

Thai Speech and Language Norms for Children 2½ to 4 Years of Age

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Objective: To create a Thai speech and language assessment tool and norms for children between 2½ and 4 years of age (TSLT2½-4).

Material and Method: The Thai speech and language assessment tool was created for children between 2½ and 4 years of age using existing Thai and English speech and language development theory, research results and tests. In order to validate the norms, the speech and language skills were prospectively assessed in 4,169 normal children representing the five regions of Thailand. Language quotients, percentiles and Conbrach's Alpha coefficients were calculated for use as a reference for Thai language development norms.

Results: Speech and language norms for children age 2½-4 years were presented. Most of the Cronbach's Alpha coefficients were good (equal or more than 70%).

Conclusion: The Thai speech and language assessment tools and norms are useful for the assessment of speech and language for children with risk for delayed speech and language development (e.g., individuals with cleft lip and palate, global development delay, autism) in Thailand. The norms can also provide the guideline for "intervention planning".

Keywords: Thai, Speech, Language, Norms

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A systematic literature review revealed the overall median prevalence of primary or specific speech and/or language delay was 6.0% (range, 1.4-19.0%) among children between 2 and 7 years of age⁽¹⁾. There have been no specific assessments of the prevalence of early language delay (ELD) or specific language impairment (SLI) in Thailand. The various speech clinics across the nation have published figures of the prevalence of delayed speech and language development (i.e., 23.4 to 46.8%), including patients with autism, brain damage, mental retardation, and hearing loss. The prevalence of children with ELD in speech clinics in Thailand is 6.0%⁽²⁾: approximately one-half of the children with ELD or SLI continue to be late bloomers while the other half have a persistent type of SLI. Many factors could serve as predictors of language

impairment, particularly ELD⁽³⁾. Early diagnosis of SLI would allow early intervention (EI), which could prevent language-related struggles, social failure, and the high cost of speech remediation during school period.

Children with ELD or SLI are at risk of social, emotional and behavioral problems and illiteracy (including both reading and spelling)⁽³⁾. Early diagnosis and intervention are necessary and these require an assessment tool(s) based on established norms. There are several tests available for the assessment of English speakers but resources for Thai speakers are limited. Language norms are needed to serve as guidelines and comparisons; thus, the development of a Thai-language assessment tool is urgently needed.

English language norms and international standard speech and language development tools are available for early assessment, e.g., the Preschool Language Scale: PLS-3⁽⁴⁾ and the Receptive-Expressive Emergent Test: REEL⁽⁵⁾. Based on the children's spoken language acquisition, the Child Talk Model assumes that early language learning includes

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the social and physical world (*viz.*, people, objects, events that involve them, sounds and gestures that characteristically accompany them and the vocal and gestural means by which a person can bring about desired results). The language learner, as a social being, has universal and individual characteristics. Thus, differences in language structures, culture, society and environment demand appropriate guidelines and tools for assessing speech and language norms.

Unlike English, Thai is a tonal language with sentences in a subject-verb-object structure. The subject is usually not explicitly stated but contextually assumed. The verb has no declensions, tense or conjugations. The object is also contextually assumed. Modifiers follow nouns (*e.g.*, dish small pink). There are no articles, so the definite/indefinite meaning is gathered contextually. Thus, direct translation of an English assessment tool into Thai version is inadequate as it misconstrues the linguistic structures and concepts of the original test and therefore sounds alien to the Thai context.

Some speech and language norms were already available for the Thai context for children between 2½ and 4 years of age. These existing Thai norms were, however, established for use with age-specific vocabulary sets and measurement of particular groups of words (*e.g.*, nouns, verbs, adjectives, adverbs and classifiers) among children 2 or more years of age and were not standardized with the exception of the *speech and language test and the norm for children between 0 and 2 years of age* which is based on the Thai language and culture⁽⁶⁾. This is currently available as a guideline for young children and for comparisons with other assessment tools.

The objective of this article was to establish a Thai speech and language tool and norms for children between 2½ and 4 years of age (*viz.*, TSLT2½-4) that would serve as a guide in intervention planning for children 2½ (TSLT2½), 3 (TSLT3) and 4 years of age (TSLT4).

