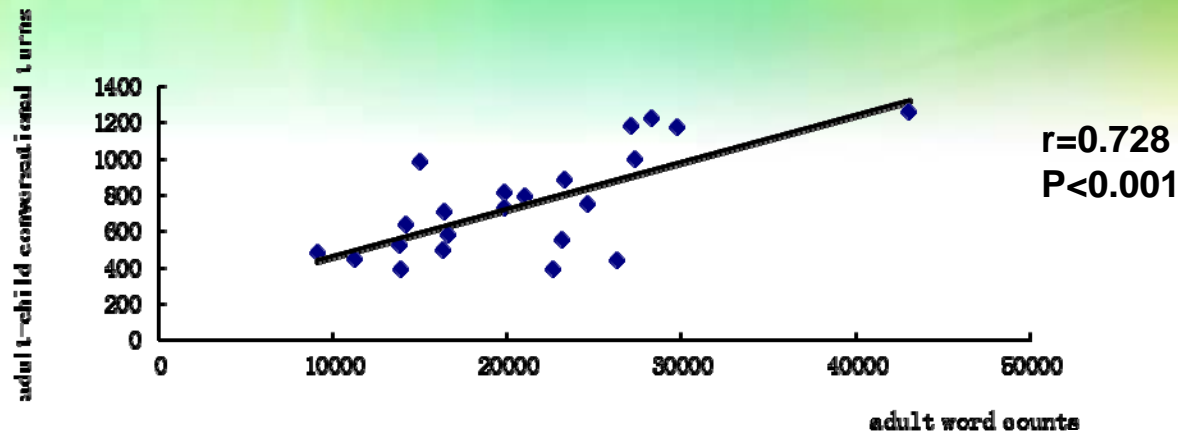


Fig 2 The correlation between Adult word counts and Adult-Child conversational turns

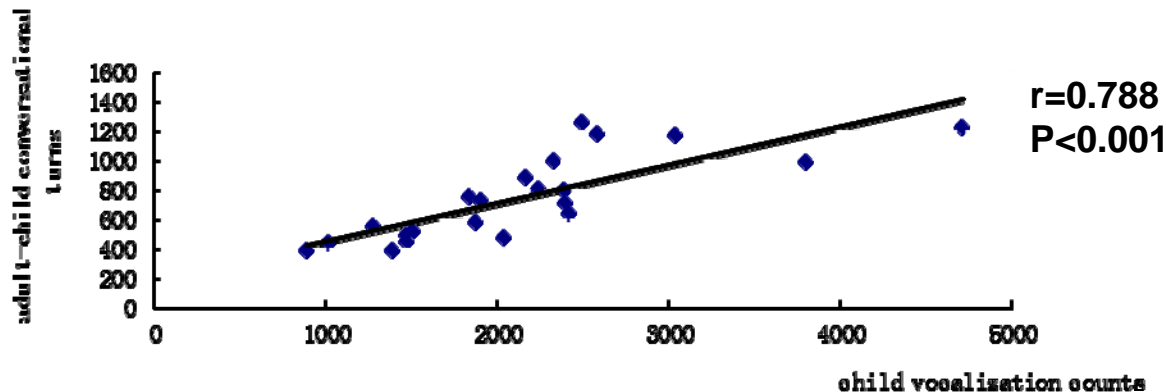


Fig 3 The correlation between Child vocalization counts and Adult-Child conversational turns

