CHAPTER 3

RESEARCH METHODOLOGY

The aim of this research was to examine the validity and reliability of the DTVP-2 and to determine the normative values of the DTVP-2 in Thai Children. Approval was secured for the research ethics by the Ethics committee at the Faculty of Associated Medical Sciences, Chiang Mai University (See Appendix A). The study was divided into 3 phases: (See Figure 3.1). 1) forward-backward translation of the DTVP-2, 2) examination of the validity and reliability of DTVP-2, and 3) determination of the normative values of the DTVP-2 in Thai children.

3.1 Phase one: Forward-backward translation of the DTVP-2

Phase one involved 2 stages: 1) the forward translation of the DTVP-2 and 2) the test-trial of the Thai version of the DTVP-2 (Thai version). The details of each stage are explained below:

3.1.1 Stage one: the forward-backward translation of the DTVP-2. (This translation method applied - the guidelines of the process of forward-backward translation provided by WHO, 2011)

1. The researcher requested permission from Pro-ed, an international publisher, who is the patent holder of the DTVP-2 in the United States regarding translation into a Thai version (See Appendix B).
2. A forward translation of the DTVP-2 was translated from English into Thai by the researcher.
3. An expert panel was held separately by three Occupational therapists who are specialized in occupational therapy working with children for over 10 years (See Appendix C).

4. The back translation of the DTVP-2 was being back translated to English by a translator who is a native speaker, fluent in Thai and English and without any experience of the DTVP-2.
5. The DTVP-2 (back translation version) was then taken to the thesis advisors for discussion, and checked for any differences between the original version and back translation versions.
6. After that, the Thai version of the DTVP-2 was reviewed again for eventual corrections by the researcher.

3.1.2 Stage two: Test-trial of the DTVP-2 (Thai version)

The test-trial of the Thai version of the DTVP-2 (Thai version) was conducted to find errors for correction. A purposive sampling of 5 children was conducted. These children were of normal development (aged between 4 – 10 years and 11 months) and their parents approved of the sample participation (See Appendix D).

3.2. Phase two: Examination of the validity and reliability of the DTVP-2 (Thai version)

In phase 2, there were three main stages of the research procedures: 1) to examine the validity of the DTVP-2 2) to examine the reliability of DTVP-2 and 3) selection and training of examiners. The details of each stage are explained below:

3.2.1 Stage one: Examining the validity of the DTVP-2 (Thai version)

The researcher had the content validity examined by presenting the Thai version of the DTVP-2 to the three reviewers for separate consideration in order to have them score each subtest of the DTVP-2 and for recognition and resolution of concepts that were still insufficiently communicated after translation.

The scoring of each subtest of the DTVP-2 was conducted by three reviewers in order to collect the data for examination of the Index of Conjugate (IOC). Each subtest should have an Index of Conjugate (IOC) at 0.5 or above according to the standard (Ruedjaroon, 2011).

3.2.2 Stage two: Examining the reliability of the DTVP-2 (Thai version)

Test-retest reliability of the DTVP-2 was studied as it applies to Thai children (n=70). The interval between this test and the previous test was about 2 weeks (Srisuk, 2000), then the Pearson Product-Moment correlation was calculated. The participants in this stage were selected by purposive sampling from Wat Dan Rama III School in Bang Pong Pang, Yanawa, Bangkok. It is a primary school under the Office of the Basic Education Commission, Bangkok. Through simple sampling, classrooms and students between 4 years and 10 years and 11 months of age were selected. Each of the seven groups were made of 10 children each, with an equal number of boys and girls by age and gender.

Inclusion criteria to select children participating in the sample groups:

- They are between 4 years and 10 years and 11 months old.
- They are Thai nationals.
- They have not been diagnosed with any sensory problems, physical or intellectual disabilities, they must have been born full-term, and have no significant medical history confirmed by the following screening tests: 1) Developmental history, 2) Academic performance checklist and 3) Evaluation of sensory profile (ESP).
- They have their parents' permission confirmed in a consent form.

