CHAPTER 3.

RESEARCH METHODOLOGY.

3.1: INTRODUCTION.

This study was undertaken to test the reliability of the MVPT-3 when the test instructions were presented in Afrikaans to an 8 year 0 month – 8 year 11 month Afrikaans speaking population, results were then compared to that of the American English speaking population. This was done so as to ensure that when the MVPT-3 instructions were translated into Afrikaans, the test continues to accurately identify problems in visual perception.

3.2: RESEARCH DESIGN.

A comparative study was undertaken. This design was selected to test the hypothesis that translating the MVPT-3 instructions into Afrikaans would not influence the reliability of the test, when presented to an 8-year-old group of South African children when compared to the American sample of the same age.
3.3: RESEARCH PROCEDURE.

Figure 3.1: Research Procedure.
3.3.1: PERMISSION OBTAINED.

Before this study could be undertaken written permission had to be obtained from the Canadian Publisher to translate the test instructions into Afrikaans as this infringed on the copyright of the test. (Appendix A.1) Permission was also obtained to enable the researcher to use their data in order to do the comparison as required by the study. (Appendix A.2) Within a week an answer was obtained giving the researcher the required permission. (Appendix A.3) (Figure 3.1: 1)

3.3.2: SUBJECT SELECTION.

Permission was requested from the Gauteng Department of Education for the research to be undertaken in Gauteng primary schools (Figure 3.1: a) (See Appendix B) Once permission was granted, ten Afrikaans speaking primary schools from the east of Pretoria were randomly selected (Figure 3.1: b) by going down the list of the primary schools in the telephone directory and selecting every second school, (from different suburbs within the Pretoria east area) from the higher to lower income areas. The researcher and statistician decided on this procedure, to ensure a good distribution of the sample. The researcher then wrote to the headmasters of the selected schools to explain the research. (Figure 3.1: c) (See Appendix C) The letter was followed up by an interview with the headmaster and heads of grade two to explain the research. (Figure 3.1: d) Although ten schools were approached the headmasters of only nine gave their permission for the study to be conducted in their schools. The sample of 8-year-old children was then selected from these nine schools. (Figure 3.1: e)
The 8-year-old age band was selected because at this age the children were settled in their second year of school (Grade two), the teachers were familiar with the child, and children in this age group are most commonly referred to an occupational therapist for treatment. This is also the developmental age mentioned by Zeitschel, Kalish, Colarusso where the development of visual perception is most active.

The inclusion criteria for the children were that they had to be 8 years old, and be first language Afrikaans speakers. As a true representative sample of the normal 8-year-old population in the area was required, it was decided not to exclude children with known learning problems as a normal population of 8-year-olds would have a certain percentage of learning disabled children in it.

The exclusion criteria were:

- any child whose parents did not give permission, by not returning the letter of permission.
- any child who did not want to participate for his own reasons.

All the children in the grade two classes at the nine participating schools were given information letters and parent consent forms to take home. (Figure 3. 1: d) (See Appendix D) 990 letters were sent out.

Each returned consent form (see Appendix E) was then given a number and the child’s name and number was entered onto a list. From then on the child could only be identified using the number. The list with the names and numbers remained with the researcher so
that no one else could identify the child. This was done for ethical and confidentiality reasons. The list was also used later in order to send the parents feedback.

The number of returned consent forms was then divided by 80 resulting in every 5th child being identified for testing. (Figure 3. 1: e) A sample of 80 Afrikaans first language children aged 8 years 0 months to 8 years 11 months was thus selected. The statistician determined that this figure would give a reliable statistical result when compared to the research done by Colarusso and Hammill. Where the schools were bigger, or where the response of the parents had been greater there was a greater number of children that were evaluated in that particular school. The 6th or 4th child was evaluated if the 5th child was too young, or sick on the day of the testing.

3.3.3: MEASUREMENT INSTRUMENTS.

1. **Background Information questionnaire**, (at the top of the parent consent form) was given to the parents together with the consent form asking for the following information. (See Appendix E)
   - The child’s date of birth,
   - Mother language,
   - Whether the child had ever been diagnosed with hyperactivity, reading problems, mathematical problems or visual problems. A visual problem included if the child wore glasses or not.