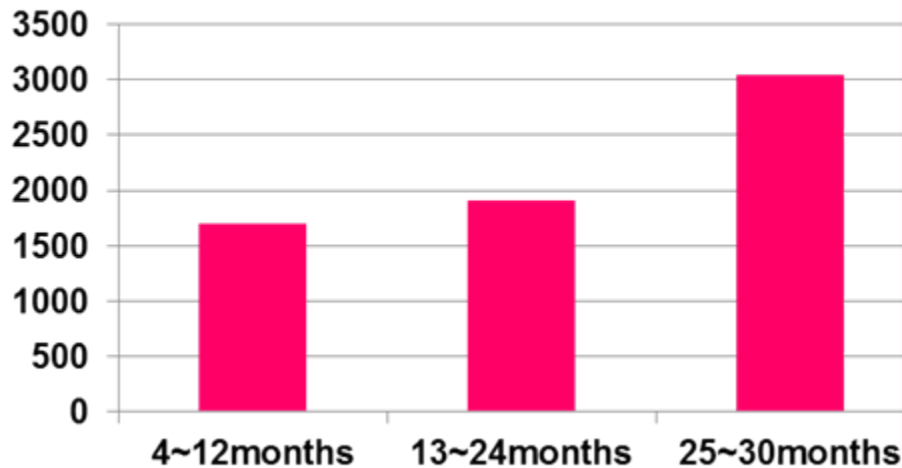
Adult-Child conversational turns is correlated with Adult word counts and Child vocalization counts

RESULTS

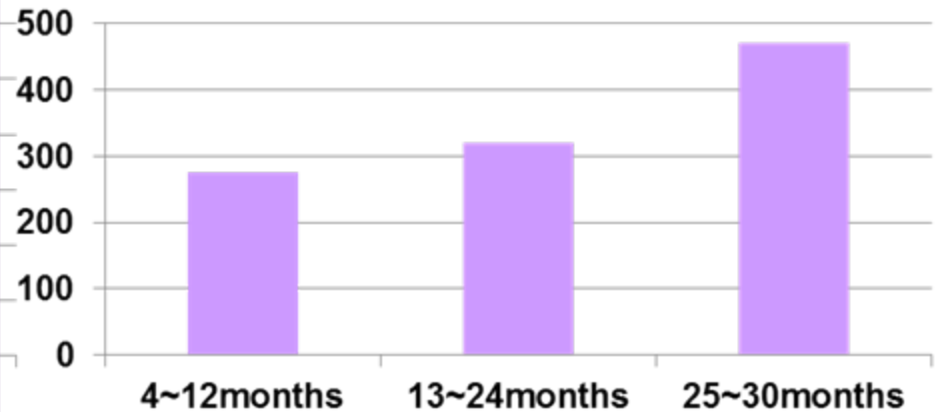
F=6.587
P=0.007

F=4.231
P=0.03

Child vocalization counts



Child-initiated conversational turns

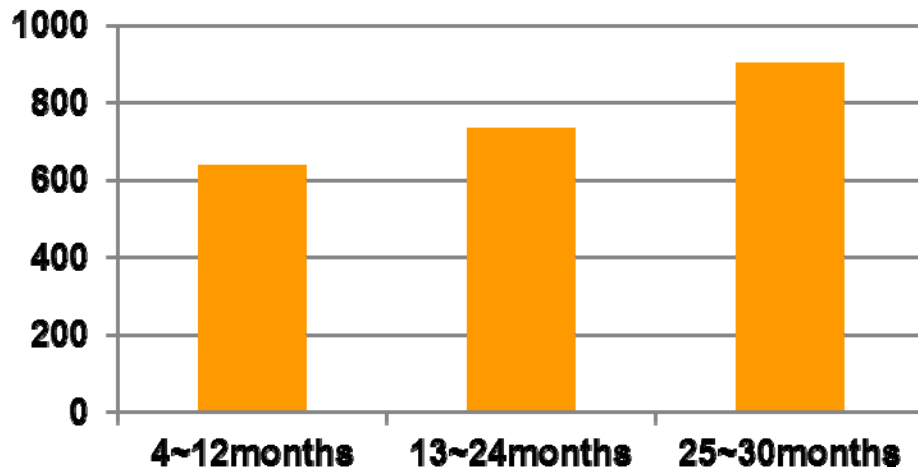


Child vocalization counts and Child-initiated conversational turns were different between the three age groups and increased with age.

