

## CHAPTER 3

### METHOD

**Chapter aims:** The aims of this chapter is to discuss the method that was followed in the research process in terms of the aims of the study, research design, ethical implications, population and sampling, materials and apparatus used during the research project, the procedures that were followed, the data recording, and the analysis and processing of data.

#### 3.1 INTRODUCTION

*“To answer some research questions, we cannot skim across the surface. We must dig deep to get a complete understanding of the phenomenon we are studying.”*

(Leedy & Ormrod, 2004:133)

Through research professional practitioners such as speech-language therapists formulate scientifically founded theories about salient phenomena as they occur in day-to-day practice and endeavour to shed light on phenomena that heretofore remained unexplained. These efforts may lead to generalizations and applications of newly acquired knowledge in intervention and treatment which may reflect effective, evidence-based practice (De Vos et al., 2005). Worthwhile, relevant research is at all times conducted in a formal, accountable manner, where the aims of the study, the research design, ethical implications, population and sampling, materials and apparatus used during the research project, the procedures that were followed during the research project, and the data recording, and analysis and processing of the data are clearly set out (Leedy & Ormrod, 2004).

Due to a shortfall in the knowledge base which focuses on the phonological awareness skills of children in the multi-lingual context of South Africa, there is an urgent need for formal research that will lead to a better understanding of the challenges faced by this unique population of young learners.

The main research and sub-aims that were formulated for this study are set out in 3.2 below.

### 3.2 RESEARCH AIMS

The main aim of this study was to explore the effect of a multi-cultural and multi-lingual education context on the English phonological awareness skills of a group of Black Grade 4-learners in a mainstream primary school setting in South Africa.

In order to realize the main aim the following *sub-aims* were formulated:

- To determine the participants' phonological ability in English as LoLT by using the Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1986).
- To determine the participants' expressive and receptive language abilities in English as LoLT by using the Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980).
- To determine the participants' phonological awareness skills in English as LoLT by using The Phonological Awareness Battery (PhAB) (Frederickson, Reason & Frith, 1997).
- To determine the participants' level of reading ability in English as LoLT by using informal tests designed by the researcher.
- To determine the participants' level of spelling ability in English as LoLT by using an informal test designed by the researcher.
- To determine the relationship between the participants' phonological abilities, language abilities, reading abilities, spelling abilities and phonological awareness skills by comparing the results of all the tests mentioned above.

### 3.3 RESEARCH DESIGN

The research design followed a *quantitative* and *qualitative* paradigm that was *exploratory*, *descriptive* and *contextual* in nature (Leedy & Ormrod, 2004; Mouton, 2004; Struwig & Stead; 2002).

A combination of the *quantitative* and *qualitative approaches* was used to enable the researcher to describe the results obtained. Combinations of research methods have the potential of minimizing the chance of bias, and thus maximizing the quality of data collected (Berg, 1998). Triangulation was implemented because a combination of approaches was used to answer the research question. Through triangulation the

researcher could bring together the data collected from the multiple sources that were drawn upon to support the final analysis of the results (Leedy & Ormrod, 2004; De Vos, 1998).

A *qualitative approach* was used to create a better understanding of the phenomenon of phonological awareness in a specific *context* (Leedy & Ormrod, 2004). According to Peshkin (1988) qualitative research enables the researcher to describe, interpret, verify, and evaluate collected information. This method enabled this researcher to gain a new understanding of the phonological awareness skills of Black grade 4-learners in a multi-lingual school context with English as LoLT, by describing, interpreting, verifying, and evaluating the obtained data.

The *quantitative approach* used in this study enabled the researcher "...to answer questions about relationships among measured variables with the purpose of explaining, predicting, and controlling phenomena" (Leedy & Ormrod, 2004:94). The standardized tests and the tests devised by the researcher made it possible to determine certain relationships between the measured variables, thereby enabling the researcher to provide information regarding the phenomenon of phonological awareness in Black learners specifically.

Firstly, the method was exploratory in nature, aiming to explore a phenomenon about which little knowledge exists, namely the phonological awareness skills of Black learners in a multi-lingual primary school setting with English as Language of Learning and Teaching (ELoLT). The methods used in exploratory research may include surveys, literature reviews, and interpretations that may lead to a better understanding of the phenomenon (Struwig & Stead, 2002). In terms of exploratory research, this study included a review of literature on phonological awareness as well as a questionnaire that was directed at parents as part of the broader research design.

Secondly, the nature of this study was descriptive. Through using a descriptive approach, an in-depth description of an identified group of Grade 4 learners' phonological awareness skills was made possible (Mouton, 2004). The research protocol comprised a questionnaire survey directed at parents, an audiological screening test, a formal test battery which consisted of an articulation test, a test for

expressive and receptive language, a test of phonological awareness, as well as tests for reading decoding and comprehension, and spelling tests. The results of these tests, considered holistically, enabled the researcher to render a detailed description of the participants' phonological awareness skills regarding English.

Thirdly, the study was contextual. The context in which this study was conducted is representative of the Outcome Based Educational (OBE) system currently followed in South Africa. The selected school is an educational institution with 1200 black learners from grade 0 to 12, where the entire curriculum is presented in English and where the majority of teachers are White, with Afrikaans as their first language.

In the light of the above, this study could be successfully conducted by using a research design that is a quantitative and qualitative paradigm that is exploratory, descriptive and contextual in nature (Leedy & Ormrod, 2004; Mouton, 2004; Struwig & Stead; 2002).

### **3.4 ETHICAL IMPLICATIONS**

When research is conducted where human beings are the main focus of investigation, there are specific ethical implications that the researcher must bear in mind before starting the research (Louw, 2004; Leedy & Ormrod, 2004).