Material and Method

A prospective cohort study was conducted. All 4,245 children, whose parents registered in the Prospective Cohort Study of Thai Children (PCTC) in Thailand's 5 regions, were included. The representative children included: 791 in Pranomtuan District, Kanchanaburi (central region); 1,076 in Thepa District, Songkla (southern region); 872 in Kranuan District, Khon Kaen (northeast region); 783 in Muang District, Nan (northern region); and 723 in one hospital in

Prayathai District, Bangkok.

Children born between October 15, 2000 and September 14, 2002, were recruited. Phase I of the longitudinal project (*in utero* to 2 years of age), influencing factors in family, community and environment, began in 2000. The children were followed-up for speech and language skills from age 2 to 4 years of age (*i.e.*, Phase II). Parental consent had been given for all of the children.

Inclusion criteria

The current research included all of the children enrolled in phase I and continued to phase II of the PCTC Project.

Exclusion criteria

Children were examined by a pediatrician at age one month and if any early significant health problems were detected they were excluded from this study. Problems included deficits of physical development, co-occurring cognitive, emotional, social, perceptual, neurological or other sensory deficits.

Of the enrollees, 24 fetuses died leaving 4,221 live births. Within one year of birth, 32 children had died and 11 children were withdrawn from the PCTC Project. Nine children had handicaps; including, microcephalus, hydrocephalus with ventriculoperitoneal shunt (VP shunt), cyanotic condition, bilateral ear malformation, cleft palate and muscle tone abnormalities.

The total remaining number of participants was 4,169 children. All of these children continued in the project until they were 3 years of age. Because the project's funding was limited and terminated in 2005, only the 872 children at the Northeast site (in Kranuan, Khon Kaen) were followed up for speech and language skills until they were 4 years of age (Fig. 1).

Creating the Thai Speech and Language Tool

The Thai Speech and Language Tool for children ages 2½ (TSLT2½), 3 (TSLT3) and 4 (TSLT4) years were created by reviewing: (1) existing non-standardized Thai language development tools and norms⁽⁷⁻¹⁸⁾, which served as information on Thai contexts for developing and creating a new tool and norm; (2) international speech and language tests^(4,5); and, (3) existing research on speech and language development and a developmental hierarchy of language⁽¹⁹⁻²⁵⁾. The initial version of the TSLT2½-4 was based on a combination of Thai and international age/