RESULTS

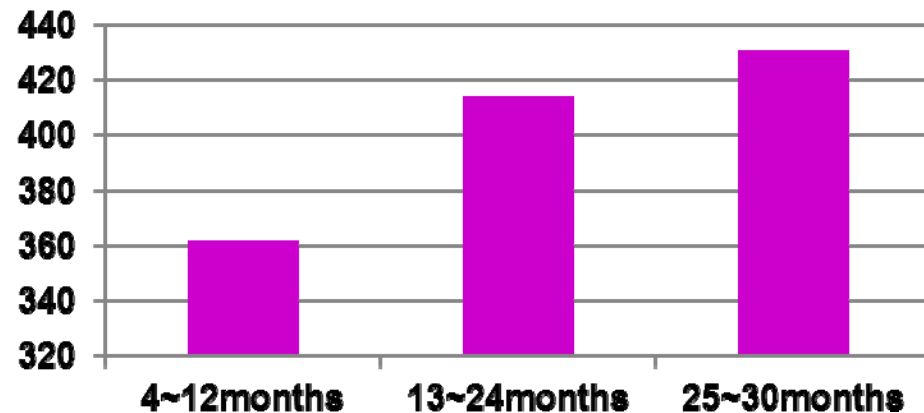
F=1.487
P=0.251

Adult-child conversational turns



F=0.309
P=0.738

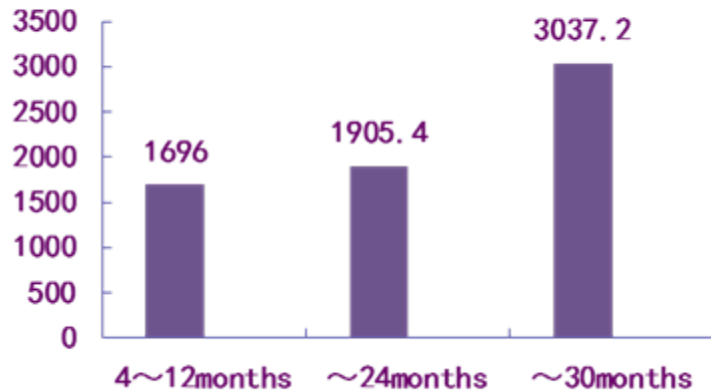
Adult-initiated conversational turns



Adult-child conversational turns and adult-initiated conversational turns demonstrate a growth trend with age.