The following ethical norms and rules, derived from ethical principles (Louw, 2004) were applied in the planning and execution of the research project:

- **Respect for persons**

All parents and participants were informed of the nature of the study before they were requested to grant consent to participate in the study. Participation was voluntary, and they had the right to withdraw at any stage during the study (Leedy & Ormrod, 2004). Letters of informed consent, describing the voluntary nature of the study, the purpose and procedures of the study, and participant's rights (Appendices B and C) were handed to the principal of the school, and also to the parents of the participants (Maxwell & Satake, 1997).

As the participants were minors, consent to participate was obtained from them after a verbal explanation followed by a letter written on an age-appropriate level. The participants were also free to withdraw from the study at any time (Appendix D). The participants' right to privacy was respected at all times. Numbers were assigned to each participant, ensuring privacy and anonymity regarding scores on tests, information obtained by means of the questionnaire for parents (Appendix E), and the information used in the research report. Confidentiality was maintained throughout (Leedy & Ormrod, 2004).

Information was reported honestly and comprehensively throughout. No intentional misleading interpretations were made about the results. Appropriate credit and full acknowledgement was given by means of referencing other researchers for their thoughts, ideas and words (Leedy & Ormrod, 2004).

- **Beneficence**

The researcher made use of a research design that was well thought through, and seriously strived to conduct the research in a competent and professional manner. In terms of the relevance of the topic in the South African context, the research outcomes should provide valuable insight where new strategies for the enhancement of the phonological awareness skills of Black Grade 4 learners in a multi-cultural and multi-lingual context are much needed. These skills are, collectively, regarded as the most important predictor for later reading and spelling success which, in its turn, is an invaluable tool for the optimal development of any twenty-first century society.

- **Non-maleficence**

This research did not, at any stage, pose any physical or psychological risks; nor did it expose the participants to any risks greater than the normal risks of day-to-day living. The participants were at most inconvenienced, by being subjected to the tests mentioned in 3.3. However, all the parents and the participants knew before hand exactly what this research processes required (Appendices C and D).

- **Distribution**

The research report will be made available to the school that constitutes the context in which this research was done. In so doing, the researcher hopes that teachers at this

school will gain insight into phonological awareness skills in their unique context and they will understand the effect that this context may have on the development of these skills.

- **Ethical clearance**

The submitted research proposal for this project was approved by the Faculty Humanities' Research Proposal and Ethics Committee, University of Pretoria (Appendix A).

### **3.5 POPULATION AND SAMPLING**

The population were sourced from a Grade 4-class at the selected school. The following criteria were followed during the selection of participants.

#### ***3.5.1 Criteria for the selection of participants***

- **Age**

The participants had to be between the ages of 9 years, 11 months and 10 years, 11 months at the time of data collection. This is the normal age of learners in the final term of Grade 4. Grade 4-learners were chosen, as this is the first grade to form part of the intermediate phase of education and marks the beginning of formal reading and writing instruction (Gultig et al., 1998). This criterion is congruent with the aim of this study, which is to explore the effect of a multi-cultural and multi-lingual context on phonological awareness skills, specifically of Grade 4-learners in a primary school setting in South Africa.

- **Educational level**

All participants had to be in the final term of Grade 4 at the time of testing to ensure that all the participants were exposed to at least 9 months of formal reading- and writing instruction. As previously stated, the formal stage of reading and spelling instruction is introduced in Grade 4 (Gultig et al., 1998).

- **First language**

The participants had to be first language speakers of any African language.

- **Language of instruction**

All participants had to be learners in a mainstream school where English was the Language of Learning and Teaching (LoLT), because this study explores the effect of a multi-cultural and multi-lingual educational setting on the phonological awareness skills of learners in a setting where English is the only medium of instruction, regardless of the learners' first language.

- **Race and gender**

The selected participants had to be black African children to be a representative sample of the wide variety of cultures and languages within the multi-lingual, multi-cultural context in South Africa (Broom, 2004; Chick, 2002; Mutasa, 2000). Gender was not controlled for in this study, as it was more important for this research study to be representative of as many of the African languages as possible.

- **Normal hearing**

All participants had to have normal hearing and middle ear functioning at the time of testing. The concept 'normal hearing' specifies normal air conduction thresholds at or below 15dB for frequencies 125 – 8000 Hz (Martin & Clark, 2000; Katz, 1994), and normal middle ear functioning (a normal type A tympanogram with middle ear pressure of between -100 and +50 daPa, and a static compliance of between 0,3 and 1,75cm<sup>3</sup> at the time of testing (Katz, 1994). Impaired hearing may have an effect on the results of the standardized tests for the evaluation of the participants' phonological, language, and phonological awareness skills (Owens, 1999).

- **Controlled hyperactivity**

In cases of hyperactivity the condition had to be controlled (the participant should have taken his/her medication on the day of testing). Hyperactivity may have a negative impact on the results because poor attention which is one of the symptoms of this condition may lead to inaccurate responses on the test items (Owens, 1999).

- **Normal cognitive abilities**

All the participants had to have, according to the teacher, normal cognitive abilities, which is a pre-requisite for acquiring reading and writing skills (Louw, Van Ede & Louw, 1998).

- **Speech language therapy**

None of the participants may have received any speech-language therapy in the past or at the time of the study, as this kind of intervention may have improved the abilities that were assessed in the current study.

### ***3.5.2 Sampling method***

In order to limit the effects of extraneous variables the researcher used random sampling (Struwig & Stead, 2002) to select the sample of 15 Grade 4-learners in such a way that any Grade 4-learner in the targeted context had an equal chance of being selected. This type of selection was used in order to ensure that the characteristics of the 15 participants approximated those of the rest of the learners in Grade 4 (Leedy & Ormrod, 2004).

### ***3.5.3 Selection of participants***

#### ***3.5.3.1 Materials and Apparatus used for the selection of participants***

In order to select the research sample group, the following materials and apparatus were used:

- Questionnaire for parents

The parents of the randomly selected participants were requested to complete a questionnaire compiled by the researcher (Appendix E). This questionnaire covered areas such as the child's developmental history, hearing status, demographics, and exposure to English. The parents' answers were important for the researcher to determine whether a participant met the selection criteria as set out in 3.5.1. The questionnaire also rendered additional information that was useful for interpreting and understanding the results.