Exclusion criteria for children to be left out of the sample groups:

- Children who were unable to complete the test due to an exception or sickness. Subjects were excluded based on an interview with the researcher, observation or teacher's report.

3.2.3 Stage three: Selection and training of examiners

This stage involved training with 2 examiners who were graduated from Department of Occupational Therapy Chiang Mai University. Additionally, they were trained once again by the researcher in the administration of the DTVP-2 and scoring the test. The training was done in the same room where the explanation procedures and children evaluation demonstrations for examiners were held. Next,

each person was trained to test three children while observing the other examiner. Therefore, the testing was conducted on 6 children in total. During this process the researcher evaluated each person until they qualified.

3.3. Phase three: Determination of the normative values of the DTVP-2 in Thai Children

There were three stages involved in phase 3: 1) sample selection 2) data collection and 3) data analysis. The details of each stage are explained below:

3.3.1 Stage one: Sample selection

The study population was composed of Thai children studying in school under the Office of Basic Education in 2011, between 4 years and 10 years 11 months of age, from a total of 3,619,423 persons (Basic Education, 2011). The specific sample group was determined through calculations to find a sample size with precisely 95% reliability and 0.03% error (Yamane, 1973). Therefore, the sample group[1] was composed of 1,111 children. However, in order to divide the children in each province equally, 1,120 children were given the test. Once the sample group was selected, Multi-stage Random Sampling was utilized with the following processes:

1. Cluster sampling by dividing the population by areas, namely the 5 regions of Thailand: the North, the Northeast, the South, Central and Bangkok.
2. Purposive sampling was conducted in each province from each region of Thailand except Bangkok: Selected provinces included Chiang Mai in the North; Nakorn Ratchasima in the Northeast; Songkla in the South; and Samutprakan in Central Thailand. The purpose was to obtain a sample group in each area that represented the characteristics of the different populations and school sizes.
3. Simple random sampling was used to select a primary school in each province and in Bangkok by size: small, medium, large, and

[1] Inclusion criteria and exclusion criteria for sample selection were applied during this stage, which was the same as examining the reliability of DTVP-2

extra-large (Ministry of Education, 2010). Each type of school had the following number of students:

3.1 Small size: 1 – 120 students

3.2 Medium size: 121 – 600 students

3.3 Large size: 600 – 1,500 students

3.4 Extra-large size: over 1,500 students

4. Simple random sampling was used to select the children from each of the 5 provinces, and divided into 224 students equally through the following methods:

4.1 Survey of the population from each province and each type of school, selected sampling with 15% of the population from small and medium sized schools and 10% of the population from large and extra-large sized schools by using a proportion of the population (Sungsudthipong, 2012).

4.2 Chosen samples would be utilized after surveying the population. The sample group had to be more specific; 224 students from each region of Thailand, divided into 7 age ranges with 32 students per range.

4.2.1 In order to get an accurate sample group from each school, A Sampling Weight Computation was applied at this stage (Policy and Statistical Techniques Bureau, National Statistical Office Thailand, 2010).

4.2.2 Selecting classrooms from each school by simple sampling.

4.2.3 Selecting children from each classroom by counting them from 1, 3, and 5 (Both boys and girls) until the number for the sample group was completed in each school.