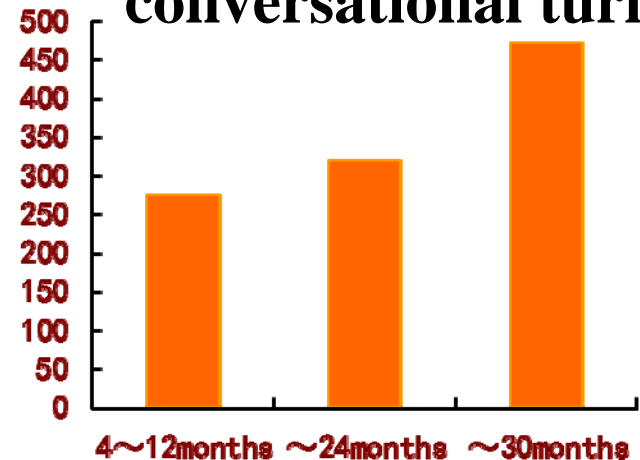
RESULTS

Child vocalization counts



$F=6.587$,
 $P=0.007$

Child-initiated conversational turns

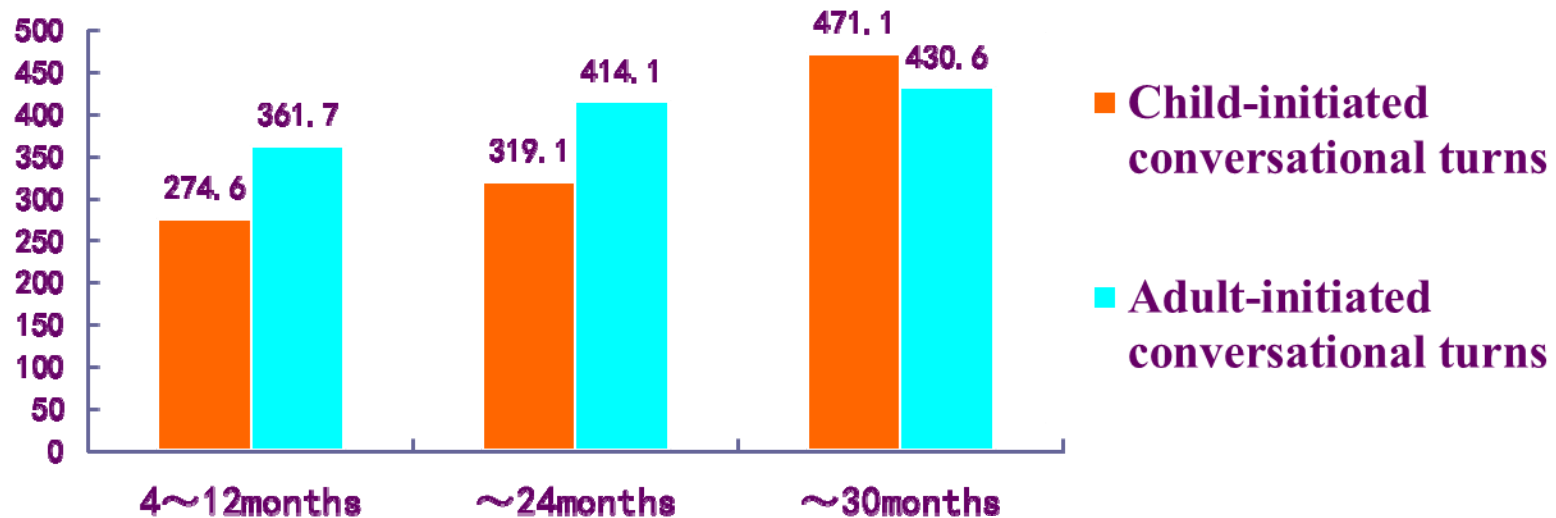


$F=4.231$,
 $P=0.030$

Child vocalization counts and child-initiated conversational turns increase with age.