- Screening of hearing ability and middle-ear functioning

A screening test (Martin, 1997) was used to verify that the subjects met the set criteria regarding normal hearing. Screening of hearing for the frequencies 500, 1000, 2000Hz was performed by means of a calibrated MAICO 25 Portable Audiometer (calibrated January 2004 in accordance with SABS-requirements). Middle ear functioning was screened by using a GSI 28A Autotymp Middle ear Analyzer (calibrated January 2004 in accordance with SABS-requirements). The results of these screening tests were recorded on the informal score sheet designed by the researcher (Appendix K).

### *3.5.3.2 Procedure for selection of Participants:*

The following procedures were followed during participant selection:

- The principal of the school where the research was conducted suggested that a letter be written which she could present to the management body of the school to explain the aims of the proposed study (Appendix B).
- The management body granted permission for the research to be conducted at this school (Appendix F). (The management body has the authority to give permission for any studies that may be conducted at their school, and they do not need to obtain permission from the Education Department of Gauteng).
- After ethical clearance was obtained from the Faculty of Humanities' Research Proposal and Ethics Committee of the University of Pretoria (Appendix A), a meeting was arranged with the principal of the primary school section of the school, the Head of Department (Intermediate Phase), and the Grade 4 teacher of the selected grade 4-class. (The fact that learners from only one Grade 4 class were used for the purposes of this study did not introduce any uncontrolled variables – all Grade 4 learners were randomly divided into two classes at the beginning of the year. Therefore, the learners in the selected class constitute representative sample of all the Grade 4-learners in this specific school). The research process was discussed with the principal, the head of the specific department and the Grade 4 class teacher, and a suitable time for the participant selection and data-collection process was chosen.

- Questionnaires for parents as well as the letters of consent were sent to the parents of all the learners in the selected Grade 4 class (Appendices D and E).
- A simple random sampling method was followed (Leedy & Ormrod, 2004), to select 15 potential participants from those children of whom the letters of informed consent from the parents were returned. Consent from the children was then obtained by explaining the procedure to the children, after which they were allowed the choice to sign a letter of consent or not (Appendix D).
- Screening of the potential participants' hearing ability and middle ear functioning determined the selection of the final 15 participants. If screening showed abnormal middle ear functioning, or abnormal hearing thresholds, the participant was excluded from the sample, and a new participant was selected by means of simple random sampling.

The following procedures were followed to determine the participants' middle ear functioning and hearing:

- The procedure for testing of middle ear functioning, as described by Northern and Downs (1984), was applied. The norms for normal middle ear functioning were applied (Silman & Silverman; 1991): Compliance: 0,3 – 1,75 ml; Volume: 1,0 – 1,5 cc/ml; Pressure: between - 100 daPa and + 50 daPa. The results were written down on the space provided for immittance measurements on the informal score sheet designed by the researcher (Appendix K).
- This researcher followed the ASHA (1978) procedure for screening of each participant's hearing functioning (Martin, 1997). The researcher started at 1000 Hz, followed by 500 Hz, and then 2000Hz and 4000 Hz. The frequencies included represents middle, low, and high frequencies of hearing (Northern & Downs, 1984). The pure tones were initially presented at 30 dB HL. The participant was required to press a response button every time he/she heard the tone. If a response was obtained, the researcher lowered the intensity in 10 dB steps. If the participant did not respond at a specific intensity, the intensity was raised by 5 dB until the 50% response criterion was met. The pure tone threshold was calculated for each ear (by adding the thresholds obtained at 500, 1000 and 2000 Hz, divided by 3). Thresholds between 0 – 15 dB were accepted as normal hearing (Martin & Clark, 2000; Martin, 1997). The results of

the screening of hearing were recorded on the informal score sheet designed by the researcher (Appendix K).

### 3.5.3.3 Description of Participants

Table 3.1 shows the biographic detail of the 15 participants that participated in the study.

**Table 3.1: Biographic detail of participants.**

Participant:	Age	Gender	First language	Nursery school attendance	Middle ear infections and treatment	Therapeutic intervention	ADHD Treatment?	Other
1	10 years, 3 months	Female	Zulu	No	Had grommets inserted (on three occasions)	None	Yes, Metered dose inhaler	Asthma and headaches
2	10 years, 5 months	Female	Setswana	Yes, 2 years	None	None	No	None
3	10 years, 3 months	Female	Setswana	No	None	Occupational therapy	No	None
4	10 years, 9 months	Female	Northern Sotho	Yes, 2 years	None	None	No	None
5	10 years, 7 months	Female	Southern Sotho	Yes, 3 years	None	None	No	None
6	10 years, 11 months	Female	Xitsonga	Yes, 2 years	None	None	No	None
7	9 years, 11 months	Female	Xitsonga	Yes, 3 years	None	None	No	None
8	10 years, 5 months	Female	Xitsonga	Yes, 2 years	None	None	No	None
9	10 years, 5 months	Female	Northern Sotho	Yes, 4 years	None	None	No	None
10	10 years, 2 months	Female	Setswana	Yes, 3 years	None	None	No	None
11	10 years, 7 months	Female	Northern Sotho	Yes, 5 years	None	None	No	None

<b>Participant:</b>	<b>Age</b>	<b>Gender</b>	<b>First language</b>	<b>Nursery school attendance</b>	<b>Middle ear infections and treatment</b>	<b>Therapeutic intervention</b>	<b>ADHD Treatment?</b>	<b>Other</b>
<b>12</b>	10 years, 8 months	Male	Zulu	Yes, 4 years	None	None	No	None
<b>13</b>	10 years, 0 months	Male	Venda	Yes, 3 years	None	Occupational therapy	No	None
<b>14</b>	9 years, 11 months	Male	Setswana	Yes, 3 years	None	None	No	None
<b>15</b>	10 years, 10 months	Female	Northern Sotho	Yes, 3 years	None	None	No	None

From Table 3.1 it is clear that all the participants were in the age range of 9 years, 11 months to 10 years, 11 months. The group of participants consisted of 12 female, and 3 male children. Six of the African languages were represented in this sample (two of the participants were mother tongue speakers of isiZulu, four of Setswana, four of Sepedi, one of Sesotho, three of Xitsonga, and one of Tshivenda). Most (thirteen) of the participants attended nursery school. Only one participant presented with middle ear infections when he was younger, and only two participants received occupational therapy at a younger age. Only one participant had to control ADHD by means of a metered dose inhaler.