2. **The Motor-Free Visual Perception Test, Third Edition (MVPT-3)** is an individually administered test designed to assess overall visual perceptual ability.
in individuals aged 4 years 0 months through to 95 years old. The visual perceptual tasks included in the test demand a number of visual processes including spatial relationships, discrimination, figure-ground, closure and visual memory. Performance in these processes provides a single score that represents the individual’s general visual perceptual ability. (See Appendix F – Answer/scoring sheet)

The test consisted of 40 test items. Each item was presented in a multiple-choice answer format, with the correct answer selected from four choices arranged horizontally across the page. (See Appendix G) The child identified the answer by the symbol under each alternative or by pointing to the answer. The only motor involvement that was required was when the child either pointed to the correct item or said the letter that was under the item. A point is given for each correct answer and the raw score is the total number of correct responses the child obtains. (See Appendix F)

The MVPT-3 was originally designed to be a tool that could be used by teachers, psychologists, occupational therapists, educational specialists and optometrists to give a quick, reliable idea of the visual processing abilities of children and adults. It was designed to be a tool that could be used for screening, diagnosis and research purposes. The test was based on the assumption that visual perceptual abilities normally mature by the age of 12 years, and using this assumption the authors standardised the test from 4 until 95 years.
The norms of the MVPT-3 were derived from a sample of 1856 American individuals. The individuals came from both the urban (76.8%) and rural (23.3%) areas and were aged from age 4 years to 95 years old. There were 141 children in the 8-year-old age group who were tested for the standardisation of the test. Those in the sample were from all ethnic groups in the American society with 51.8% female and 48.2% male.

The authors examined the reliability of the test by evaluating its internal consistency and temporal stability. They concluded that the MVPT-3 could be used with confidence with individuals aged 5 years and older, and only with caution at the 4 year old age level.

When determining the validity they considered the content, the criterion-related and construct validity. They concluded that the MVPT-3 adequately represented visual perception, that it was comparable to other available visual perception tests and that it tested visual perception as designed, thus making the MVPT-3 a valid instrument for testing visual perception.³

3.3.4: RESEARCH TECHNIQUE.

Permission was granted from the Canadian Publisher to translate the test into Afrikaans in order to conduct the research. (See Appendix A)

A qualified translator translated the English instructions of the test templates into Afrikaans. (Figure 3.1: 3) The Afrikaans instructions were then given to a second translator who translated them back into English (Figure 3.1: 4). A third translator then
compared the two sets of English instructions to make sure that they were the same. (Figure 3.1: 5) This process was followed so as to ensure the instructions were exactly the same as the original instructions.

Once the translation of the research instrument was complete permission had to be obtained from the Gauteng Education Department. (Figure 3.1: a) (Appendix B) They required that the schools be named on the application sent to the researcher, so ten schools were chosen. The schools were selected from different suburbs within the Pretoria east area so as to obtain children from different socio-economical levels in the area. (Figure 3.1: b)

Once permission was granted from the department, an appointment was set up with each of the headmasters. (Figure 3.1: c) During the interview the research procedure and the expectations of the school was explained. The schools were asked to provide a small, quiet room with a table and two chairs as a venue for the individual testing of each child.

After the headmaster’s permission was attained the researcher negotiated with the teachers for the most appropriate time to test the children so as not to interfere with their class work. (Figure 3.1: d) All the children from one class were tested before moving to the next class so as to disrupt the classes as little as possible. The researcher collected each child from the classroom. Children were evaluated from 8:30am in the morning until 11:30 excluding the first break and finishing before the second break (Figure 3.1: f). It was hoped that this would allow the teachers to settle the children into class in the
mornings and then give her time to finish her morning work. The researcher used first break to score test results. (Figure 3.1: g)

The researcher collected each child from the classroom, explained the research that she was doing and asked the child’s verbal permission to test him/her. (See Appendix H) All children agreed and appeared eager to take part. The researcher took the child into the assessment room and sat the child down at the desk. The researcher sat on the opposite side of the desk with the test between her and the child.

The MVPT-3 test stood up vertically on the table, with the instruction plates facing the researcher and the test plates facing the child, so that the child could neither see the
answer booklet nor if he/she obtained a correct or incorrect mark. The researcher explained the instructions asking that the child give the researcher an answer of A, B, C, or D. This positioning worked well. After the testing, which took 15 minutes; the researcher walked the child back to the classroom and thanked him/her for their participation. There was some variation in the testing environment between the different schools. Most schools were using all the available space and no small quiet area was available for testing. Due to the limitation of space, the administration of some tests was done in the school hall, which was noisy at times and may have affected the concentration of some children.