RESULTS

conversational turns



Before 24 months adult-initiated conversational turns is higher than children's, the trend is reversed after 24 months.

RESULTS

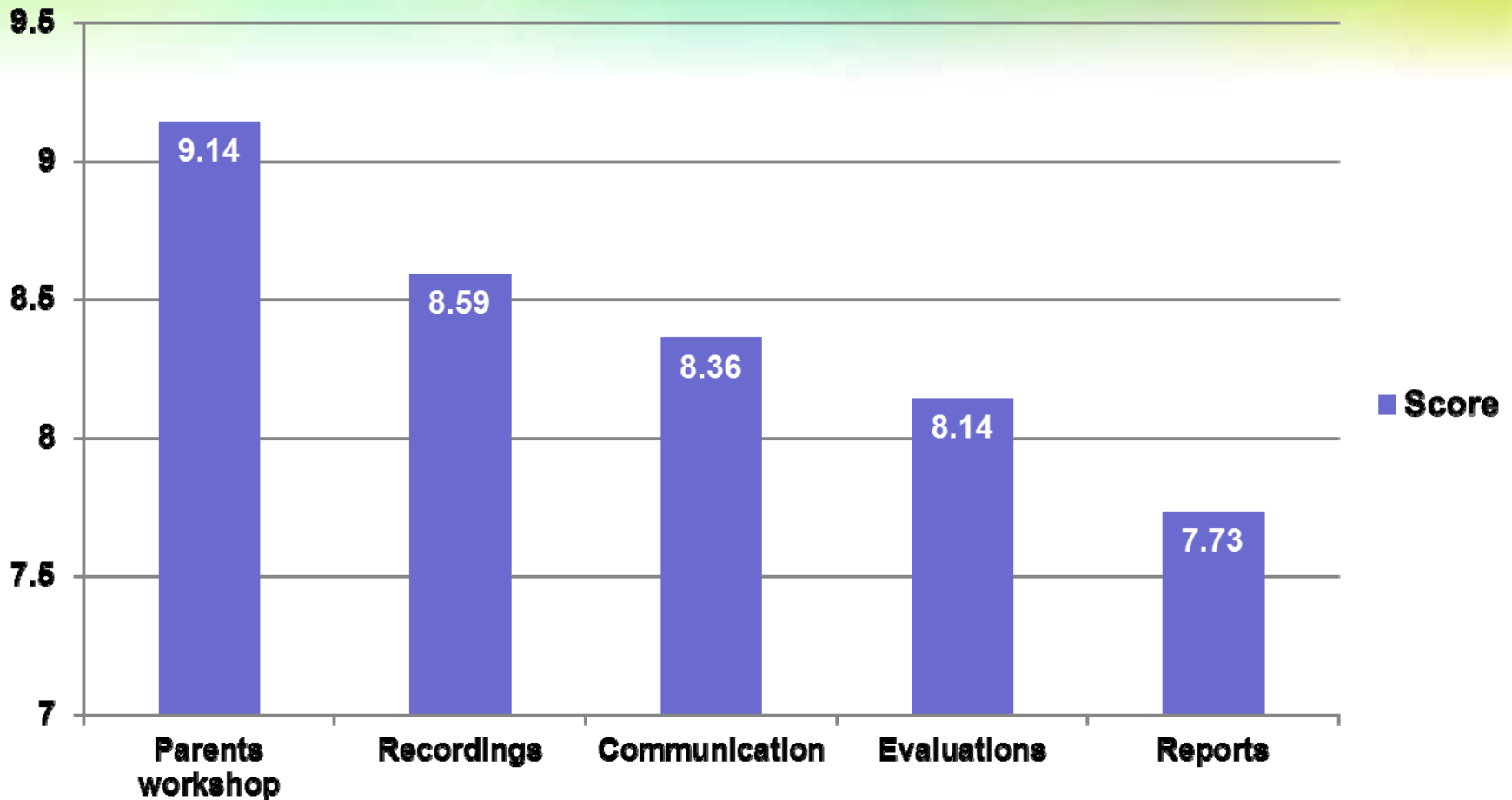
Table 3 The correlation of recording results with child language and cognitive development

