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The translucency values of Blissymbols as rated by typically developing Setswana learners

by

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Submitted in partial fulfilment of the requirements for the degree

Masters in Augmentative and Alternative Communication

In the

Centre for Augmentative and Alternative Communication

Faculty of Humanities

UNIVERSITY OF PRETORIA

PRETORIA

Supervisor : Prof. J. Bornman

November 2006

ACKNOWLEDGEMENTS

"God is with you in everything you do."

Gen. 21:22

Prof. Erna Alant for her dedication to the field of AAC, especially in South Africa. Your commitment is an example to me and to every other student!

Prof. Juan Bornman - someone else who inspired me. If it were not for you, I would not have started this study (and not completed it either!). Thank you, Juan!

My husband, Piet. Dankie my wonderlike man vir jou ondersteuning, geduld en bystand!

My adorable children, Liza and Janie. I love you so much! You are a blessing to me.

My family and especially my wonderful parents, for providing unconditional love, motivation and support.

My sister, Lidia, for always being willing to help. You are a star and indeed an example to everyone!

Wonderful friends, cell groups and colleagues for their patience and support.

Elizabeth who acted as research assistant and all the small children who participated in this study.

The translators.

Rina Owen, Department of Statistics, University of Pretoria and Renee Koen for advice and assistance with the statistical analysis.

Mrs. Ina Bruwer for the language editing of this thesis. Thank you for your hard work!

Mrs. Karien Naudé for the technical editing.

The financial assistance of the National Research Foundation (NRF) towards this research project is hereby acknowledged.

Opinions expressed in this report and conclusions arrived at,

are those of the author and not necessarily

attributable to the NRF.

ABSTRACT

Cross-cultural differences in the perception of pictorial material has long been established and documented. In the Republic of South Africa, which is increasingly globalized, and where it is appealing from financial, economic and training perspectives, the temptation is to use Western-based AAC symbol systems and strategies in intervention with clients from other language and cultural orientations.

The aim of this study was to determine the translucency ratings of specific Blissymbols as rated by six-to seven-year-old Setswana-speaking children. A secondary aim was to determine whether the ratings changed after second and third exposures in order to determine the learnability of these symbols. A brief comparison was made between the results of the current study and the results reported in the Quist *et al*., study (1998).

Thirty-five Setswana learners were exposed to 93 selected Blissymbols, based on a study by Quist *et al*., (1998). A three-point semantic differential scale, consisting of three faces accompanied each Blissymbol. Participants marked the face that best described his/her perception of the specific symbol's iconicity. This procedure was repeated over a period of three days. The results indicated that the translucency ratings of the majority of the Blissymbols ranged from moderate to high. The research further demonstrated significant differences in translucency ratings between the first and second exposures, suggesting learning of the symbols. A smaller difference was noted between Days 2 and 3. A correlation in findings was noted between the current study and the Dutch and US studies (Quist *et al*., 1998).

Key terms

Augmentative and Alternative Communication (AAC); Blissymbols; cultural issues; comparative studies; iconicity; learnability; repeated exposure; Setswana language; symbol systems; translation process; translucency.

OPSOMMING

Kruis-kulturele verskille in die waarneming van prentmateriaal is lank reeds gevestig en gedokumenteer. In 'n toenemend geglobaliseerde Republiek van Suid-Afrika, is dit uit finansiële, ekonomiese en opleidingsperspektiewe, ‘n versoeking om Westers-gebaseerde AAK-simbole te gebruik in intervensie met ander taal- en kultuurgroepe.

Die doel van hierdie studie was die deursigtigheidsbepaling van spesifieke Blissimbole soos beoordeel deur 6-7-jaar oue Setswana-sprekende kinders. 'n Sekondere doel was om vas te stel of die beoordelings verander het na 'n tweede en derde blootstelling, om sodoende die leerbaarheid van hierdie simbole te bepaal.

Vyf- en dertig Setswana-sprekende leerders is blootgestel aan 93 geselekteerde Blissimbole, gebaseer op 'n studie deur Quist *et al*, (1998). 'n Driepunt- semantiese differensiaalskaal, bestaande uit 3 gesigte het elke Blissimbool vergesel. Elke deelnemer het die gesig wat sy\haar persepsie van die ikonisiteit die beste beskryf het, gemerk. Die prosedure is oor 'n periode van 3 dae herhaal. Die resultate het aangetoon dat die deursigtigheidsbepalings van die meerderheid van die Blissimbole gevarieer het tussen gemiddeld en hoog. Navorsing het verder belangrike verskille uitgewys tussen die eerste en tweede blootstellings, wat leerbaarheid van die simbole suggereer. 'n Klein verskil is opgemerk tussen Dag 2 en Dag 3. 'n Korrelasie is gevind tussen die huidige studie en die Nederlandse en Amerikaanse studies.

Sleutelterme

Aanvullende en Alternatiewe Kommunikasie (AAK); Blissimbole; deursigtigheid; herhaalde blootstelling; ikonisiteit; kulturele aspekte; leerbaarheid; Setswana taal; simbool stelsels; vergelykende studies; vertalingsprosedure.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Augmentative and Alternative Communication
AAK	Aanvullende en Alternatiewe Kommunikasie
HRHC	Categories based on the high dimensions of representativeness (R) and concreteness (C);
LRLC	Categories based on the low dimensions of representativeness (R) and concreteness (C);
PCS	Picture Communication Symbols
PIC	Pictogram Ideogram Communication
PICSYMS	A graphic symbol system of pictographs and ideographs
SOV	Subject Object Verb
SVO	Subject Verb Object
STD	Standard Deviation
USA	United States of America
UK	United Kingdom

CHAPTER 1

INTRODUCTION

1.1 PROBLEM STATEMENT

Practitioners and educational specialists in South Africa are presenting and teaching Western-based graphic representational systems to their clients, without really knowing how these clients relate to them, their ability to learn the meaning of the symbols and their motivation to use them as an interactive communication tool.

Although a variety of studies on graphic communication symbols have been conducted in the past, the majority were done in European-American linguistic communities (Bloomberg, Karlan & Lloyd, 1990; Huer, 2000; Mizuko, 1987). To date, only a few iconicity studies focusing on cross-cultural comparisons have been done (Huer, 2000; Nakamura, Newell, Alm, & Waller, 1998; Quist, Lloyd, Van Balkom, Welle-Donker Gimbrere, & Vander Beken, 1998).

Local iconicity studies include Haupt's investigation (2001) of the iconicity of PCS in a rural Zulu community and Basson's study (2005) on the iconicity of PCS in Afrikaans-speaking children. A comparative study on the learnability of Cyberglyphs and Blissymbols was done in the Northern-Sotho context (Alant, Life & Harty, 2005). Iconicity issues were explored in two other studies, where Minspeak ™ formed the focus of the research (Kolatsis, 2005; Van der Merwe, 2000). These studies are described in more detail in Chapter 2.

Where lack of resources (therapists, finances, etc.) and high illiteracy rates are present, it is appealing from a financial, economic and training perspective, to use standardized symbol systems and strategies in intervention (Alant, 2005a) on clients from other language -, and cultural orientations. However, when applying AAC systems in a culturally diverse country such as South Africa, Brown's warning (1977) that iconicity is culture-, time- and experience-bound, must be recognized. AAC interventionists therefore have to be cautious so as not to become insensitive to the individual's prior experiences and learning (Alant, 2005a) and they should be warned that results from iconicity studies on one cultural group

cannot necessarily be applied to another (Haupt & Alant, 2002). The need for iconicity studies in different cultural and language groupings is thus clear.

The term *iconicity* is defined as the degree of similarity between the symbol and the referent (Blischak, Lloyd & Fuller, 1997; Fuller & Lloyd, 1991). It has been hypothesized that if a graphic symbol is highly iconic, its referent or meaning should be more readily guessable than if it were not iconic. *Translucency* is the degree to which individuals perceive a relationship between a symbol and its referent when the referent is known (Blischak *et al*., 1997).

First exposure impression will influence instruction and learning. If a symbol is highly iconic it would simplify teaching and use of the symbol (Sevcik, Romski, & Wilkinson, 1991). For meaningful communication, everyone involved must be able to understand it. While a literate communication partner can read the accompanying gloss (written word), illiterate communication partners as well as pre-literate partners, e.g. young children, have to rely on symbol iconicity to guess the symbol's meaning.