All of the participants that were selected met the set criteria (3.5.1).

#### 3.5.3.4 Description of the rating assistant and the speech scientist

A rating assistant was used during the rating of the participants' phonological abilities, and a speech scientist with a linguistic background for the analysis of the participants' phonological skills. Table 3.2 provides the relevant information on the rating assistant and the speech scientist.

**Table 3.2: Relevant information regarding the rating assistant and the consulting speech scientist.**

Qualification	Work setting	Years of experience	Reason for selection
B.Communication Pathology: Speech-language therapy and Audiology	Community Service year	One year	Knowledge in the field of articulation and phonological disorders
BA (Pret.) MA (Pret.) DTE (Pret.)	Senior Lecturer, Department of Communication Pathology, University of Pretoria	40 years	Field of expertise: Articulatory phonetics, Acoustic phonetics, Phonology. BA included Sepedi 3 and Zulu 1

### 3.6 MATERIAL AND APPARATUS

The material and apparatus for data collection are summarized in Table 3.3.

**Table 3.3: Material and apparatus used for the collection of data.**

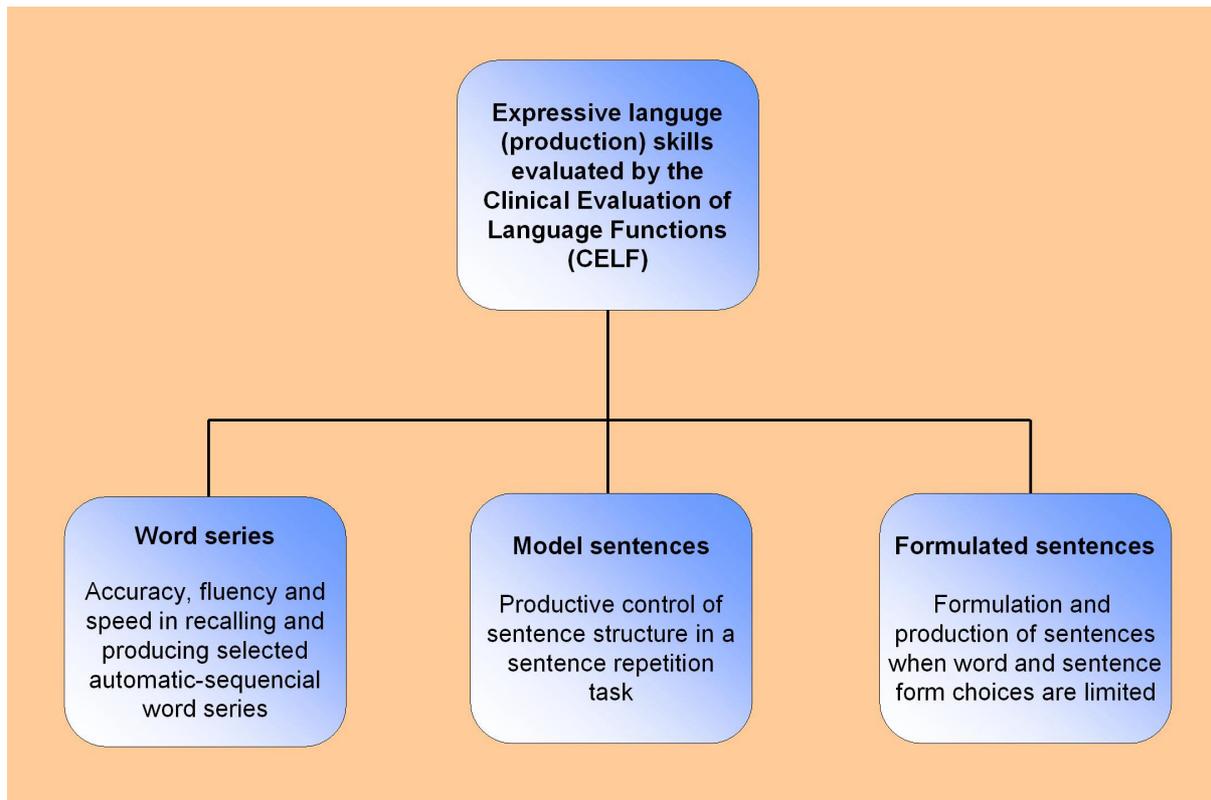
Area of evaluation	Test / Assessment tool	Justification	Additional Information
Phonological skills in English	The Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1986)	According to literature it is essential to determine the level of development of phonological skills of the participants, as the level of these skills may predict phonological awareness competence (Carrol, Snowling, Hulme, & Stevenson, 2003). Research has shown that children with phonological disorders struggle significantly with phonological awareness tasks (Cowan & Moran, 1996).	Although this test is not standardised for Black South African children, it was implemented because of its wide use in clinical practice. The sole purpose for administering this test was to get some insight into the level of the phonological ability of the participants.
Expressive and receptive language abilities in English	Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980)	Research has shown that the speaking and understanding of a language plays a vital role in the development of phonological awareness skills (Cooper, Roth, Spence & Schatschneider, 2002; Rvachew, Ohberg, Grawburg & Heyding, 2003).	This test is routinely used in clinical practice in South Africa, and rendered the required information about the expressive and receptive English language abilities in of the participants.
Phonological awareness skills in English	The Phonological Assessment Battery (PhAB) (Frederickson, Reason & Frith, 1997).	It is important to know what the phonological awareness skills of the participants are in English, since English is the LoLT. The phonological awareness skills regarding English need to be on a level where it will enhance English reading and spelling (Dawber & Jordaan, 2002.).	The PhAB was included as part of the test battery because it is widely used in clinical practice. It tests a variety of phonological awareness skills, provides practice items in each sub-test and takes only 45 minutes to execute. It was also successfully used in research conducted by Pijper (2004).