Measure	Adult word counts	Adult-Child conversational turns	Controlling for child age	
			Child vocalization counts	Child-initiated conversational turns
Language expression score/ equivalent age	0.128/ 0.153	0.480* / 0.529*	0.658*** / 0.707***	0.603** / 0.670***
Language comprehension score/ equivalent age	0.051/ 0.064	0.418 / 0.424*	0.523** / 0.560**	0.485* / 0.491*
Nonverbal expression score/ equivalent age	0.161/ 0.163	0.224/ 0.278	-0.201/ 0.039	-0.125/ 0.022
Bayley MDI	0.013	0.322	0.525*	0.388
Bayley PDI	0.480*	0.431*	0.155	0.231

Notes: * means p<0.05
 ** means p<0.01
 *** means p<0.001

Adult-Child conversational turns and Child vocalization counts are correlated with expressive language ability.

FAMILY'S RANKING

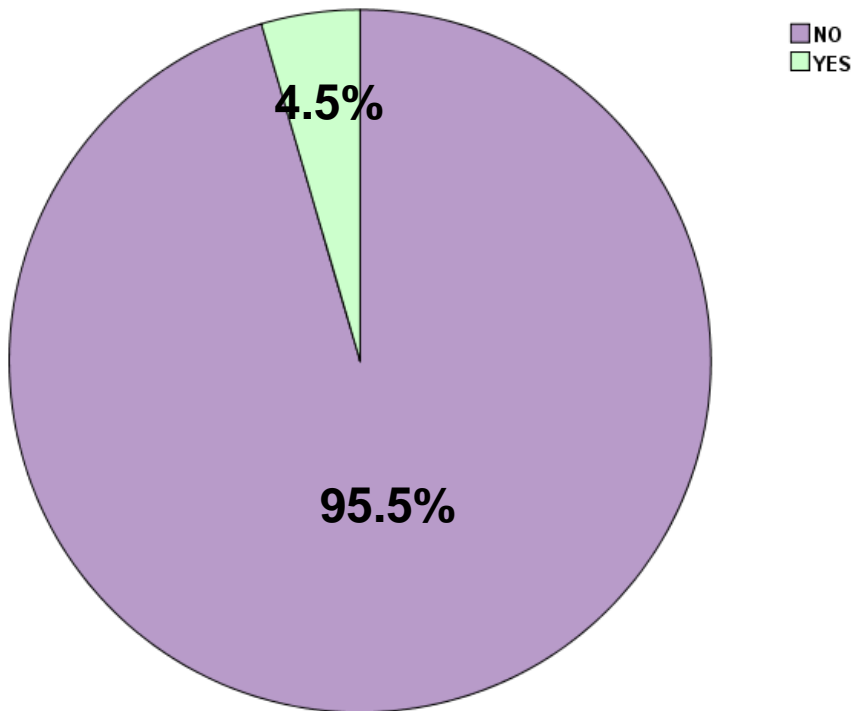


Families ranked the importance of intervention components for influencing their behavior