A second equally important issue in symbol learning is ease of learning or the learnability of symbols (Basson, 2005). Studies should therefore not only look at the responses of individuals at first exposure, but also take the learnability of symbols into account. The learnability of graphic symbols is influenced by many factors: the features or inherent characteristics of the symbol set/system (Fuller, Lloyd & Stratton, 1997), the individual's own abilities (Light & Lindsay, 1991) and motivation (Vanderheiden & Lloyd, 1986), the selected vocabulary (Arvidson & Lloyd, 1997), the representational range, cultural aspects (Soto, Huer & Taylor, 1997) and the individual's previous experience and world knowledge (Zangari & Kangas, 1997). In order to make a meaningful match between the AAC user and the graphic symbol set / system, the above-mentioned factors should be considered carefully.

To conclude, more research is needed, especially in non-Western cultures, to fully understand different influences on the implementation and learning of graphic symbol systems. The current study will contribute to this by investigating iconicity and translucency in a non-Western population.

1.2 CHAPTER OUTLINE

The research is presented in 5 chapters.

Chapter 1 presents a brief problem statement and introduction to the study. It offers an outline of each chapter and explains important terms used throughout the study.

Chapter 2 gives the theoretical background to the study. Concepts mentioned in Chapter 1 are expanded upon and relevant research and literature are discussed.

In C*hapter 3* the research methodology is set out. A detailed description of the aims of the study, the research design, the participant selection and description; material; data collection procedures, analysis and processing of data, as well as the results of the pilot study, are given.

Chapter 4 presents the results and a discussion of the results obtained in the main study.

In C*hapter 5* results are integrated, the study is critically evaluated, and recommendations for further research are made.

1.3 DEFINITION OF TERMS

The following terms need some clarification.

Iconicity

This term refers to the visual relationship between a symbol and its referent and includes both *transparency* and *translucency* (Blischak *et al.*, 1997; Fuller & Lloyd, 1991).
The absence of iconicity is called *opaqueness* (Fuller & Lloyd, 1997).

Learnability

Learnability is the ease with which a symbol can be learned by an AAC user or the individual communicating with the AAC user.

Translucency

Translucency refers to the degree to which individuals perceive a relationship between a symbol and its referent when the referent is known (Blischak *et al*., 1997).

Transparency

Transparency is used to describe the guessability of a symbol in the absence of its referent (Blischak *et al*., 1997).

1.4 SUMMARY

This chapter provided an overview of the rationale for this study by highlighting the limited research on iconicity issues in South Africa. It also included an outline of the different chapters by which the aim of the research will be realized. The chapter concluded with a list of frequently used terms.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses research done on the iconicity and translucency of graphic symbols in the AAC field, including studies conducted in South Africa. Different research methodologies are outlined. The importance of iconicity in learning and using graphic symbols is highlighted. It also explores different variables that might impact on first exposure and on the learnability of graphic symbols.

2.2 ICONICITY AND TRANSLUCENCY RESEARCH IN THE AAC FIELD

Iconicity refers to how apparent the relationship between a symbol and its meaning (gloss) is to individuals (Luftig & Bersani, 1985a) or to the visual relationship between a symbol and its referent (Blischak *et al*., 1997; Fuller & Lloyd, 1991). It refers to any association that an individual forms between a symbol and its referent. This association may be based on a recognized physical link between the symbol and its referent or any idiosyncratic association made by the viewer (Robinson & Griffith, 1979). The degree of iconicity is thus an important factor in determining the learnability of the symbol.

If symbols are neither guessable nor based on a logical relationship between the symbol and its referent, messages are likely to be misunderstood. Iconicity can thus aid clinicians in the selection of graphic symbols, since iconic symbols are easier to learn than those that are less iconic (Fuller, 1987, Luftig, 1983; Mizuko, 1987). In other words, graphic symbols with a strong resemblance to their referents would thus be easier to learn and remember than those with a weak visual relationship (Fuller & Stratton, 1991). Research on the iconicity of graphic symbols predominately supported the iconicity hypothesis. These findings are consistent for children and adults with typical cognitive and physical abilities, as well as for individuals with cognitive impairments (when comprehension tasks are considered) and also individuals with autism (Fuller & Lloyd, 1997). According to Sevcik, Romski and Wilkinson (1991), learners with severe cognitive disabilities who do not comprehend the spoken referent, may not benefit from iconicity, as they would not be able to perceive a similarity between the symbol and its referent. Learners with a prior receptive understanding of the

particular word may be able to learn a symbol-referent relation more effectively than those without this understanding (Clark, 1987).

Two dimensions of iconicity have generally been of interest in past research in the AAC field, namely transparency and translucency. A symbol is considered transparent if it looks like the referent (Blischak *et al*., 1997). A translucent symbol is understandable once the relationship between symbol and referent is known (Lloyd, Fuller & Arvidson, 1997).

Translucency is believed to be the most psycholinguistically valid as this is what typically occurs in the natural learning environment (Griffith & Robinson, 1980). Translucency has at least two underlying processes: first speculating about the possible meanings of an icon and then, after presentation of the referent, understanding the connection. Translucency represents an individual's judgment along a continuum (such as a Likert rating scale of 1–7). It has been found to facilitate symbol learning for both Blissymbols and manual signs (Fuller, 1997; Luftig & Lloyd, 1981).

Much attention is given in AAC research and literature to the nature and importance of iconicity (first exposure impression) as an important variable in symbol learning (Fuller, 1987; Goossens', 1984; Luftig & Bersani, 1985b). DePaul and Yoder (1986) expressed their concern that too much attention is given to iconicity, to the exclusion of other variables also important in symbol learning. The importance of iconicity in the initial acquisition of aided and unaided AAC symbols has, however, been clearly demonstrated in previous research (Fuller, 1987; Luftig & Bersani, 1985b; Luftig & Lloyd, 1981; Mizuko, 1987). For a detailed summary of previous studies on iconicity, refer to Schlosser's meta-analysis (2003).

Iconicity research can be grouped into studies comparing the guessability of systems, and studies rating the iconicity of symbols. The methodology of the different studies varies. When comparing the learnability and recognition of different symbol sets or systems, participants have to indicate or label responses. When rating iconicity on a specified scale, the dimension of translucency becomes important, which is the focus of the present study.

In translucency studies participants need to rate the visual similarity of the symbol to its referent on a specific scale (Bloomberg *et al*., 1990). The participants are given both the symbol and its meaning and have to indicate how strong they perceive the relationship

between the symbol and the referent to be. A rating of 1 indicates little or no relationship, while 7 indicates a very strong relationship between the symbol and its referent (Luftig & Bersani, 1985a).

Blissymbol representativeness, a term suggested by Yovetich (1986), and Yovetich and Young (1988), instead of the term Blissymbol translucency, was also considered as a visual relationship. Yovetich (1986) defined it as the degree to which a symbol is perceived as representing its concept or word referent. Carmeli and Shen (1998), however, claimed that this approach, focusing primarily on the visual relationship, is too narrow. They suggested investigating, in addition to iconicity, the semantic relationship between symbols and their referents. Two types of transparency/translucency should be distinguished: one visual (representing iconicity) and the other semantic, representing the relationship of agreement between two meanings: the composite meaning of symbol components and the meaning of the symbol referent. For example, the degree of agreement between the components "house" and "fabric" and its referent "tent" is the degree of semantic transparency / translucency.

For the present study, it is important to highlight *complexity* as a significant variable when determining the translucency of the symbols. The physical complexity of a graphic symbol is defined by the number of strokes required to produce a symbol (Fuller & Lloyd, 1987). Symbols having one to five strokes were regarded as low in complexity, while those with eight or more strokes were considered high (Fuller, 1997). According to Luftig and Bersani (1985b) complexity increases as the number of basic elements increases. The degree to which the figure of a graphic symbol stands out from its background may also indicate complexity (Lloyd, Fuller & Arvidson, 1997; Silverman, 1995).

Transparency studies usually employ one of two methods. A *forced-choice task* requires participants to match a spoken label with a symbol from a closed set of alternatives (Mirenda & Locke, 1989). The presentation is usually in the form of a grid with the target symbol and three foils of the same symbol type. Other transparency studies use an *open-choice task* that requires participants to guess the meaning of a symbol presented to them (Luftig & Bersani, 1985b). According to Musselwhite and Ruscello (1984) a forced-choice task might be easier than an open-choice one.

Three significant translucency studies, where Blissymbols were presented to mainly Western populations, explaining their methodologies and outcomes, are summarized in Table I. The focus of these studies was on the visual transparency or translucency, rather than on semantic transparency / translucency.