Table 3.1 Research data from the sample by province, size of school and sample group of each school

Province	School size	Number of children (N)	Name of Schools	Number of Sample	Chosen Sample (n)
Bangkok	Small	-	-	-	-
	Medium	543	Wat Sommanat	54	18
	Large	1264	Samsen Kindergarten	190	65
	Extra-large	2753	Praya Thai	413	141
				657	224
Chiang Mai	Small	105	Wat Pra Non	11	5
	Medium	254	Kam Tieng Anusorn	25	11
	Large	723	San Patong	108	49
	Extra-large	2340	Chiangmai Kindergarten	351	159
				495	224
Nakorn Ratchasima	Small	111	Chumchon Ban Petch	11	5
	Medium	297	Taw Sura Naree	30	15
	Large	872	Thai Wattana Pracharat	131	63
	Extra-large	1940	Muang Nakorn Ratchasima	291	141
				463	224
Songkhla	Small	95	Wat Pho Klang	10	4
	Medium	421	Songkla Pattana Panya	42	18
	Large	756	Ban Kuan Nieng	113	48
	Extra-large	2409	Songkla Kindergarten	361	154
				526	224
Samutprakarn	Small	96	Wat Sawang Arom	10	5
	Medium	258	Klong Samrong	26	12
	Large	846	Wat Namdaeng	127	59
	Extra-large	2104	Wat Dansamrong	316	148
				479	224
Total				**2620**	**1120**

3.3.2 Stage two: Data collection

1. The researcher collected the data from the sample group, starting with the first process. The following steps were included in the data collection process: the researcher presented the research proposal to the Ethics committee at the Faculty of Associated Medical Sciences, Chiang Mai University for review and approval of the research proceedings (See Appendix A). After approval the researcher contacted and asked permission from selected schools by sending letters.
2. The researcher selected the sample group from each school that complied with the inclusion criteria and asked permission from parents.
3. Examiners proceeded to collect the data. The effectiveness of testing locations was also a factor for the test, and students were provided with good environments that had silence, proper lighting, privacy and comfort. It was a individual test; 1:1, with only the examiner and student. Building a good relationship with the student and observing the student's anxiety level were emphasized. The administration was stopped when the student showed signs of fatigue or decreased attention to the test. The examiner could praise and encourage the student, but would not lead.
4. Evaluation was conducted according to the following hierarchy: (1) Eye-hand coordination (2) Position in space (3) Copying (4) Figure-ground (5) Spatial relation (6) Visual closure (7) Visual–motor speed (8) Form constancy

3.3.3 Stage three: Data analysis

The researcher checked all of the data collected from the test, and proceeded to score the test and analyze the data by using Statistical Package for the Social Sciences (SPSS) program. The information is presented as follows:

1. Descriptive statistics consist of general information of the characteristics of the sample, such as age, gender, handedness, residence and geographical areas.
2. Test Scores and Interpretation, the DTVP-2 has the following five types of scores (Hammill, Pearson & Voress, 1993):
   - 2.1 Raw scores are the total number of points that a child scored for the items of a subtest.
   - 2.2 Age equivalents (Visual perception age) are derived by calculating the average normative group score at each 6 month interval.
   - 2.3 Percentiles or percentile ranks represent values that indicate the percentage of the distribution that is equal to or below a particular score.
   - 2.4 Subtest standard scores provide an indication of the child's subtest performance. Standard scores allow examiners to make comparisons across subtests. A standard score (or scaled score) is calculated by taking the raw score and transforming it to a standard scale. A standard score is based on a normal distribution with a mean and a standard deviation.
   - 2.5 Composite quotients are derived by the sum of the 8 subtest standard scores and converted to a quotient by applying a standard score having a mean of 100 and standard deviation of 15. The sum of the total scores for the 8 subtests is 160, therefore the median is 80, and its equivalent to the quotient is at 100.
3. The SPSS program has the following analysis process:
   - 3.1 Computing raw data to find standard scores and percentiles by fixing 6 months as the age interval for 4 – 7 years 11 months, and 1 year as the age interval for 8 – 10 years 11 months.