Area of evaluation	Test / Assessment tool	Justification	Additional Information
Reading ability in English	The researcher used a selected English passage and participants were required to answer ten multiple-choice questions based on the content of the passage.	Reading, as part of a test battery to clarify the phonological awareness of a participant is a pre-requisite, as research shows the importance of reading and phonological awareness in relationship to one another (Betourne & Friel-Patti, 2003; McBride-Chang & Kail, 2002). The primary components of reading are the ability to decode words and to comprehend that which was read (Gilbertson & Bramlett, 1998).	<p>The reading task that was selected was on the level of the Grade 4 learners. The participants were expected to read the passage out loud to the researcher to enable her to note the type of errors that occurred.</p> <p>Finally, the multiple-choice test was used to determine the participants' comprehension of the passage content.</p> <p>A reasonable time limit was set to allow all participants to read the passage and complete the required comprehension assessment.</p> <p>The technique set out above was implemented with success in a local study done by Pijper (2004).</p>
Spelling ability in English	The researcher compiled a spelling test that comprised of words that forms part of the Grade 4 curriculum.	Spelling skills were assessed because of the close link between spelling and phonological awareness skills (Clarke-Klein & Hodson, 1995).	

It is important to note that the use of standardised tests in the current study, which are not necessarily culturally appropriate because they have not been standardised for the South African ELoLT context, was unavoidable because no tests that were developed in South Africa existed at the time of testing.

The participants' language production in English was assessed by means of sub-tests of the Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980). Figure 3.1 presents the *receptive* language abilities that were evaluated by this instrument, with a short definition of each ability as provided by Semel and Wiig (1980:23, 26, 28).



**Figure 3.1: Receptive language abilities evaluated by the Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980).**

Figure 3.2 presents the different *expressive* (production) abilities that were evaluated by the CELF, with a short definition of each ability as stated by Semel and Wiig (1980:23, 26, 28).

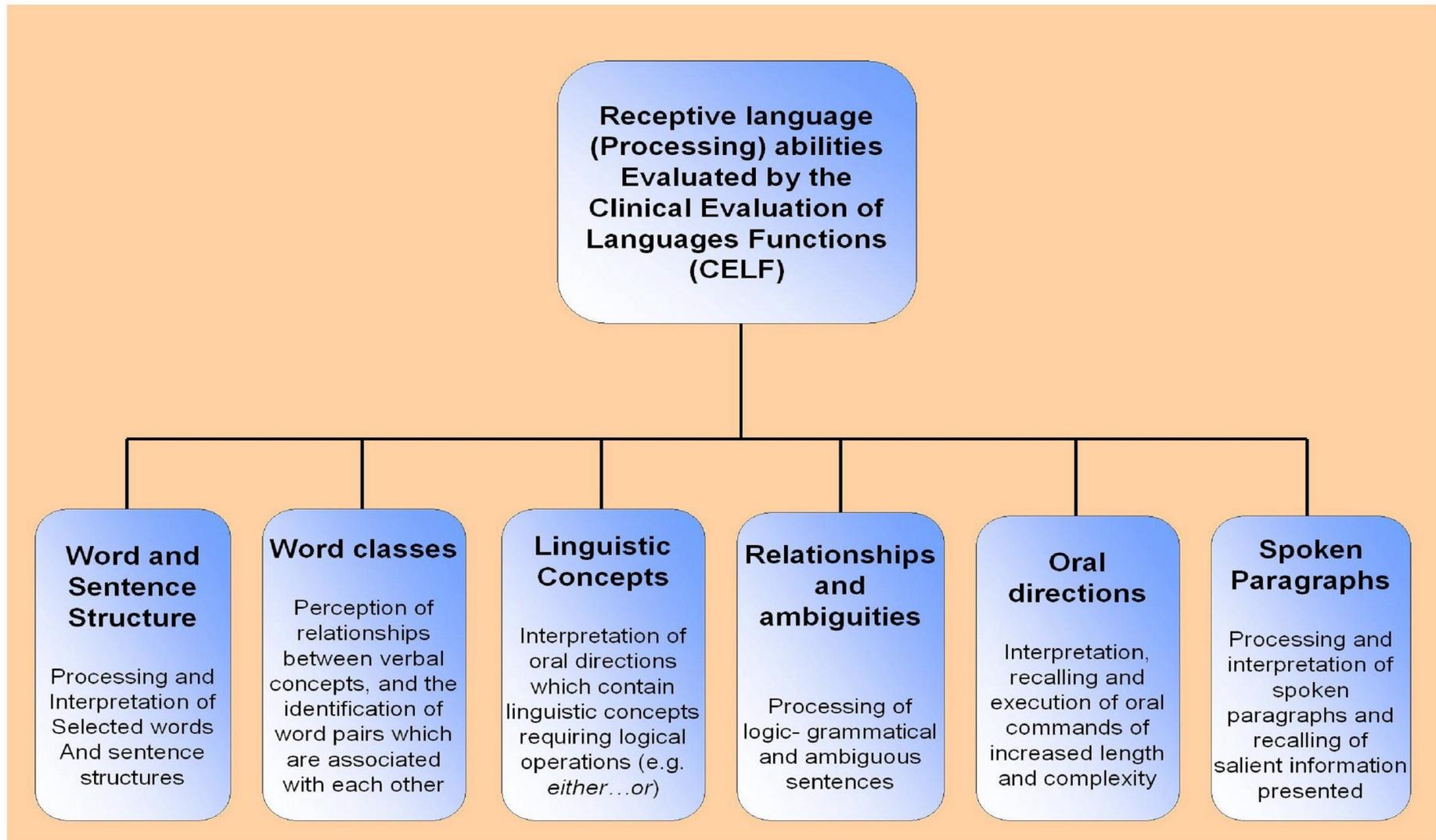


Figure 3.2: Expressive (production) ability evaluated by the Clinical Evaluation of Language Functions (CELF).