TABLE I Three Blissymbol studies investigating translucency

Title, author/s, year	Objectives	Graphic symbol set / system	Participants	Methodology	Results	Shortcomings and clinical recommendations
An initial investigation of translucency, transparency and component complexity of Blissymbolics. (Luftig & Bersani, 1985a)	To measure the transparency and translucency of a large sample of Blissymbols. To investigate the effect of component complexity on transparency and translucency.	Blissymbols	95 undergraduate college students	Translucency: video consisting of 200 Blissymbols, presented with its written and spoken label. Participants required to rate visual similarity on a scale of one to seven. Transparency: video containing same Blissymbols. Participants required to guess the meaning of each symbol.	Translucency and transparency values were determined. Transparency low. No difference between word classes. The number of components negatively influenced translucency and transparency values.	Verbs were not more transparent than nouns, as is the case with manual signs. Possibly because the action indicator is opaque.
Initial study into the effects of translucency and complexity on the learning of Blissymbols by children and adults with normal cognitive abilities. (Fuller, 1997)	To investigate the effect of translucency and complexity on Blissymbol learning.	Blissymbols	Children and adults with normal cognition.	Forty symbols were presented to each participant. They were instructed to name symbols orally. For an incorrect response, the correct label was provided. A final retention trial was conducted one week after the first session employing the same procedure.	Highly translucent and highly complex symbols were learned most often. Adults learned more symbols than children.	Complexity positively influenced children's symbol learning when translucency was low. No effect on adult's performance.

Title, author/s, year	Objectives	Graphic symbol set / system	Participants	Methodology	Results	Shortcomings and clinical recommendations
The comparative translucency of initial lexical items represented in five different graphic symbol systems and sets. (Bloomberg, Karlan & Lloyd, 1990)	To compare translucency within and across five aided AAC symbol sets/systems. Symbols represented three parts of speech: nouns, verbs and modifiers.	Blissymbols Rebus PCS PIC PICSYMS	50 undergraduate university students.	Symbols with labels were provided. Participants were required to rate the visual similarity of the label to its symbol on a scale of one to seven.	Nouns were significantly more translucent than verbs or modifiers, regardless of the sets/systems. PICSYMS and Blissymbols: verbs and modifiers were equally translucent. PCS, Rebus and PIC: verbs were significantly more translucent than modifiers. Considering most parts of speech (most translucent to least); Rebus and PCS (equivalent); Blissymbols.	Symbol sets/systems are not internally consistent with regard to translucency. An initial lexicon could include symbols selected from a variety of sets/systems after considering the translucency of the symbol and the experience of the user.

The majority of studies aiming to determine the transparency and/or translucency of graphic symbols involved Blissymbols. From Table I it is clear that translucency is an important factor in the learning of graphic symbols. In addition, it shows that different symbol sets or systems are not internally consistent with regard to translucency and that more information on specific symbols is needed.

Further inspection of Table I and literature shows that comparative studies between graphic symbol systems or sets have been conducted mainly on Western populations. De Paul and Yoder (1986) warn against the generalization of iconicity ratings.

In the context of manual signs, Luftig and Lloyd (1981) also pointed out that the perceived relationship between sign and referent might be largely based on culture and world knowledge. What is judged to be translucent by one population, may be regarded as opaque by another. Symbols must therefore be re-evaluated periodically for their current relevance. A picture symbol of an old-fashioned wall telephone with the crank at the side might be easily understood by senior citizens, but be opaque to children and adolescents (Millikan, 1997) or other cultural groupings.

In past translucency research, an extensive seven-point equal-interval Likert scale has been used to rate translucency with a rating of one indicating very little visual relationship between symbol and referent, and a rating of seven indicating a very strong visual relationship (Lloyd, Karlan & Nail-Chiwetalu, 1994). Sufficient cognitive ability to make delicate distinctions between different levels of resemblance is necessary to indicate varying degrees of visual relationship between the two extremes (Quist *et al*., 1998). Griffith and Robinson (1980) and Page (1982) suggested the use of three- and four-point scales when working with younger children. They suggested that children as young as four years could reliably rate translucency by using smiley faces on a three- or four-point scale.

Table II provides information on three landmark international cross-cultural iconicity studies, while culture-specific studies in the South African context are included in Table III.

TABLE II Three international cross-cultural iconicity studies

Title, Author/s, Year	Objectives	Graphic Symbol set / system	Participants	Methodology	Results	Shortcomings and Recommendations
How do members of different language communities compose sentences with a picture-based communications system? – A cross-cultural study of picture-based sentences constructed by English and Japanese speakers. (Nakamura, Newell, Alm & Waller, 1998)	To determine the influence of word order and lack of particles on the performance of Japanese speakers when using graphic symbol sets that rely on English SVO word order.	PCS	80 undergraduate Japanese university students proficient in spoken and written Japanese. (Most common word order is SOV in Japanese. Particles rather than word order indicate subject and object.)	Participants listened to Japanese folktale. 40 answered 5 questions using PCS alone; 40 with PCS and added particle array. Half of the symbols were arranged in SVO order and half in SOV order. Interview with participants after experiment.	Participants used particles when available. Reported difficulty when not available. Participants produced more SOV than SVO sentences; no SVO sentences produced when particles were available.	Particles should be added to graphic symbols sets, but may lower iconicity. Thus, add particle for users with adequate language ability. English equivalent can be used to add prepositions and tense markers.

Title, Author/s, Year	Objectives	Graphic Symbol set / system	Participants	Methodology	Results	Shortcomings and Recommendations
Translucency values of Blissymbols across cultures. (Quist, Lloyd, Van Balkom, Welle-Donker Gimbrere & Vander Beken, 1998)	To establish the effect of cultural differences on translucency ratings of Blissymbols. To compare translucency data of children with those of adult ratings. To compare translucency ratings of individuals from different cultures. To compare translucency ratings of children with disabilities with those of typically developing children.	Blissymbols Two lists containing 57 symbols each.	161 typically developing children, age six-seven years, from the USA and the Netherlands. 21 deaf children in Belgium and the Netherlands. 16 individuals with severe disabilities in the Netherlands.	Children had to draw a circle around the face best describing their rating of the Blissymbol on a three-point scale.	Children generally rated the translucency similarly to adults. Blissymbols rated high in translucency by adults were also rated high by children. Mid and low translucency Blissymbol identifications were mixed. Data on children with disabilities was included and some similarities in performance were suggested. For some children translucency plays a significant role, but for others individual perceptions may be affected more by personal experiences (which is linked to cultural background), or by their active imaginations.	Data suggested similarity in performance of disabled and nondisabled children. Because of small number of participants and limited disabilities, this observation should be viewed with caution. Extend research to more disabilities.
Examining perceptions of graphic symbols across cultures: Preliminary study of the impact of culture/ethnicity. (Huer, 2000)	To investigate the impact of culture/ethnicity on participants' perceptions of graphic symbols.	Blissymbols PCS DynaSyms	147 adults from different cultures, but comparable backgrounds: European American, African-American, Chinese American, Mexican American.	Labels of symbols were translated. Participants were presented with symbol and label. Rated translucency on seven-point scale. Study comparable to Bloomberg *et al*., (1990).	Ratings within symbol sets showed significant differences. Order of rankings the same across groups. PCS most translucent, followed by DynaSyms, then Blissymbols.	Developers of AAC symbol sets / systems should take culture into account. AAC symbols should be selected in consultation with users and families. Participant selection and translation of labels important issues in further research.

*SVO – Subject Verb Object SOV – Subject Object Verb

As can be seen in Table II, African American participants were included in the Huer study (2000), but, since these participants were born and educated in America, the results cannot be applied to cultures indigenous to South Africa and the rest of Africa. Huer's recommendation that developers of AAC symbol sets / systems should take culture and factors such as translating of symbols into account, must be highlighted (Huer, 2000). The lack of information on translucency and transparency issues of graphic symbols for African cultures is apparent.

When conducting cross-cultural research, it is necessary to consider some methodological difficulties. A fundamental matter in cross-cultural research relates to the issue of achieving test equivalence on various levels of the process (Sechrest, Fay & Zaidi, 1972). Equivalence in cross-cultural research can be defined as "a state or condition of similarity in conceptual meaning and empirical method between cultures that allows comparisons to be meaningful" (Matsumoto, 2000, p. 115).