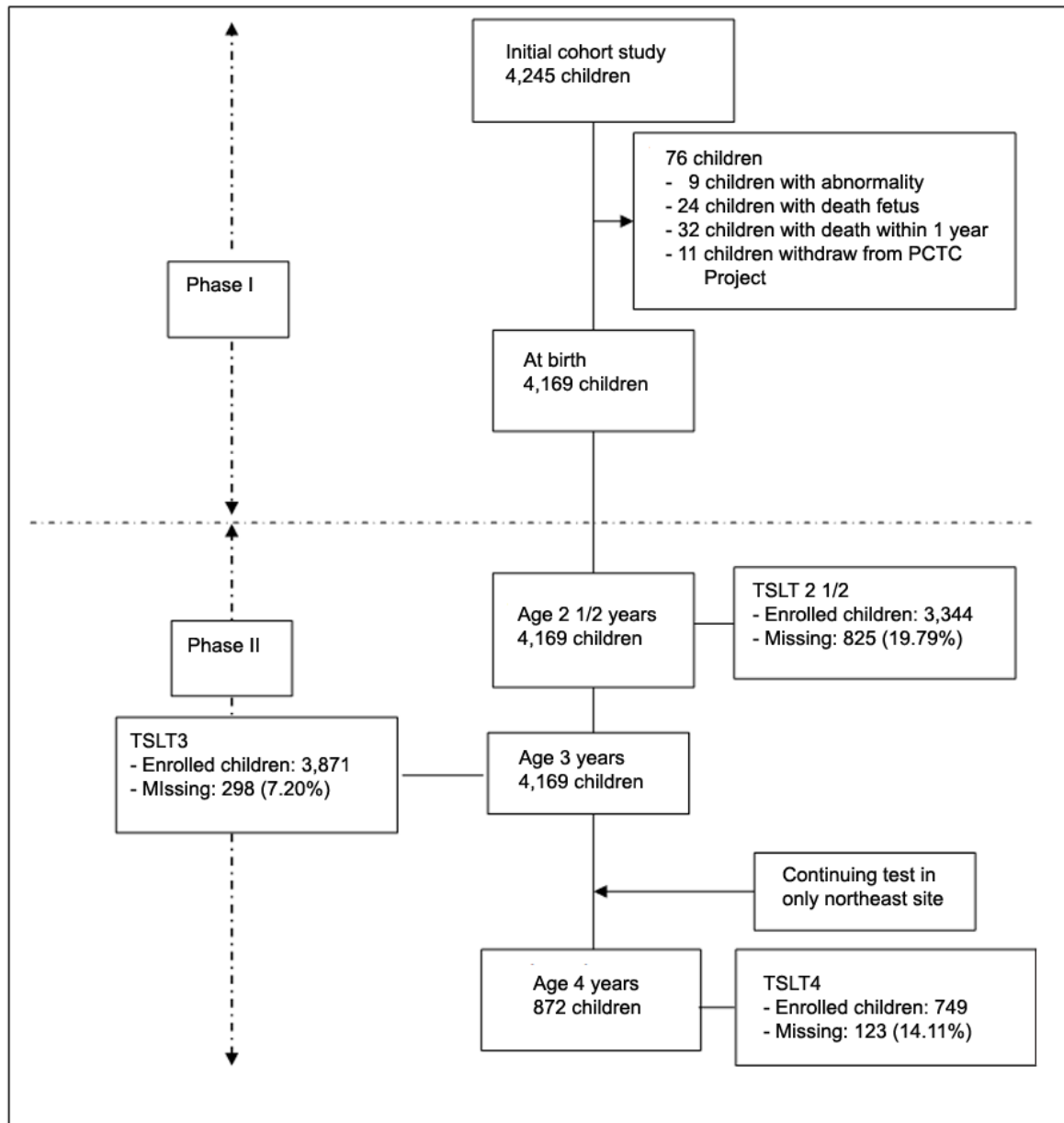


Fig. 1 Design outline

TSLT2½: Thai Speech and Language Test for Children aged 2½;

TSLT3: Thai Speech and Language Test for Children aged 3;

TSLT4: Thai Speech and Language Test for Children aged 4

developmental-based language levels (e.g., language tests for children ages 2½, 3 and 4 years, respectively). Content or face validity (i.e., full domain of concepts and their representation) and construct validity (i.e., theoretical principles related to concepts) were considered. After revision, the new test comprised a record form, a manual and instruments. The final version

of the TSLT2½-4 then underwent the two pre-tests.

The pre-tests

To establish validity, objectivity, difficulty, meaningfulness and reliability, two pre-tests of the TSLT2½-4 were conducted on groups of children (age group 2½, 3 and 4 years of age) who lived in the

same area as participants' area. Twenty-five typically developing children (TD) were in each age group: five each from the North, Northeast, West, South and Bangkok were tested. After the 1st pre-test, the tests were revised following suggestions and comments from the investigators, research assistants and caregivers. The 2nd pre-test was tested and revisions made. The tests included the instruments, record forms and manual.

The final version of the tests had two parts. Part I included general information on demographics and related factors (*e.g.*, the child's age, birth weight, birth order and household language), retrieved from the PCTC project's Phase I data base. Part II were the language tools for children between 2½ and 4 years of age, subdivided into expressive and receptive modalities:

Thai Speech and Language Test for Children aged 2½

The TSLT2½ test has 4 subtests (for a total 8 items) for expressive language and 4 subtests (22 items) for receptive language.

The expressive language test included: (1) nickname telling; (2) colour naming (*viz.*, red, black, yellow, green and white); (3) extent of language expression (average length of sentences: 2-3 word sentences); (4) ability of the child to name at least two needs such as milk/water and a hug.

The receptive language test included: (1) preposition use: put the cup under a chair, put a cup on a chair, put a cup in a box, give me a big cup, give me a small cup; (2) ability to follow commands: doing the Thai sign of respect (the *wai*), raising the hand, clapping the hands, opening the mouth, smiling, standing up, raising a leg, folding the arms across the chest, sitting down and waving bye-bye; (3) identifying the parts of the body: ear, eye, nose, mouth, hair, hand and foot.