The participants' phonological awareness skills in English were determined by means of sub-tests of the Phonological Assessment Battery (PhAB) (Frederickson et al., 1997). Figure 3.3 shows the different skills that were evaluated, with a short definition of each, as formulated by Frederickson et al. (1997:65).

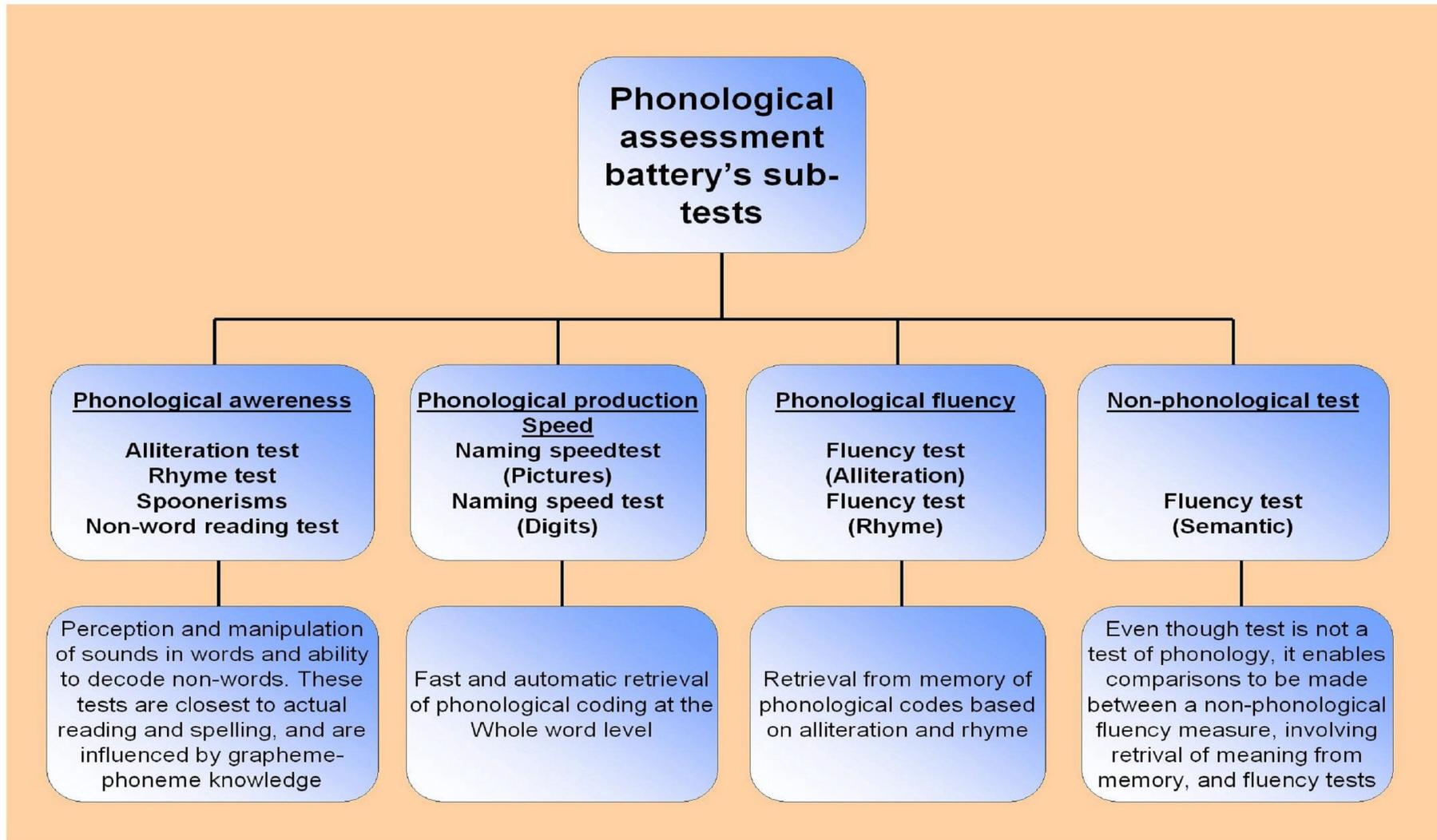


Figure 3.3: Sub-tests of the Phonological Assessment Battery (PhAB)

### **3.7 PROCEDURES**

The procedures for data collection, data recording, and data-analyses are described below.

#### ***3.7.1 Pre-testing of the test battery***

##### ***Aim of pre-testing***

Pre-testing was done in order to evaluate the applicability of the measurement instruments, to compile a score sheet for summarising the results, and to evaluate the proposed data-analysis procedures (Leedy & Ormrod, 2004; Mouton, 2004; Struwig & Stead, 2002; Cjasa & Blair, 1996). Pre-testing determined the feasibility of the research, whether the proposed procedures and measurement instruments were appropriate in terms of the main and sub-aims, and to familiarise the researcher with the proposed research protocol (Leedy & Ormrod, 2004).

##### ***Description of the participant***

One Grade 4-learner between the ages of 9 years, 11 months and 10 years, 11 months was selected as participant for the pre-study. This learner conformed in every respect to the same criteria as formulated for the participants of the main study (3.5.1), but she was in another school and excluded from the main study.

##### ***Procedures of the pre-testing***

The measurement instruments as described in Table 3.3 (3.6) were used to elicit responses from the participant, and the tests were conducted as set out under 3.7.2 (*Procedures for collection of data*). The results were analysed as described under 3.7.4 (*Procedures for the analysis of data*), and were used to answer the main and sub-aims of this study. By using the exact procedure as set out at 3.6, 3.7.2, and 3.7.4, the researcher made certain adjustments to the protocol. These adjustments are set out below.