One important issue relates to the problem of translation and equivalence in translation. When conducting cross-cultural research, both the correct selection and translation of symbols are essential (Huer, 2000). Words and other verbal utterances can have more than one meaning, depending on the context (Knapp, 1978). While many words have similar meanings in different languages, they often have different nuances and connotations (Matsumoto, 2000). Even common words for breaking, cutting and drinking, can have entirely different connotations and nuances, and can be used in different contexts in other cultures (Suzuki, 1978). According to Werner and Campbell (1970), it is more difficult to translate a shorter utterance than full sentences because of the lack of context. When translating an English word into its literal equivalent in another language, it is often assumed that the words mean the same. The translation of symbols has thus to be done in such a way that participants can identify with it. This whole process is called ethnographic translation (Brislin, 1980). Sechrest *et al*., (1972) refer to this basic tension, relating to equivalence in translations, as the "paradox of equivalence". The paradox implies that, if one demands that one form of a test or other measure produces comparable results in two different cultures in order to demonstrate equivalence, the more equivalent the two forms become, and the less probability there is of cultural differences. It is necessary for researchers to make informed decisions about which components of equivalence are relevant in producing the desired outcomes between the cultural groups, and which are not (Alant, 2005b).

Iconicity information of graphic symbols thus has tremendous value in the selection of a symbol set or system, especially if this information is culture-specific. In addition to the international studies already mentioned, a few studies have been conducted in the South African context with various graphic symbol systems/sets. These are summarized in Table III.

TABLE III Seven South African iconicity studies

Title, Author/s, Year	Objectives	Graphic symbol sets/ systems	Participants	Methodology	Results	Shortcomings and Recommendations
A Microcomputer-based synthesis of Blissymbols from Key Components. (Shalit, 1991	Iconicity hypothesis: component composition and transparency.	Blissymbols:HRHC LRLC	Study one: 43 able-bodied high school students. Study two: 35 able-bodied high school students.	Study one: Labelling spoken response; Study two: Rating of translucency	HRHC symbols were easier to guess than LRLC symbols. Providing the component composition increased the transparency and translucency of compounds.	The use of the semantographic approach to the teaching of Blissymbols should be expanded on.
The difference in the ease of acquisition of Blissymbols in pre-school children of two different language and cultural groups. (Lorenz, 1995)	To determine whether there is a difference in the ease of acquisition of Blissymbols in pre-school children of two different language groups.	Blissymbols	Two groups consisting of five children each.	Eighteen symbols were trained for two days. A baseline evaluation, end-of-training evaluation and an after-withdrawal evaluation were conducted, as well as participants' ability to generalize information to unfamiliar symbols.	Verbs proved to be problematic for both groups. Both groups performed better with single element symbols than with compound symbols.	The influence on generalization by using a number of different words for a symbol during training, should be investigated formally.

Title, Author/s, Year	Objectives	Graphic symbol sets/ systems	Participants	Methodology	Results	Shortcomings and Recommendations
A comparison of the learnability and retention between Blissymbolics and Cyberglyphs. (Alant, Life & Harty, 2005)	To compare two symbol systems in terms of learnability and retention.	Blissymbols CyberGlyphs	50 typically developing Northern Sotho speaking children ranging from grade four to grade six.	Participants were taught different referents (40 Bliss and 40 CyberGlyphs). Participants were tested on symbol recognition at four different stages: after initial training, revision period, seven-day withdrawal period and after 30 days of withdrawal.	Ease of learning and retention of CyberGlyphs higher than those of Blissymbols. CyberGlyphs possibly easier to access visually.	Impact of poverty and reduced exposure to literate environment on symbol learning should be investigated. Impact of using a different presentation mode – hand-drawn vs. computer-generated symbols on symbol learning.
The iconicity of selected picture communication symbols for rural Zulu-speaking children. (Haupt & Alant, 2002)	To investigate the iconicity of selected PCS for rural Zulu-speaking children.	PCS	94 Zulu –speaking children between the ages of ten and eleven years.	Participants were required to match a symbol with each of 36 spoken Zulu labels.	The iconicity of PCS symbols was generally low, possibly because of the presence of arrows in many of the symbols.	It might be profitable to use a symbol set/system that employs more postural cues and fewer arrows. Future studies should investigate how rural Zulu mother-tongue speakers interpret arrows and why.

Title, Author/s, Year	Objectives	Graphic symbol sets/ systems	Participants	Methodology	Results	Shortcomings and Recommendations
The iconicity and learnability of selected picture communication symbols: A study on Afrikaans-speaking children. (Basson, 2005)	To investigate the iconicity and learnability of PCS for Afrikaans-speaking children.	PCS	46 Afrikaans-speaking children between the ages of six and seven years.	Participants were provided with 16 copies of a 16 topic specific matrix overlay and required to match a symbol with a spoken Afrikaans label. One group of children then received training.	Iconicity of between 12.5 % and 25 %. The results showed significant improvement after training.	Enlarge the size of symbols on communication board. Further studies without symbols organized thematically. Conduct same study in cross-cultural contexts. Studies investigating different teaching strategies and their influence on learnability.
Young adult's associations with Minspeak TM icons. (Van der Merwe & Alant, 2004)	To investigate young South African adults' association with selected Minspeak TM icons, used in Unity TM software.	12 Minspeak TM icons	480 able-bodied tertiary education students from diverse backgrounds.	Participants completed a questionnaire accompanied by each Minspeak icon.	Some of the icons and their encoded vocabulary items might be used successfully in the South African context, while others need to be adapted to be locally relevant.	Subsequent research should include more participants from diverse backgrounds to obtain a more representative sample of the South African adult population.

Title, Author/s, Year	Objectives	Graphic symbol sets/ systems	Participants	Methodology	Results	Shortcomings and Recommendations
The associations English - speaking South African adolescents make with Minspeak TM icons found on the unity 128 software package. (Kolatsis, 2005)	To determine and compare the common associations of 12 Minspeak™ icons contained within the Unity 128 Software Package by young adolescents.	12 Minspeak™ icons contained within the Unity 128 Software	53 young English-speaking South African adolescents aged between 12 and 14 years.	Participants completed one measuring instrument with 12 icons each in accordance with the instructions and in the allocated time period.	The most frequently chosen associations were those based on their visual properties. The vocabulary in the Unity 128 Software Package may be useful as a basis for customizing a user's vocabulary. Associations in some cases are influenced by multilingual and multicultural factors. Most of the vocabulary chosen would need to be revised for the South African context.	More participants should be included in future studies. A greater representative sample of all the official languages should be obtained. A more appropriate geographical and cultural sample must be included in future studies.

Table III shows that two published studies, namely Alant *et al*., (2005) and Basson (2005) investigated iconicity issues on subsequent exposure. Studies which focus on the way different graphic symbols are learnt and retained by children and adults, are important for a better understanding of the processes involved in graphic symbol learning.

Table III also illustrates that all children have difficulty in recognizing less iconic graphic symbols, even after training. Familiarity with the graphic symbols plays an important role in the learnability of the communication system. This is significant, as graphic symbols unfamiliar to young children will require greater effort to learn, which is particularly problematic for children with severe disabilities (Basson, 2005).

Certain suggestions, based on previous research, were made to adapt symbol sets or systems (for example PCS), to the South African context - including four large categories, i.e. context, content, structural and conceptual changes (Bornman, Haupt, & Geiger, 2002). These suggestions include changing the people category to bring the facial features more in line with African people and to add well-known African personalities, e.g. Mr. Nelson Mandela. Family dwellings also needed to be changed to be brought more in line with typical African dwellings, ranging from rounded Zulu huts to the brightly coloured Ndebele houses (Bornman *et al.*, 2002).

It is clear that the data on the iconicity of graphic symbols on indigenous cultures is limited. This is a common problem, as the majority of studies focus on widely used European languages and cultures.

According to Hersen and Barlow (1976), “one of the most cherished goals of any science is the establishment of generality of findings” (p.50). With the range of cognitive, linguistic and physical abilities inherent across all AAC system users, the complications in generalizing findings from able-bodied subjects become more noticeable (Bedrosian, 1995). As the AAC field can be described as a relatively new “science”, there may be a period in which there is not yet enough observed evidence / data to support generalizability of findings, especially in the ability to apply research findings from non-disabled subjects to the population of persons with communicative impairments (Bedrosian, 1995). An adequate number of comparison studies employing similar methodologies, with the two populations, must be conducted, in

order to feel confident in the ability of researchers to generalize their findings (Bedrosian, 1995).

2.3 FIRST EXPOSURE IMPRESSION

In the AAC field, good practice often suggests the selection of easy to learn symbols as the first symbols to be taught to a client (Fuller, 1997; Mirenda & Locke, 1989). It is believed that this strategy facilitates communication, while ensuring communication success, which in turn motivates the AAC user. Images, according to Barthes (as cited in Besio & Chinato, 1996), may be easier and more immediately intelligible than linguistic messages. Although elementary, iconic images may add a symbolic level to the person's cognitive world and can thus support the subject's development (Piaget, 1951). Graphic symbols are interesting as they provide the AAC user the opportunity of processing information based on translucency (Lonke, Lloyd, Van Balkom, & Arvidson,1999). The higher the translucency of the graphic symbols, the higher the likelihood of the user focusing on their "imagistic" characteristics (Lonke *et al*., 1999, p. 191). It may therefore be assumed that the iconic image of a higher logical level can be an appropriate mediator for learning towards symbolic representation (Barthes, as cited in Besio & Chinato, 1996), which is important in the communication development of the person with little or no functional speech.