3.2 Converting sums of standard scores to composite quotients.

3.3 Converting raw scores to age equivalents for subtests.

3.4 Conducting interpretation of standard scores and composite quotients based on normal distribution.

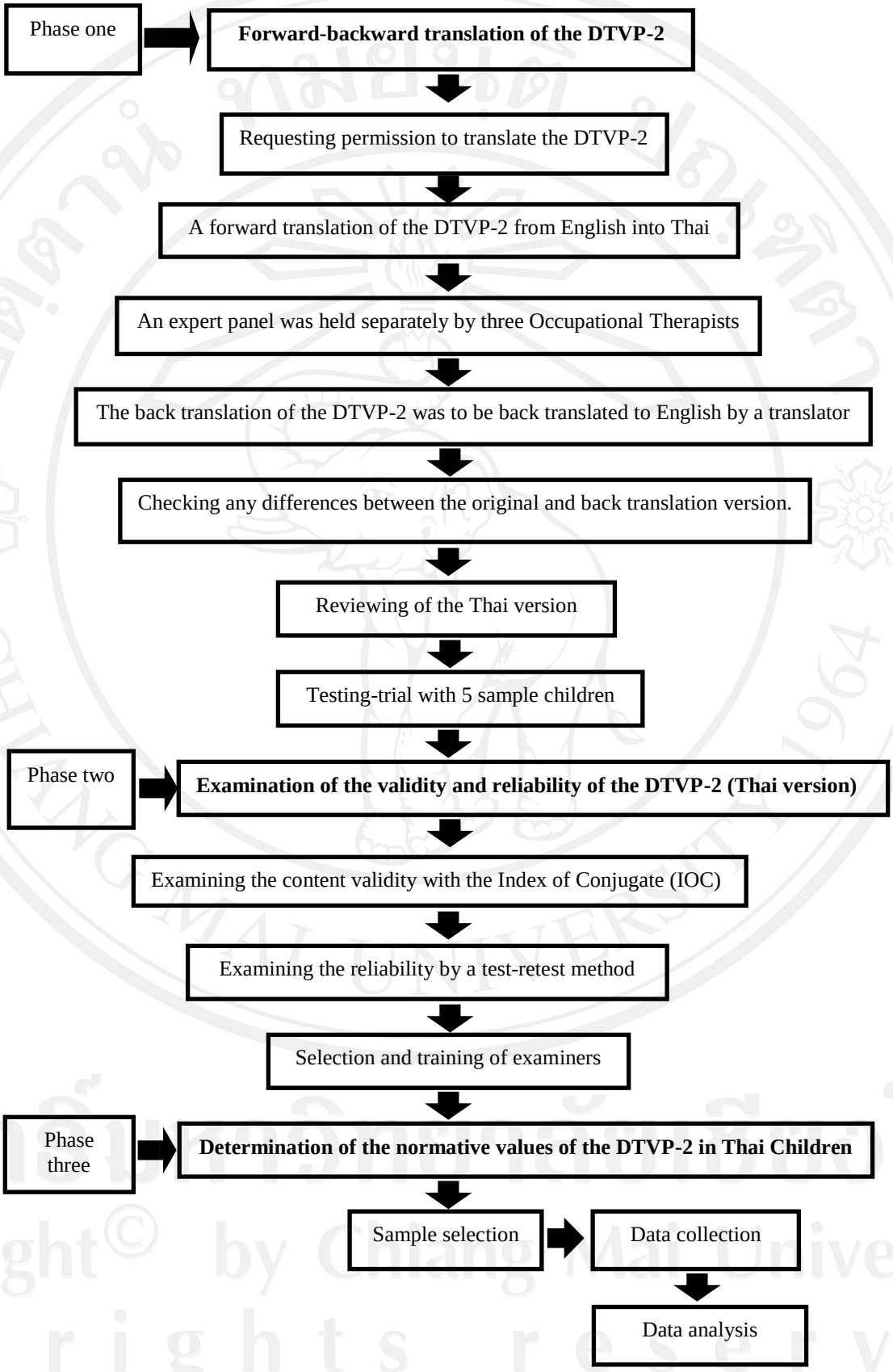

Figure 3.1 Research process