### ***Pre-testing results and subsequent changes to the protocol***

The pre-testing indicated that some sub-tests of the evaluation protocol were repetitive, which led the researcher to omit them in the main study. The omitted sub-tests of the CELF were

- *Producing Names on Confrontation*
- *Producing Word Associations*
- *Producing Speech Sounds*

According to the manual for the Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980), omission of these sub-tests, would not negatively impact on the reliability or validity of the test results. The abilities that are tested by these sub-tests were already evaluated by the rest of the protocol.

The time taken for the participant to complete the pre-testing was 115 minutes. This was well within the limits originally planned for. The *Score-sheet of Raw Data*, designed by the researcher, proved to be adequate for the recording of all the raw data (Appendix K).

#### ***3.7.2 Procedures for the collection of data***

- Permission from the principal of the primary section of the school to test the children during regular school hours was obtained prior to testing. Informed consent from both parents and learners were obtained (3.4).
- Each participant was tested individually for approximately 120 minutes. The participants only completed one test session, as the researcher focused on one ability at a time (the researcher first conducted all the articulation tests, then the language test, then the phonological awareness test, followed by the reading test).
- Testing was done on consecutive school days and was completed within 2 weeks.
- Individual testing was conducted in a quiet room in the school. The participant

was seated opposite the researcher.

- Participants were tested during school hours because of transport arrangements (buses were the only mode of transport for the majority of learners, which meant that they could not be requested to remain after school hours).
- The Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1986), Clinical Evaluation of Language Functions (CELF) (Semel & Wiig, 1980) and The Phonological Awareness Battery (PhAB) (Frederickson et al., 1997) were used and the recommended procedures as specified in the test manuals were followed.
- Informal tests (designed by the researcher) for the following abilities were conducted:
  - Reading abilities:

A selected passage (adapted from the participants' Grade-4 reader) (Appendix H) was placed in front of the participant. The participant was asked to read the passage and was instructed to guess a word if he/she was uncertain. The types of reading decoding mistakes were recorded on an informal score sheet designed by the researcher (Appendix I). After the participant completed this part of the battery, the informal comprehension test was placed in front of him/her. The participant was requested to circle the correct answers on the answering sheet (Appendix H).
  - Spelling abilities  
The researcher collaborated with the class teacher to compile the spelling test (Appendix J). The spelling test consisted of words that were part of the participants' Grade 4 curriculum. To save time, the teacher conducted the spelling test three days before the data collection commenced. Clear instructions were given to the teacher.

The general guidelines for conducting least-biased assessment as suggested by Goldstein (2000:63-64) were followed during the testing. A research protocol, which included several formal and informal tests for assessment of the targeted areas, was implemented. The families of the participants completed the questionnaire for parents

(Appendix E) and permission forms (Appendices C and D). The purpose of the research protocol were clearly defined and described (by the sub-aims), possible limitations were acknowledged (culturally inappropriateness), and the most recent edition of the tests was used (Goldstein, 2000). For the purposes of this study, the researcher described the phonological awareness skills in ELoLT, without any adaptations for the specific culture.

### **3.7.3 Procedures for recording of data**

The recommended procedures as specified in the test manuals of the individual formal tests (Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1986); CELF (Semel & Wiig, 1980); PhAB (Frederickson et al., 1997) were meticulously followed to ensure reliability. Scoring and interpretation were done according to these instructions as well.

The informal tests were analysed as follows:

*Test for reading abilities:* The researcher analysed the decoding mistakes by using the informal score sheet designed for this purpose (Appendix I). Depending on the number of decoding mistakes, each participant's reading ability was described as *Poor, Average, or Good* (Appendix M). Multiple-choice answers were scored out of 10 (Appendix H)

*Spelling abilities:* The spelling test was scored out of 10 and the spelling mistakes were analysed (Appendices J and N).

### **3.7.4 Procedures for the analysis of data**

The following procedures for the analysis were followed:

#### ***Qualitative analysis***

The responses on the questionnaires received from each participant's parent/s were organised in the form of a table (Table 3.1). The parental observations assisted the researcher in the selection criteria, and also contributed to the eventual explanation of

the results.

### ***Quantitative analysis***

The researcher designed an informal score sheet on which all the raw data of the participants were entered (Appendix K). The statisticians used the informal score sheet to design a spreadsheet. Descriptive as well as inferential statistical procedures were used to analyse the data. The purpose of the statistical procedures was to summarise the raw data on the spreadsheet in such a manner that meaningful information could be extracted from it (Louw, 2005).

The first stage of statistical analysis, *descriptive statistics*, were used to draw bar charts for which numerical values (such as the mean, median, standard deviation, and minimum and maximum scores) were determined in order to gain more insight into the data (Louw, 2005).

The second stage of the statistical analysis, the *statistical inference*, used statistical tests aimed at reaching conclusions regarding the Grade 4 test population on the basis of the data obtained. Because the data falls on the level of continuous as well as categorical data – and due to the small sample size – the two non-parametric (distribution-free) statistical procedures, namely *The Mann-Whitney Test* and the *Spearman Correlation Coefficient* (Louw, 2005; Anderson, Sweeny & Williams, 2003; Keller & Warrack, 2000) were used.

The descriptive analysis enabled the researcher to describe the data, whilst inferential analysis enabled the researcher to make inferences about large populations from the small sample used in the study (Leedy & Ormrod, 2004).

### *Phonology*

The participants' responses on the *Goldman-Fristoe Test of Articulation* (Goldman & Fristoe, 1986) were coded to show whether an articulation error or phonological process was present or absent (Appendix G). A second speech-language therapist was present throughout the testing of the participants' phonological abilities, and the researcher and this therapist compared the codes assigned to each participant's level

of phonological abilities. The phonological abilities of the participants were described on the segmental level of vowel and consonant variations. The single word utterances, which were elicited, were analysed with the assistance of a speech scientist with a linguistic background in terms of the above sound categories within the context of BSAE, since this variety of English has its own unique identity and ownership (Tesner, 2005; Kachru, 1986).