Each child’s test was scored and all marks were kept confidential. A letter of thanks was later written to the parents giving feedback on their child’s performance, although the actual scores were never given to them. (Figure 3.1: i) Where problems were noted the letter indicated areas where their child might need further assistance. (See Appendix I) A letter of thanks was also delivered to the headmasters thanking them for their help and the teachers’ participation and understanding.

3.3.5: TEST SCORING.

Each child’s performance was scored on a standard sheet. (Appendix F) The response for each of the 40 items was marked correct or incorrect. (Figure 3.1: g) The total number of correct answers was then summed. The raw score for each child was then used to work out the standard score and percentile rank using the American norms on the answer sheet.
The raw scores for each individual item, date of birth, gender and age were entered onto an Excel spread sheet and this information was given to the statistician. (Figure 3.1: h)

3.4: DATA ANALYSIS.

3.4.1: DEMOGRAPHICAL ANALYSIS.

The parent questionnaire data was evaluated and interpreted to determine the demographic characteristics of the children as well as the number of children who had been diagnosed with hyperactivity, reading problems, mathematical as well as visual problems.

3.4.2: STATISTICAL ANALYSIS.

The following data was analyzed on each child:

- date of birth
- gender. (Gender was coded 1 for boys and 2 for females) (Figure 3.1: h)
- results of MVPT-3. (If a child obtained an incorrect result for any of the 40 test items a value of 0 was entered, if correct the value 1 was entered.)

The data recorded on an excel spreadsheet was imported into STATA, the statistical software system, used for data analysis by Dr Becker of the Medical Research Council (MRC), associated with the University of the Witwatersrand, Faculty of Health Science. (Figure 3.1: j)
An item analysis of all 40-test items was undertaken to assess the internal consistency of the MVPT-3 using Chronbach’s alpha (alpha). The Chronbach’s alpha is the statistical procedure used to test the reliability of the complete scale (in this case the MVPT-3) composed of specified variables or items (item or question), when compared to the underlying factor (the Afrikaans translation). The Chronbach’s alpha is then said to be the square of the correlation between the measured scale (MVPT-3) and the underlying factor, or variable (i.e. The Afrikaans translation).

A Chronbach’s alpha score was calculated for each individual item in the test battery. This indicated whether each specific item contributed to the overall score or not. If the Chronbach’s alpha score of an individual item was smaller than the overall alpha score, it contributed to the internal constancy of the test battery. If the item’s alpha score was larger than the overall Chronbach’s alpha score, that item did not contribute to the test battery, and could be removed in order to make the test more reliable. Excluding these scores would increase the overall Chronbach’s alpha score, thus suggesting an increased internal consistency.

An overall Chronbach’s alpha of 0.8 or higher was considered to be reliable, although the STATA reference manual recommended a Chronbach’s alpha score of 0.95 for research purposes.
Two item analyses were undertaken removing items, which had individual Chronbach’s alpha scores larger than the overall alpha. This was done to determine if the overall alpha would improve in value without these items.

As there were some anomalies in the results the Canadian publishers were contacted in order to obtain their item analyses and their raw data for the 8-year-old group. It was found that they had done their item analysis on another statistical software system. The item analysis was repeated using the SYSTAT system in order to truly compare the two data sets (the item analysis of the South African population to the American population). Unfortunately this system was not available to the MRC, and the item analysis was done as a favour from the distributors of the SYSTAT system in South Africa. When analyzing the item analysis done by the SYSTAT system, it was found that this analysis included a “split-half” analysis, which gave the Chronbach’s alpha for the first half of the test and the Chronbach’s alpha for the second part of the test, so that the reliability of the first half could be compared to the second half.

Due to the lack of availability of the SYSTAT system a later analysis had to be done using the STATA system. This included analyzing the results according to genders. This was achieved by using the boys’ and the girls’ scores separately. Due to the SYSTAT system having given the split half analysis this was done using the data from the two gender groups.
Following the second round of item analyses the three item lists (all children, boys only and girls only) were then tabulated and interpreted. All these results were then compared to the American results as they appear in the MVPT-3 manual.

3.5: CONCLUSION.

A comparative study was undertaken to test the reliability of the MVPT-3, using Afrikaans instructions on Afrikaans speaking 8-year-olds, by comparing this to the reliability of the MVPT-3 using English instructions on the American child. The research consisted of testing 80 children from 9 different schools in the east of Pretoria. These children’s tests were then scored and entered onto two different data basis, doing two different data analysis in order to obtain the Chronbach’s alpha thus testing the internal consistency of the test. This was then compared to Chronbach’s alpha obtained by the American sample, and conclusions were drawn.