In the AAC field iconicity is, furthermore, important as it possesses expressive and representative strength (Besio & Chinato, 1996). Iconicity offers advantages in the communication of, for example, adults with aphasia, as relatable images may help with their spoken or written communication. A person may, for example, incorrectly, but successfully, use the graphic symbol 'glass' to signify a desire to drink, instead of the existing symbols 'drink' or 'thirsty' (Besio & Chinato, 1996).

Information on the iconicity of symbol sets and symbol systems is especially valuable in the South African context, because of widespread illiteracy in the country. A literate communication partner can read the gloss (written text) that accompanies each graphic symbol (for example on a communication board), while illiterate communication partners have to rely on the transparency (or guessability) of a symbol to give meaning (Musselwhite & Ruscello, 1984). It is expensive and practically impossible to train all possible communication partners in the use of the relevant symbol set or system (Dunham, 1989).

The use of iconic symbol sets or systems would thus be more efficient (Musselwhite & Ruscello, 1984).

Currently, increasing attention to cultural issues and their possible impact on the iconicity of graphic symbols is evident in the AAC literature (Huer, Saenz & Doan, 2001). Published articles, for example, "Do individuals from diverse cultural and ethnic backgrounds perceive graphic symbols differently?" (Nigam, 2003), stimulate discussion. Research on the iconicity of graphic symbols indicated that participants with different cultural backgrounds had a range of interpretations of graphic symbols and of natural gestures presented (Brown, 1977; Hall, 1979; Haupt, 2001; Morris, Collett, Marsh & O'Shaughnessy, 1981; Nigam & Karlan, 1994; Poyatos, 1988).

There is also evidence in the AAC literature that different word categories impact on the iconicity of graphic symbols (Haupt, 2001; Mizuko, 1987; Mizuko & Reichle, 1989, Nigam, 2003). Although not statistically tested, it seemed, in the Haupt study (2001), for example, that nouns were perceived as more iconic than other word categories.

Other factors impacting on the iconicity of graphic symbols are world knowledge and experience. In order to recognize something one must have prior knowledge of it. The interpretation of pictures is thus based on comparing perceived elements of the picture with the contents of the person's memory (Hoffman, 2002). It is not an easy task to understand the differences in the experiences people have. Researchers must therefore acknowledge the complexity of, but also the need for considering the individual's background and experiences, when investigating iconicity issues of graphic symbols.

Various studies have shown differences in visual perception across different cultures. Cultures with an oral tradition, for example, do not respond to pictorial depth cues as other Western subjects do (Bock, 1988; Deregowski, 1980; Hoffman, 2002; Hudson, 1960; Segall, Campbell & Hersokovits, 1963; Sigel, 1978). The symbolizing three dimensions in two theory, for example, suggested that people in Western cultures focus more on things on paper than people in other cultures – and in particular, spend more time learning to interpret pictures (Matsumoto, 2000).

Because of differences between pictures and objects, it is suggested that the perception of similarity between picture and object may be a learned skill (Mollica, 2003). Several preconditions for understanding pictographs exist, for example, daily exposure to, and experience with pictographs in a given society (Gangkofer, 1990). Hoffmann (2002) concluded that the visual perception of illiterate persons does not differ from those of literate persons. The basic process of perception is the same, but the contents differ, as they reflect different habits of inference.

2.4 SUBSEQUENT EXPOSURE: THE LEARNABILITY OF GRAPHIC SYMBOLS

According to Light and Lindsay (1991) there are two basic procedures to test what has been learned, namely recall and recognition. With recall tasks participants must learn information and then be able to remember or reconstruct it at a later date. With recognition memory, the participant has to retrieve or reconstruct learned information, but only be able to recognize it when the target item is presented at a later stage (Light & Lindsay, 1991).

A variety of studies have been conducted on the ease of learning graphic symbols, using recall or recognition procedures (Burroughs, Albritton, Eaton, & Montague, 1990; Ecklund & Reichle, 1987; Fuller, 1997; Luftig & Bersani, 1985b). These studies confirm the iconicity theory (Fristoe & Lloyd, 1979) with more iconic symbols learned faster.

Research on the learnability of graphic symbols include studies describing the internal characteristics of the systems. For example, symbols with a higher number of components were more difficult to learn than symbols with few components (Luftig & Bersani, 1985b). Symbol complexity appears to have an effect on children when learning Blissymbols (Fuller, 1997). According to Fuller (1997) variables such as the complexity of symbols, formational features, the frequency of occurrence of the referent and concreteness also play an important role in symbol learning. Luftig and Bersani (1985b) found, for example, that high translucent symbols were learned faster than symbols judged low in translucency. A study done by Shepherd and Haaf (1995) shows that regardless of age, participants learned more when the meanings of elements were included in training.

In Basson's study (where iconicity and learnability of PCS were investigated) the control group did not receive training (Basson, 2005), yet significant differences were found between

pre- and post-results of both the control and experimental groups. These findings can be attributed to the single exposure the participants had to the symbols and labels during the pre-test procedure.

Different teaching strategies also influence symbol learning (Burroughs *et al.,* 1990; Clark, 1981).

2.5 SUMMARY

This chapter explored research on iconicity and translucency in the AAC field. The listed studies include international studies as well as those done in the South African context. Different methodologies when conducting iconicity and translucency research were outlined. The chapter explored the importance of iconicity and related variables, which may have an effect on first and subsequent exposures of graphic symbols.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In this chapter the methodology used in the study is discussed. The main aim and objectives of the research and research questions are included. The study is then outlined in terms of a preparatory phase, the pilot study and the steps followed in the main study. The criteria used for participant selection, as well as materials and equipment used, are included. The translation procedure used to translate the concepts into Setswana is highlighted. The chapter concludes with the data collection procedures and data analysis used in the main study.

3.2 AIM OF THE STUDY

3.2.1 Main aim of the study

The main aim of the study is to determine the translucency ratings of specific Blissymbols on first exposure by Setswana[1] speaking children. An additional objective was to determine the learnability of these symbols after subsequent exposure.

3.2.2. Sub-questions

What are the translucency ratings of 93 selected Blissymbols by typically developing six- to seven-year-old Setswana-speaking children?

What are the translucency ratings on second and third exposure on three consecutive days?

3.3 RESEARCH DESIGN

This is a non-experimental descriptive design (McMillan & Schumacher, 2001). Thirty-five Setswana speakers (six- to seven-year-old-learners) were exposed to 93 selected Blissymbols, based on a study done by Quist *et al*., (1998). A three-point semantic differential scale

[1] The language Setswana is spoken widely in Southern Africa with an estimated four million speakers, including speakers in Zimbabwe and Namibia.

(McMillan & Schumacher, 2001) - a variation of the Likert scale - which is orientated towards younger children, was used. The rating scale (consisting of three faces) accompanied each Blissymbol. Participants marked the face that best described his/her perception of the specific symbol's iconicity:

a *smile* (the Blissymbol looks a lot like the word presented)

neutral (the Blissymbol may look a little bit like the word presented) and

frown (the Blissymbol does not look like the word presented at all).

This procedure was repeated three times over three successive days and each of the 35 participants completed a total of six booklets. The data acquired by this procedure is quantitative in nature and can be subjected to statistical analysis to produce meaningful information.

3.4 PARTICIPANTS

3.4.1 Selection of schools

The study aimed at exploring Setswana-speaking learners' perception of Blissymbols' iconicity. The Gauteng Department of Education provided information on schools with Setswana as tuition language. The selected primary school, whose main language of tuition is Setswana, was one of three in the Tembisa area (Gauteng). This particular school was chosen both for fitting the language criteria, as well as its proximity to where the researcher lives. The period, during which the research was conducted was chosen to be as convenient as possible to the school, so as not to interfere with examinations or other important events.

Poverty, illiteracy and unemployment of parents are features of life in the area. To involve participants of only one school would help to establish a homogenous group, as the socio-economic circumstances differed greatly between different schools in the area (F. Motsoane, personal communication, 12 May 2005).

3.4.2 Selection of participants

Purposeful sampling was used and participants were selected according to specific selection criteria. These criteria are described in Table IV. A total of thirty-five participants were selected to take part in the study (Gabor & Ing, 1997). Five additional participants were included in case of participant withdrawal.