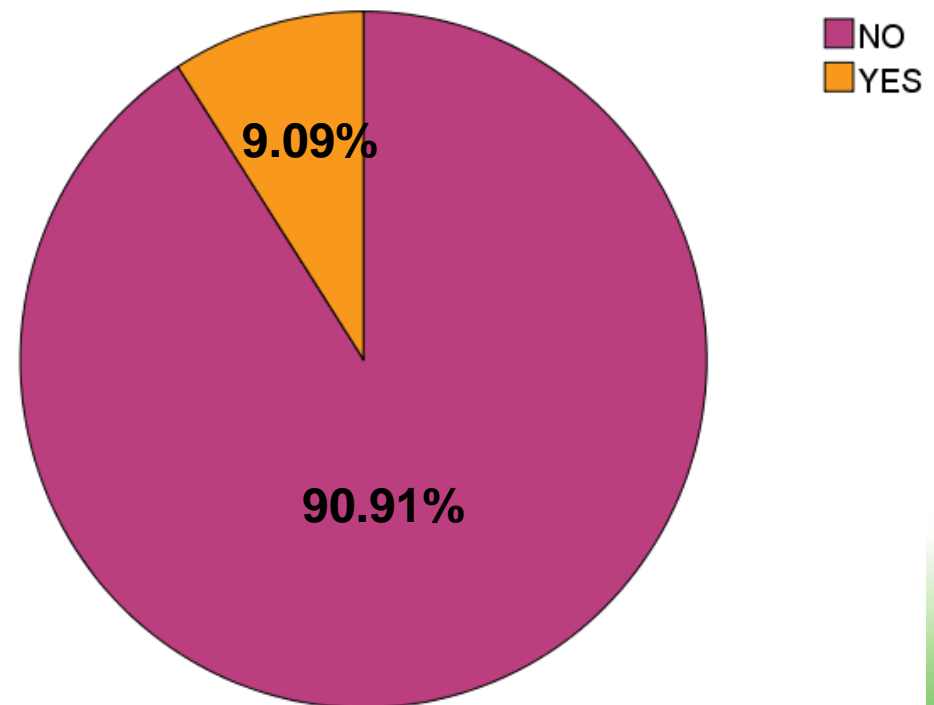
“0” means No~ “10” means the most

FAMILY'S REPORTS OF LENA PRACTICE

Affect family's daily life



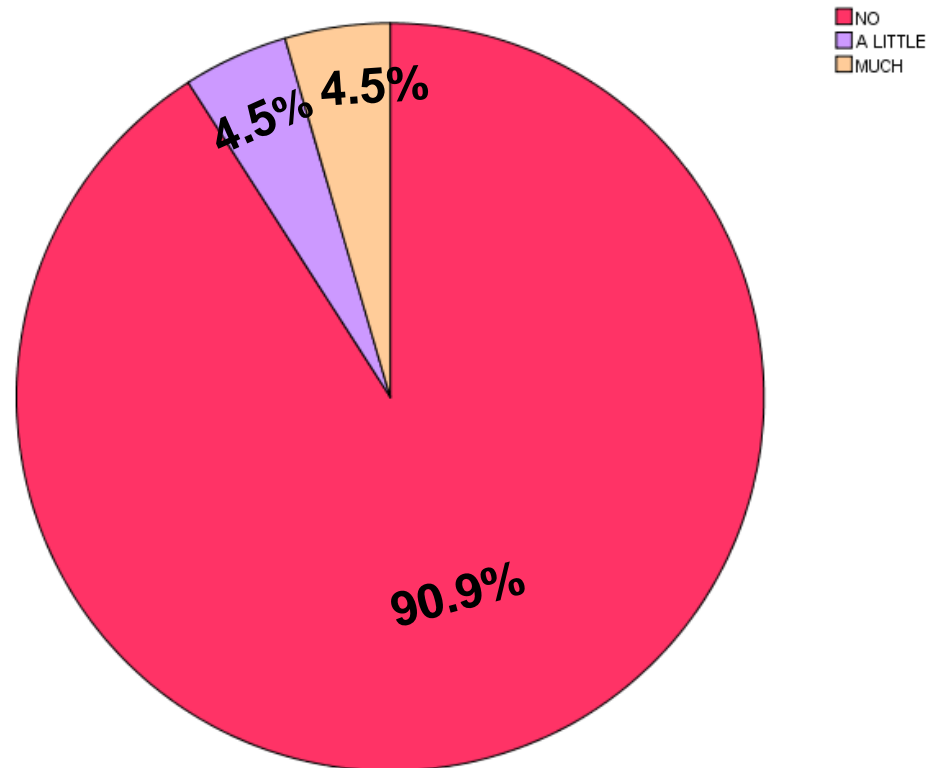
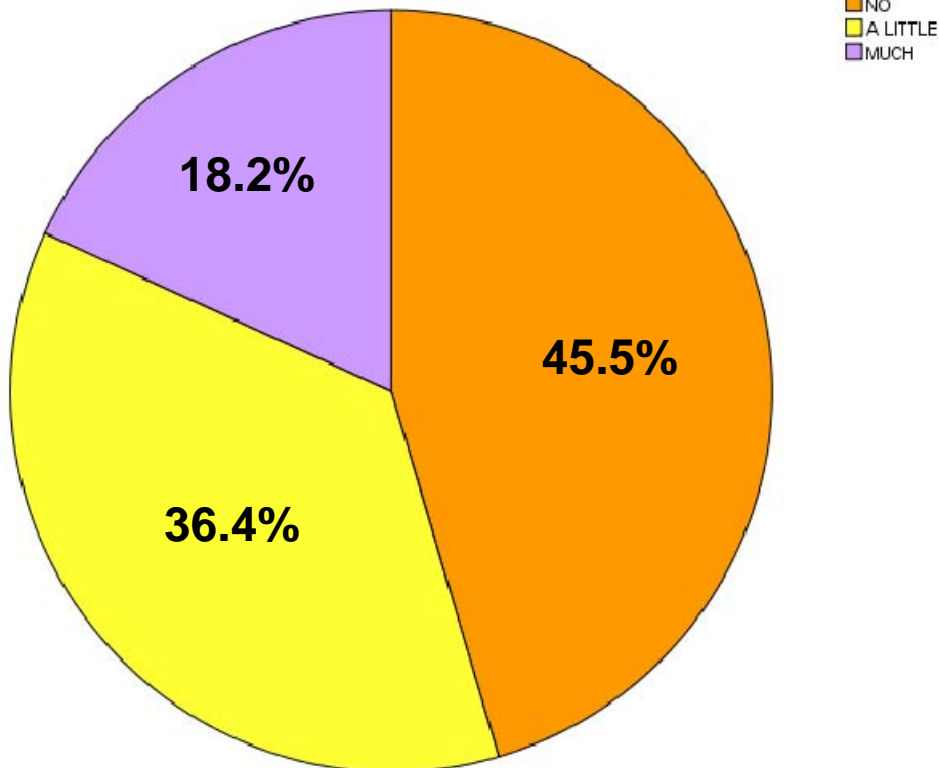
Worried about privacy



FAMILY'S REPORTS OF LENA PRACTICE

Inconvenient to wear LENA cloths

Inconvenient to do recordings



CONCLUSIONS

- **We have described characteristics of family responsiveness for infants and toddlers whose native language is Chinese.**
- **Family responsiveness is correlated with language and cognitive development in infants and toddlers in China.**
- **LENA is feasible in evaluating child language and cognitive development in China, and is well accepted by Chinese families.**

ACKNOWLEDGMENTS

- 22 children and their families