Thai Speech and Language Test for Children age 3

The TSLT3 comprised 4 subtests (10 items) for eliciting expressive abilities and 4 subtests (10 items) for observing receptive abilities. The expressive language test includes: (1) prepositions: the car is on, under or in; (2) the functions of objects: like a toothbrush, dish and/or shoes; (3) describing a picture in complete sentences, based on a question "What is he/she doing?" Answer: "He/she is taking a bath, He/she is having a meal and He/she is brushing his/her hair"; (4) using the possessive pronoun: "Whose shirt is it?, Whose shoes are these?" (The child is to point

to a shirt or shoes). The receptive language test includes: (1) identification the 4 functions of common objects based on question "Point me the picture used for" (while presented pictures of a glass, a spoon, a shirt and a chair); (2) identification of adjectives from pictures (*viz.*, hot, long, fat) (3) identifying three parts of a car; and, (4) following two-step commands like the Thai respective *wai*/action, then, good-bye; clap your hand, then, raise your hand.

Thai Speech and Language Test for Children age 4

The TSLT4 expressive language test has 5 subtests (11 items) for eliciting expressive abilities and 3 subtests (7 items) to elicit receptive abilities.

The expressive language test includes: (1) 'What is your name?' (*i.e.*, first and last); (2) Answering questions relating to three comparative adjectives from real situations (*i.e.*, heavier-lighter, taller-shorter, more-less); (3) Answering three common problem solving queries (*i.e.*, 'If your hand is dirty, what do you do?', 'If you are cold, what do you do?', 'If you are sleepy, what do you do?'); (4) Answering two queries for complicated preposition (*i.e.*, Question: 'Where is the spoon/the comb?' Answer: 'in front/behind the doll'); and, (5) Answer questions after listening to a story about a picture: 'Why does Keaw have a toothache? If you don't want a toothache, what should you do?'

The receptive language test includes: (1) Doing actions for two prepositions: put the spoon *beside* the doll, put the car *next to* the spoon; (2) Identification of three comparative adjectives: 'Which one is heavy and Which one is light?', 'Which one is long?' and 'Which one is short?', 'Which one is more?' and 'Which one is less?'; and, (3) Follow 2 three-step commands in order.

Standardization study

All of the children were assessed for language skills at 2½, 3 and 4 years of age using the Thai Speech and Language Test (TSLT2½-4) for each age group. The TSLT2½ was administered for children of 2½ years, the TSLT3 for children of 3 years and the TSLT4 for children of 4 years of age. The test was administered whenever the child reached the target age (± 1 month). The time required for each test was between 45 and 60 minutes. A lengthier test time was allowed, or 2 re-tests used, if the initial test duration was > 60 minutes or the child had no responses.

Research assistant training

A workshop (based on theory, logic and

principles of data collection) was conducted for training 10 bachelor-level research assistants and 4 master's degree research assistants. We wanted 2 assistants and 1 research assistants for each study site. The assistants were introduced to Thai normal speech and language development and the assessment process using the TSLT2½-4; after which they practiced administering the test under supervision until competent. Every day, the leader of each site re-checked and observed each research assistant's performance during the testing using a standard record form. He/she made random, periodic checks to confirm the data from video record. If there was any inconsistent score, discussion and consensus were performed. The research assistants were able to consult with the researchers at any time for assistance or to ask the questions.

Main outcome

The main outcome of this study were scores of language skills at age 2½, 3 and 4 years of age. The language skill of each participant was scored by a research assistant. Each item for the TSLT2½, TSLT3 and TSLT4 was scored as fail = 0, pass = 1. The score for each item in the expressive and receptive language tests was summed for the total expressive (ELS) and total receptive (RLS) language score. The ELS and RLS were then summarized in the total combined expressive and receptive score (CLS). To facilitate comparisons with other populations and international tests, the language scores were transformed into language quotients and percentiles, by dividing by the age of each child in months and multiplying by 100.

$$\text{Receptive Language Quotient (RLQ)} = \frac{\text{Receptive Language Scores (RLS)} \times 100}{\text{Age (months)}}$$

$$\text{Expressive Language Quotient (ELQ)} = \frac{\text{Expressive Language Scores (ELS)} \times 100}{\text{Age (months)}}$$

$$\text{Combined language scores (CLS)} = \text{RLS} + \text{ELS}$$

$$\text{Combined language Quotient (CLQ)} = \frac{\text{CLS} \times 100}{\text{Age (months)}}$$

Statistical analysis

The data was scanned for consistency using Scanivet. The demographic characteristics were presented using descriptive statistics while the number and percentages were used to describe the categorical variables. Percentages were used to describe the general information and means and standard deviations (SD) for the language quotients. The 10th, 50th, 75th and 90th percentiles were calculated to standardize scores for comparisons with normal language skills. Cronbach's Alpha coefficient was used to test reliability.