TABLE IV Participant selection criteria and description

Variable	Selection criteria	Description
Chronological age	Participants had to be between six and seven years old at the time of the study to be comparable with the Quist study (Quist *et al*., 1998).	Each participant's age was calculated using the birth date received from teachers' reports.
Mother tongue and tuition language	Participants' mother tongue and language of tuition had to be Setswana.	A school where the language of tuition is Setswana was targeted. Information was gathered from the parent questionnaire (Appendix A), learner profiles and information from the teachers.[1]
Receptive language abilities	All participants must have receptive language abilities in the typically developing range. The participants must be able to understand the concepts presented. No obvious language difficulties or delays in Setswana must be present.	As the researcher did not have the means of doing a receptive vocabulary test, the researcher requested the learners' teachers[1] to compile a list of fitting candidates based on the selection criteria.
Scholastic performance and learning difficulties	None of the participants must have had to repeat an academic year. This criterion was included to control for obvious learning disabilities.	The original list compiled by the teachers[1] was checked against the school's records and the names of all learners not meeting this criterion were removed.
Visual and hearing acuity and visual processing ability	Normal vision and hearing are important criteria, as the participants would have to interpret visual stimuli by responding to auditory instructions. Participants' visual discrimination and processing skills had to be adequate to perform the tasks required.	Information was obtained from parent questionnaires (Appendix A) as well as from teachers[1] and the list of possible participants adjusted accordingly.
Attention and behaviour	Participants must have no obvious attention and behavioural problems.	Information was obtained from teachers[1] and the school's learner profiles.
Familiarity with Blissymbols	Participants must have had no prior exposure to Blissymbols.	Information was obtained from teachers.[1] No incidence of therapeutical intervention in the school made the probability of previous exposure to Blissymbols slight.

[1] The literature suggests that under appropriate conditions, teachers can be reliable informants with respect to the functional performance of their students, when not formally evaluated (Skuy, Westaway, Makula & Perold, 1988). The researcher is not familiar with the Setswana language or the learners, and therefore relied on teachers to obtain the necessary information.

Table IV shows that seven specific variables were used to select participants.

3.5 RESEARCH PHASES

The research consisted of the following two phases:

- A preparatory phase that consisted of the selection of symbols and the translation of English concepts into Setswana, as well as a pilot study.
- The main study that includes the data collection procedures.

3.5.1 Preparatory phase

3.5.1.1 Selection of symbols

Because the methodology was based on that used in the Quist *et al*., study (1998), the list of symbols used by Quist *et al*., formed the basis for this study (Appendix B). It is, however, important when rating iconicity that participants have the receptive skills and be familiar with the concepts studied. The test material has to form part of the world knowledge of children from the target population (Blachowics, 1994). The list of symbols used by Quist *et al*., (1998) therefore had to be adapted, leaving out concepts that may be unfamiliar to the target population of this study.

The hundred symbols or English concepts that were used in the study of Quist *et al*., (1998) were given to two independent teachers associated with the participating school, and familiar with children at this age level. They were asked to judge the symbols and to eliminate concepts probably not familiar to the selected participants. The judges were familiar with both English and Setswana, and also familiar with the functioning level of six- and seven year old Setswana children. The judges worked independently and indicated four concepts that could possibly be unfamiliar to the target population (pepper, purple, peak and shower). Appendix C provides the proposed list of concepts, after the familiarity rating. Of the 93 remaining symbols, 72 were nouns, six adjectives, twelve verbs and three adverbs. The seven practise items that were used in the Quist *et al*., study (1998), were also used as practise items before each session.

3.5.1.2. Translation of concepts into Setswana

To minimize the influence of linguistic factors on the performance of participants, the entire test procedure was conducted in Setswana. The original list of English words, as well as the

initial orientation, instructions and help prompts, thus had to be translated into Setswana. As stated by Retief (1988) the best way of accomplishing ethnographic translation is to involve persons familiar with both the source and the target language.

- **Translation Procedure**

The translation procedure as described by Haupt (2001) was used; this is based on Brislin's (1980) basic translation methods and Bracken and Barona's (1991) work on translation. It includes a combination of blind back translation, review committee and pre-test procedures. The translation procedure is discussed in more detail in Table VI, while Table V provides information on the translators involved in the three translation phases.

TABLE V Description of translators

TRANSLATION PHASE 1			
	Translator 1	**Translator 2**	**Translator 3**
Qualifications	B. Bibl; Honours African Languages; Diploma: Translation	B.Ed	HOD B.Ed
Occupation	Librarian	Minister	Teacher
Mother tongue	English/Afrikaans	Setswana	Setswana
Other languages	Setswana, seSotho, Dutch	English	English
Translation experience	Frequently, freelancing	Occasionally, for social and church groups.	Frequently for curriculum purposes.
TRANSLATION PHASE 2			
	Translator 4	**Translator 5**	
Qualifications	HOD	B.Ed Honours Linguistics	
Occupation	Teacher	Educator; Head of Department (Foundation Phase)	
Mother tongue	English	Setswana	
Other languages	Setswana	English, Afrikaans	
Translation experience	Frequently, for work-related purposes	Frequently, freelancing	

TRANSLATION PHASE 3		
	Translator 6	**Translator 7**
Qualifications	B.Ed Honours	B. Sc (Chemistry)
Occupation	Teacher	Chemist
Mother tongue	Setswana	Setswana
Other languages	English, Northern Sotho (seSotho sa Leboa)	English
Translation experience	Occasionally, freelancing	Occasionally, freelancing

Table V indicates that all translators had university degrees. Their occupations varied as did their mother tongues. Four of the seven translators did frequent translation work, while the remaining three were Setswana speakers. Four of them consider themselves professional translators. The translation was done in three phases. Table VI shows the translation process in detail.

TABLE VI Translation process

STEP 1: First translation into Setswana		
Translators involved	Procedure	Results
Three translators were involved (Appendix D – letter to translators). A description of the first three translators is presented in Table 3.2.	Three translators were provided with the list of words compiled after the familiarity rating (Appendix C). The researcher provided the translators with the English words, as well as with the associated Blissymbol. By providing the Blissymbol, the translators would better understand the context of the words and avoid major discrepancies or inappropriate translations. In one instance, the translator was familiar with Dutch and this translator was provided with a copy of the list translated into Dutch (Quist *et al*., 1998) as well (Appendix B). The three translators independently translated the English concepts into Setswana.	Of the 93 words 33 were translated identically by all three translators; twelve were translated to three different words by the three translators. The remaining 45 words were translated identically by two of the three translators. In many cases there were only differences in spelling (e.g. kgetse vs. kgetsi and Labohlano vs. Labotlhano) and in other cases prefixes and prepositions were added by some and omitted by other translators (e.g. mo godimo vs. godimo and kwapele vs. pele). More discussions were therefore necessary, which led to step 2.
STEP 2: First Consensus		
Translators involved	Procedure	Results
The team of translators involved in step 1, and the researcher.	The three different translations were compared and the differences discussed with the translators until consensus was reached on the correct translation. This is called the *First Consensus* (Appendix E).	Some of the words are not native to the Batswana culture and Setswana language and are colloquialisms obviously borrowed from other languages (e.g. “tennis”: thenese, tenesi and “machine”: motshini, matshine). In these cases, the most commonly used form of the word was selected. In other cases, there was more than one correct translation, and the translators had to decide on which one would be less ambiguous (e.g. “money”: madi, chelete).
STEP 3: Blind back translation		
Translators involved	Procedure	Results
A second team of two translators.	The First Consensus was translated back to English by a second team of translators. They did not have access to the original list, therefore it is called a *blind back translation.* They worked independently and afterwards consolidated their suggestions (Appendix F).	All but 14 words were translated back to exactly the same words as the original. Of these 14 words, some were synonyms (e.g. candy vs. sweet; truck vs. lorry). Some had similar meanings (scream vs. shout, careful vs. take care) while two were translated to a different word (woods vs. news, mop vs. maize).