### *Language*

The mean and standard deviation values of both the receptive and expressive language abilities were calculated separately for each participant and then combined, for the purposes of descriptive statistics, for each of the sub-tests of the CELF (Semel & Wiig, 1980). Descriptive statistics was used in the analysis of quantitative data to obtain the minimum and maximum scores for each sub-test on the CELF, as well as the mean, median, and standard deviations for each sub-test (Louw, 2005).

### *Phonological awareness skills*

The mean and standard deviation values, as well as the minimum and maximum scores were calculated for the sub tests of the PhAB (Frederickson, et al., 1997).

### *Reading*

The reading abilities of each participant were analysed on the level of reading decoding and comprehension. The decoding abilities of each participant were described as being *Good*, *Average* or *Poor* (Appendix M). The type of mistakes that occurred was coded and described (Appendix I). A numeric value (between 0 – 10) was assigned to represent the participant's scores in reading comprehension (Appendix H) (Broom, 2004).

The analysis of the participants' reading decoding abilities was done by determining the number of decoding errors (Appendix I). Both the researcher and the speech-language therapist analysed the reading samples in an attempt to maximise the validity and reliability of the results. Instances that could possibly be described as decoding errors were identified using a checklist compiled by the researcher. These errors are illustrated in Table 3.4. and included the following (as illustrated in 3.4):

**Table 3.4: Descriptions or definitions of decoding errors.**

Type of decoding error	Description or definition of decoding error
1. Omits words	Omitted an entire word from the passage.
2. Selects wrong words	Read an approximation of the target word.
3. Guesses words	Read a different word.
4. Repeats certain words	Read the target word, but repeated it.
5. Ignores punctuation	Paid no intention is to full stops, commas, question marks etc.
6. Reads each word separately	Fragmented reading with little or no fluency.
7. Sounds the words	Sounded the target word and pronounced it correctly.
8. Sounds, but cannot pronounce the word	Sounded he target word, but pronounced it incorrectly.
9. Has poor word recognition	Could not read the target word because of a lack of word attack abilities
10. Guides with finger	The participant used a finger to guide himself/herself during reading.
11. Does not recognize the words after modelling.	After the researcher modelled the target word, the participant still showed no word attack abilities.

For the evaluation of the participants' reading comprehension, the researcher formulated ten multiple-choice questions in order to determine the participants' understanding of the passage he/she had to read (Appendix H). A value (a mark out of ten) was assigned to represent the participants' scores on the level of reading decoding.

### *Spelling*

A value (between 0 – 10) was assigned to represent the participants' scores on the spelling test. Reading error were analysed in terms of mistakes.

### *Combination and correlations of results*

One-way frequency tables were compiled for each measurement and were interpreted and described by using descriptive statistics (bar charts were drawn and numerical values (such as the mean, median, standard deviation, and minimum and maximum scores) were determined).

As mentioned previously, the data falls on the level of continuous as well as categorical data and the sample size was small. Therefore, the non-parametric (distribution-free) statistical procedures, *The Mann-Whitney Test* and *Spearman Correlation Coefficient*, were used (Louw, 2005; Anderson, Sweeny & Williams, 2003; Keller & Warrack, 2000). The *Mann-Whitney Test* enabled the researcher to compare the mean values of the categorical and quantitative data. The *Spearman Correlation Coefficient* determined how effectively one or more variables predicted the value of another variable (Leedy & Ormrod, 2004). These inferences were used to describe the interrelatedness of the data, as well as how the phonological awareness skills correlated with the rest of the data (Leedy & Ormrod, 2004).

### **3.7.5 Reliability and validity**

“Reliability is the consistency with which a measuring instrument yields a certain result when the entity measured hasn’t changed” (Leedy & Ormrod, 2004:29). In order to attain reliability in this study, tests used clinically in South Africa were conducted. Testing was done in a consistent manner (by following every step in the test manuals), by one person (the researcher), and in the same environment and sequence (Leedy & Ormrod, 2004). The class teacher was the only assistant that was used during the collection of data (the speech-language therapist and the speech scientist assisted in the analysis of the phonological variations and the analysis of the reading samples).

“The validity of a measurement is the extent to which the instrument measures what it is supposed to measure” (Leedy & Ormrod, 2004:28). In order to reach informed conclusions from the collected data, the researcher strived throughout to ensure internal and external validity. Internal validity was addressed by eliminating possible other explanations for the results (through conclusive stipulation of the aims), and by using triangulation (where multiple sources of data were collected to describe the phonological awareness skills of a group of Grade 4 learners in a multi-cultural, multi-lingual context) (Leedy & Ormrod, 2004). External validity was met by selecting a sample of the broader black Grade 4 population in South Africa, describing the method of the current research in great detail, and by conducting the research in a

'real-life' setting (Leedy & Ormrod, 2004).

### **3.8 SUMMARY**

Formal research requires that the researcher will state all the detail of a research method that will guarantee valid, reliable results. A comprehensive explanation of a method that was well thought through ensures replicability, and/or application of the research outcomes in daily practice (De Vos et al., 2005; Leedy & Ormrod, 2004).

In designing the method for this research project all the necessary precautions were taken to ensure that the research results would lead to a better understanding of the phonological awareness skills of black learners in multi-cultural, multi-lingual education context.

### **3.9 CONCLUSION**

In this chapter, the researcher discussed the method that was followed in conducting this research. The main- and sub-aims for determining the phonological awareness skills of the participants were clearly stated, as well as the research design that formed the basis for the research. The criteria and selection procedures for the selection of the participants were discussed, as well as the materials and apparatus used for the collection of data. The procedures for collection, recording and analysis of data were also discussed in detail. The ethical implications of the study and the reliability and validity of the research received the due attention.