Results

The characteristics of subjects are presented in Table 1. The proportion of males to females was about 1:1. Most of the children had birth weights within the normal range and the participants were 1st or 2nd in birth order. The household language was monolingual Thai. The socioeconomic status of the children's families averaged slightly below the poverty line, incomes in the 1st to 75th percentile. Most families had inherited property.

The mean, standard deviation (SD), median, minimum (Min) and maximum (Max) of the language quotients RLQ, ELQ and CLQ for the TSLT2½, TSLT3 and TSLT4 tests are presented in Table 2. The respective mean RLQ, ELQ and CLQ were 8.72-77.51 for children age 2½ years, 27.78-55.56 for 3 years and 14.58-37.50, based on language skills and the number of items used for testing. For simplification, the 10th, 25th, 50th, 75th and 90th percentiles of language skills at age levels are presented in Table 3. Language skills under the 75th percentile were generally considered to represent delayed speech and language development.

The Cronbach's alpha (correlation coefficients of reliability) for the expressive language test and the receptive language tests for children age 2½, 3 and 4 years ranged from 0.45 to 0.83 (Table 4). The coefficient of reliability for the receptive language for TSLT4 was fair and lower than the ones for language skills from the other age groups.

Discussion

The ELQ, RLQ, and ELQ had the scoring similar to the scoring from the standard English tests such as the Preschool Language Scale 3⁽⁴⁾, Receptive-Expressive Emergent Language Test⁽⁵⁾ Even though these scores are not directly compared each other because they were developed based different contexts, they are used to assess language skills for children with risk for delayed speech and language development and be a guideline for early intervention for these children. This study showed most ELQs were low compared to RLQs, as *per* the natural pattern of speech and language development since young children tend to have better receptive than expressive language⁽²²⁻²⁵⁾. A direct comparison between the RLQ and ELQ cannot be made given the difference in the maximum scores and quotients are used.

Most of the Cronbach's Alpha (correlation coefficients of reliability) for the expressive language and the receptive language tests for children age 2½, 3 and 4 years of age were generally good to very good

Table 1. Demographic characteristics of the children studied

Factors	Percentages		
	2½ years (n = 3,344)	3 years (n = 3,871)	4 years (n = 749)
Birth weight (grams)			
855-2,499	8.30	8.40	10.40
2,500-5,220	91.70	91.70	89.60
Gender			
Male	49.60	49.70	48.20
Female	50.40	50.30	51.80
Birth order			
1 st -2 nd child	85.50	79.90	90.10
3 rd -4 th child	12.0	15.50	9.20
5 th child or higher	2.50	4.60	0.80
Socioeconomic status			
Insufficient	29.50	33.0	43.60
Slightly insufficient	52.90	51.0	45.70
Enough or more	17.70	16.0	10.80
Number of languages spoken at home			
One	84.0	85.30	89.70
Two or more	16.0	14.70	10.30

Table 2. Mean (SD) of receptive, expressive and combined language quotients for children at each age level

Language quotients	Number	Full score	Mean	SD	Median	Min	Max
2½ years							
RLQ	3344	73.33	68.78	5.68	70.0	0	73.33
ELQ	3344	23.33	8.72	4.42	6.67	0	23.33
CLQ	3344	96.67	77.51	8.08	76.67	0	96.67
3 years							
RLQ	3871	27.78	20.80	6.17	22.22	0	27.78
ELQ	3871	27.78	15.42	7.99	16.67	0	27.78
CLQ	3871	55.56	36.21	12.65	38.89	0	55.56
4 years							
RLQ	749	14.58	10.65	2.49	10.42	0	14.58
ELQ	749	22.92	14.43	5.69	14.58	0	22.92
CLQ	749	37.50	25.08	7.20	27.08	0	37.50

RLQ: Receptive Language Quotient, ELQ: Expressive Language Quotient, CLQ: Combine Language Quotient

(equal or more than 70%), with the exception of the receptive part for children age 4 years, which was fair (45%) (Table 4). Perhaps the language skills for testing children at this age, especially items in the receptive test, need more attention and cooperation. Thus, careful interpretation of the results and comparisons with other

receptive language tests are needed. The receptive part of TSLT4 should, therefore, be concerned with interpretation and further development.