STEP 4:		
Translators involved	Procedure	Results
The second team of two translators.	This team of translators examined the cases where differences existed between the original and the back-translated English. They were asked to suggest better translations for each of the problem words.	Four recommendations were made: Some of the words had more than one English translation (e.g. policeman vs. police officer). The Setswana language does not differentiate between words like shout and scream (goa) and lady and mother (mme). In some instances, the spelling of the word can change the meaning (e.g. mopo = maize vs. mmopo = mop). There were three different translations for the word 'wood'. Two of the three translators suggested 'sekgwa' for woods, but the third translator insisted that the word 'sekgwa' was 'grassfields' and that woods were 'dikgang'. It was decided to use the word word 'dikgang' for woods. (In the first back translation it was translated into news.)
STEP 5: Second Consensus		
Translators involved	Procedure	Results
The first team of translators.	The suggestions of the second team of translators were presented to the first team of translators and they had to consider it to reach a *Second Consensus* (Appendix F).	After deliberation, the first team of translators accepted the suggestions as is.
STEP 6: Second blind back-translation to English		
Translators involved	Procedure	Results
A third team of two translators.	The *Second Consensus* was handed to another team of translators who did not have access to the original list of English words, for another *blind back-translation*.	The results of the second back-translation were compared with the original list of English words and no more conceptual differences were found.
STEP 7: Pilot Study		

As no differences were reported at Step 7, it demonstrates that this is an effective method of achieving an accurate translation. The seven-step translation process described in Table VI resulted in a list of 93 symbols of which no conceptual differences were found between the translations.

3.5.1.3 Pilot study

- **Objectives of the pilot study**

A pilot study was conducted to ensure the feasibility of planned data collection procedures and the suitability of test material (McMillan & Schumacher, 2001). This was done to identify any potential areas of uncertainty or problems in either the words to be used in the test, or in the test procedures.

The pilot study's main aim was to determine the participants' comprehension of the instructions and the relevance of the use of pictures/faces on the three-point-scale, instead of written descriptive words like "yes", "it looks a bit like" or "no". The comprehensibility of the translation was also tested. The participants as well as their teachers were asked if there were words that they did not recognize or were foreign to them (see Table VII).

The pilot study gave a more accurate estimation of the time it would take to complete the survey each day. The relevance of the score sheets and the procedure in which raw data was to be transferred to a table, were also tested.

The objectives of the pilot study are discussed in detail in Table VII.

- **Context and subjects**

Ten participants were selected for the pilot study. They were selected from the same school and the same age group for the main study. The possibility that they would discuss the contents of the test material with the participants of the main study was considered, but this was dismissed for the following reasons:

- the abstract nature of the material would make discussion irrelevant to the outcome of the study
- the relatively long period (three weeks) between the pilot and the main study

- choosing another school (with different socio-economic circumstances) would influence the compatibility between the pilot and the main study.

The same steps as outlined for the main study were followed. The procedure was completed in one day, instead of being repeated over three days, as done in the main study. For a description of the research assistant's selection, refer to Table X.

TABLE VII Objectives, results and recommendations following the pilot study

Objectives	Materials & Equipment	Procedures	Results	Recommendations
1. To evaluate whether participants could relate to the test material.	Booklets A1 and B1 with all the test items.	Informal discussion with Grade 1 and Grade 2 teachers familiar with the age group. The test material was presented to the teachers and asked if the participants would understand the concepts (Appendix F) and the different faces on the three-point-scale. The test material was presented to the participants in the same manner as proposed in the main study.	According to the teachers the children would understand the concepts. Participants enjoyed the activity and had no difficulty in completing the task.	The material seemed to be appropriate for use with the target population and no changes were necessary. It was decided to exclude the symbol number from the test booklets, to avoid confusion with the number next to the Blissymbol.
2. To determine whether participants understand the instructions.	Booklets A1 and B1 Verbatim Setswana instructions (Appendix G) Markers	Responses given by participants were investigated.	Initially, when conducting the training items, some participants had difficulty in marking the corresponding face next to the Blissymbol. These participants marked either the previous or the following example's scale. No difficulty in understanding the instructions was noticed.	The instructions were adapted and the research assistant motivated the participants, after completing each item, to place their finger on the next picture. No difficulties were detected and the participants understood the procedure. Instructions seemed to be appropriate and no changes were needed.
3. To determine the most effective response made, e.g. pictures (smiley face, neutral or frowning) or the use of written words ('yes', 'a little bit' or 'not at all'.)	Booklet A1 with pictures of three faces (smiley, neutral and frowning). Booklet B1 with written Setswana words (Ee = yes; dibatlile = a little bit and Nnya = no).	Discussions with teachers of participant age groups. Investigating the participants' responses during the test-procedure.	Participants related well to both the pictures and the words. According to the teachers, the children were familiar with the pictures of faces as they are part of the curriculum requirements.	The use of a picture scale instead of written words was decided on.
4. To investigate the conversion of raw data to	Raw data in booklets	After completing the procedure, the raw data from the booklets was captured in a table in such a way	No transferring problems were noted, except for one instance where the	Provision must be made in the table for cases where the participants' choices

Objectives	Materials & Equipment	Procedures	Results	Recommendations
meaningful information.		that it can be subjected to statistical analysis.	participant's choice was not clear. In this case, it was indicated as such for the purpose of correct statistical analysis.	are not clear.
5. To determine whether participants could turn the pages one at a time, when instructed.	Booklet A1	Any problems were noted.	The participants had no problem in turning the pages when instructed.	No changes were needed with the outlay of the booklets.
6. To determine whether the pre-training items and training procedure were sufficient.	Training items (Nr 1- 7) in Booklet A1 Markers Verbatim instructions Blackboard and marker	Research assistant used verbatim instructions and modelled behaviour of drawing a line through the selected face on the blackboard. All seven training items were drawn on the blackboard, identical to Booklet A1. Participants were motivated to select a face independently and not to only copy the research assistant's decision.	Participants imitated the research assistant's behaviour successfully.	Pre-training procedure was deemed sufficient and it was decided to keep the process unchanged.
7. To train the research assistant in the test procedure.	Training items (Nr 1- 7) in Booklet A1 Markers Verbatim instructions Blackboard and marker	Executing the complete test procedure.	The research assistant was confident with the process.	No further training would be necessary.

The Pilot study yielded unexpected results (i.e. with regards to the instructions). The recommendations made following the pilot study contributed to the quality of the main study and were therefore also implemented in the main study.

3.5.2 Main study

3.5.2.1 Introduction

The main study consisted of the data collection over a period of three consecutive days. The following chapter describes the participants, the material and equipment used, as well as the data collection procedures.

3.5.2.2 Description of participants

Participants were selected according to specific criteria as described in Table IV. Thirty-five learners were selected to take part in the study. The average age of the participants was 6 years 11 months with a standard deviation (STD) of 5 months. The first language of all participants was Setswana. One child was absent on Day 3.

3.5.2.3 Material

- **Format of test booklets**

Three sets of symbols, one for each day, were used. Each set contained all 93 symbols, but in a different sequence. It is important to note that the 93 symbols were compiled into one data set, but for practical reasons these symbols were divided into two booklets, namely Booklet A and Booklet B. Each day's proceedings was conducted over two sessions with a break period. Booklet A was used for the first session and Booklet B for the second session. Seven symbols served as practise items in the beginning of Booklet A for Day 1. The same seven symbols were also included as practise items in Booklet A for Day 2 and Day 3. Apart from these seven symbols, the sequence of the symbols were randomized for each day. Thus, six booklets were printed (Booklet A1, B1 for Day 1; Booklet A2, B2 for Day 2 and Booklet A3, B3 for Day 3).

The test material consisted of the Blissymbol for each word, accompanied by three computer-drawn faces (Appendix H). The gloss (or written word) was not printed in the booklets. One

copy with the translated Setswana concepts was, however, provided to the researcher and the research assistant to ease the sequence process of presenting the test-material.

One recommendation, following the pilot study, was to remove the numbers that accompanied each Blissymbol. This was done to eliminate confusion of the Blissymbol and the number next to each other. Each page was numbered in the middle at the bottom of the page.

- **Blissymbols**

The Blissymbols were generated using WinBliss computer software (an application that allows the user to edit / create Blissymbols), supplied by Blissymbolics Learning Center in Bala, Canada.

The Blissymbols were printed on A4 pages in landscape format. The contents of each page consisted of a grid of four blocks wide by four blocks high. Four Blissymbols appeared in the first column, with next to each symbol a smiling face in the second column, a neutral face in the next and a frowning face in the fourth column. The first seven symbols in each booklet served as practise items.

The order in which the symbols appeared was randomized by computer. It was double-checked afterwards to make sure that no symbol appeared more than once on the same page and no symbol appearing on the last page of a previous booklet and on the first page of the following booklet. Each child had to evaluate 297 symbols over the three days. Of the 93 symbols, 72 were nouns, six adjectives, twelve verbs and three adverbs.

- **Faces**

Each Blissymbol (in all six booklets) was provided with a variation of the Likert scale, namely the *semantic differential scale* (McMillan & Schumacher, 2001). The rating scale consisted of a *smiley face; a neutral face and a frowning face* to represent the three choices:
The Blissymbol “looks a lot like the word”;
The Blissymbol “looks a little bit like the word”; or
The Blissymbol “does not look like the word at all.”