Clinicians can use the language norms for a comparison of language skills in children at risk of delayed speech and language development; such as

Table 3. Receptive, expressive and combine language quotients of children at each age level based on percentiles

Language quotients	Number	Percentiles				
		10	25	50	75	90
2½ years						
RLQ	3,344	63.33	66.67	70.0	73.33	73.33
ELQ	3,344	6.67	6.67	6.67	10.0	13.33
CLQ	3,344	70.0	73.33	76.67	80.0	86.67
3 years						
RLQ	3,871	13.89	19.44	22.22	25.00	27.78
ELQ	3,871	2.78	11.11	16.67	22.22	25.0
CLQ	3,871	19.44	30.56	38.89	44.44	50.0
4 years						
RLQ	794	8.33	10.42	10.42	12.50	12.50
ELQ	794	6.25	10.42	14.58	18.75	20.83
CLQ	794	14.58	20.83	27.08	29.17	33.33

Table 4. Cronbach's alpha coefficients of speech and language tests for each age category

Age	Language	Item numbers	Coefficients
2½ years	Receptive	22	0.71
	Expressive	7	0.77
3 years	Receptive	10	0.77
	Expressive	10	0.83
4 years	Receptive	7	0.45
	Expressive	11	0.78

children with cleft lip and palate, global development delay or autism. If their language skills fall below 1.5-2 SD of the speech and language norms or below the 75th percentile of the norms, they might be at risk for delayed speech and language development and need further investigation^(10,21). The data can be also used as a guideline for “intervention planning”. Remediation should focus on items in which children fail to reach normal language skill.

Conclusion

The TSLT2½-4 for children between 2½ and 4 years of age was developed from existing information of speech and language tests. This tool should be part of a battery of tests used as a guideline for clinicians and professionals in Thailand assessing and planning intervention for children with delayed speech and language development. The tool might also be useful as a tool for developing language tests in other

countries that have a similar language context and culture (*e.g.*, Laos, Myanmar, Cambodia).

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การพัฒนาการพูดและภาษาไทยปกติของเด็กอายุ 2½ - 4 ปี

เบญจมาศ พระธานี, ปรียา หล่อวัฒนพงษ์, กัลยาณี มกรากิรมย์, วรวรรณ วัฒนาวงษ์สว่าง

วัตถุประสงค์: เพื่อสร้างแบบประเมินการพูดและภาษาและหาค่าปกติของเด็กอายุระหว่าง 2½-4 ปี

วัสดุและวิธีการ: แบบประเมินการพูดและภาษาของเด็กอายุระหว่าง 2½-4 ปี ได้ถูกสร้างขึ้นจากข้อมูลที่เกี่ยวข้องกับการพัฒนาภาษาและการพูดงานวิจัยและแบบทดสอบทั้งภาษาไทย และภาษาอังกฤษที่มีอยู่ในปัจจุบันด้วยการประเมินทักษะทางการพูดและภาษาของเด็กปกติจำนวน 4,169 คน จาก 5 ภูมิภาคของประเทศไทย คือภาคกลาง ภาคเหนือ ภาคตะวันออกเฉียงเหนือ ภาคตะวันตก และภาคใต้ เพื่อหาค่าคะแนนการพูดและภาษาปกติโดยแสดงเป็นค่าคะแนนมาตรฐาน เปอร์เซ็นไทล์ และค่าสัมประสิทธิ์ของ Cronbach's Alpha

ผลการศึกษา: ได้ค่าคะแนนการพูดและภาษาปกติของเด็กอายุ 2½-4 ปี และพบว่าค่าสัมประสิทธิ์ของ Cronbach's Alpha ส่วนใหญ่อยู่ในเกณฑ์ดี (เท่ากับหรือมากกว่า 70 %)

สรุป: แบบประเมินการพูด และภาษาและค่าคะแนนปกติเป็นสิ่งที่มีความประโยชน์ในการประเมินเด็กที่มีความเสี่ยงต่อภาวะพัฒนาการพูดและภาษาล่าช้าในประเทศไทย (เช่น เด็กปากแหว่งเพดานโหว่ พัฒนาการช้าทุกด้าน ออทิสซึม เป็นต้น) และยังเป็นแนวทางในการวางแผนการฝึกพูดได้อีกด้วย