The three faces were printed by using computer software written for this purpose. An example of the rating scale is given in Table VIII.

TABLE VIII Example of rating scale

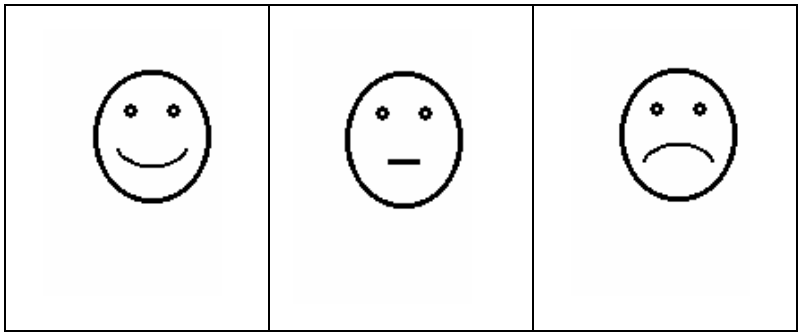


Table IX provides a description of the equipment used in the study, as well as the way in which it was used.

TABLE IX Equipment

Material / equipment	Description / use
Six test booklets (A1, A2, A3 and B1, B2, B3) for each participant for recording purposes	Each participant received six test booklets to be completed over three consecutive days. The first seven items in each booklet served as training items. The training items appeared in the same sequence in each booklet. A total of 210 booklets was used.
Verbal instructions	Verbal instructions in English and Setswana (Appendix G). Prompts allowed during the session (Appendix I)
Markers	Each participant received a marker to indicate choice.
Portable whiteboard and marker	The research assistant modelled behaviour of marking a face (frown, neutral or smile) when training the selected items. The articipants then practised this behaviour in their individual booklets.
Tokens (sweets, pencil and stickers)	Each participant received stickers, pencils and some refreshments as reward for participating in the study.
Ball, bean bags and hoops	A fun activity took place to give the participants a break between completing 2 booklets each day. The break occurred after completing Booklet A1and before starting

Material / equipment	Description / use
	Booklet B1 on Day 1. The same procedure be followed on Day 2 and Day 3.
Tape recorder and cassettes	Sessions were recorded in order to determine the consistency of instructions given across sessions.

3.5.2.4 Selecting and training of research assistant

A research assistant was selected in collaboration with the principal of the school where the pilot study was done. Proficiency in Setswana and English, as well as experience working with young children, were essential criteria in appointing the research assistant. The research assistant had to be familiar with the target population and also had to live Tembisa, the area where the study took place. Biographical information of the research assistant is given in Table X.

TABLE X Details of research assistant

Criteria	Description
Age	41 years
Gender and nature	Female; friendly; spontaneous, familiar working with young children.
Mother tongue	Setswana
Other Languages	English, seSotho
Occupation	Teacher
Qualification	B.Ed Honours
Experience with children	Mother of teenage boy; 15 years in teaching profession. Currently teaching Grade 3 (nine year olds).

The research assistant interacted with the participants in the pilot-, as well as in the main study. Training was done by providing the assistant with general background information regarding the study. The assistant received a copy of the instructions to be given to the participants. The translated instructions (Appendix G) were read in Setswana in order to ensure consistency between sessions. The research assistant also received a copy of the allowed neutral prompts or reminders in Setswana (Appendix I). The research assistant was trained to give only the specified prompts - to ensure that all participants received the same amount of clarification.

The research assistant was trained using three children who did not participate in the study. After this she also practised the procedure in the pilot study.

3.5.2.5 General procedural considerations

Permission was obtained from the Gauteng Department of Education to conduct the study. A Research Request Form was completed and electronically submitted to the department (Appendix J). Written approval to conduct the study in a Gauteng school was given by the Gauteng Department of Education (Appendix K). A primary school in Tembisa, with Setswana as the language of tuition, was targeted. A visit to the selected school was

scheduled and a meeting with the principal was arranged. The nature and purpose of the study was discussed with the principal and other stakeholders.

Oral permission was given to conduct the research in the school. A letter to obtain formal permission was then sent to the selected primary school (Appendix L). The principal responded positively and a copy of the permission is attached (Appendix M). The participants were selected as described in 3.4.1.3. A letter was sent to the parents of possible participants. Permission was obtained to allow their children to be part of the study (Appendix A).

General information on the child was obtained through an attached questionnaire (See Appendix A). Parents were assured that children would take part on a voluntary basis and that participation could be terminated at any time if they so wished. The assistance of the school was asked beforehand to collect the completed letters. Only learners with positive written approval to participate in the study were included in the research.

A suitable time was scheduled with the school and the research assistant. The study was conducted over three consecutive days. The same procedures were followed each day. The data collection procedure on the first day (Day 1) is described in Table XI.

3.5.2.6 Steps followed in collection of data

TABLE XI Data collection procedures

	Description of procedure
	Day 1
Step 1	Participants that met the selection criteria gathered outside the room designated for the study. For control purposes, each participant received a numbered card (1 – 35) to pin to his/her collar, while waiting in line.
Step 2	Participants were instructed to take the seat with the corresponding number (stuck on the tables). They were instructed not to touch the booklets or pencils on their tables when entering the room.
Step 3	After settling down, the researcher handed out the booklets. Care was taken to give each participant the correct numbered booklet. The booklets used over the three days were numbered as follows: Participant no. 1; Booklet A1 etc. This was done to eliminate confusion and to help with analysis of data. The participant's number corresponded with the numbers on the individual booklets on their desks (Booklet A1).

	Day 1
Step 4	Rapport was established by introducing the researcher and the research assistant and explaining the reason for their involvement.
Step 5	The research assistant explained that no marked choices were *right* or *wrong* answers and that each child has his/her own idea of how each symbol looks. Participants were motivated not to copy each others' work or to discuss the test items.
Step 6	The research assistant presented the practise items by modelling the expected behaviour on the whiteboard. The research assistant guided the participants through the individual practise items (1-7) in Booklet A1. The translated Setswana instructions (Appendix G) as well as the list of prompts that were allowed throughout the session were used (Appendix I). No other comments or instructions were allowed. When analysing the data, an independent rater determined the consistency with which these instructions were given across different sessions and on different days.
Step 7	Each participant indicated his/her choice by marking one of the three possible faces on the rating scale.
Step 8	Participants were asked to look up after completion of each item in order to give the researcher an indication when a specific test item was finished. The researcher and the research assistant ensured that all participants were familiar with the procedures before proceeding to the sampling of the main test items.
Step 9	After completion of the seven practise items, the next 50 symbols were presented one by one. The same instructions used in the practise items were also used in the remainder of Booklet A1. The tape recorder was switched on at this point.
Step 10	When all the items in Booklet A1 were completed, the researcher and the research assistant collected the booklets.
Step 11	Afterwards a fun activity took place outside the room to give the participants a break.
Step 12	After the fun activity, the participants were asked to settle in the room again. The second booklet (Booklet B1) was already on their numbered desks and the whole procedure followed the same steps as described above.
Step 13	The session was concluded by expressing appreciation and by giving each participant a reward.
Step 14	The instructions / remarks were played back to an independent rater after the completion of data collection. A checklist comprising all the prompts/comments (Appendix I) was used to record which instructions/comments were used and which were left out or changed.
	Day 2 and Day 3
Step 1 to Step 14	The procedure on Day 2 and Day 3 followed the same steps as on Day 1, with the same participants. Booklets A2 and B2 were used on Day 2. Booklets A3 and B3 were used on Day 3. The data collection was scheduled on three consecutive days.

As Day 2 and Day 3 followed exactly the same procedures, the 14 steps are not described in detail again, therefore Table XI highlights specific aspects only.

3.6 PROCEDURE INTEGRITY

In order to ensure that the instructions and motivational remarks of the test procedure were consistent across sessions, the instructions / remarks of all three days were played back to an independent rater after the completion of data collection. A checklist comprising all the prompts (Appendix I) was used to record which instructions/comments were used and which were left out or changed.

Of all the comments, 96% were the prescribed comments as stated in Appendix I. This includes slight variations e.g. "Don't look at your neighbour's work" instead of "Don't copy from your neighbour." The remaining 4% were comments related to the situation e.g. "There's another pencil for you". Consistency was calculated by dividing the number of altered comments by the total number of comments.

The above calculation indicates that the comments from the research assistant corresponded to the prompts as provided. The difference in the number of comments per day was calculated by dividing the smallest number of comments per day (Day 2) by the largest number of comments (Day 1). The result (8.2%) was considered small enough not to have influenced the outcome of the study.

3.6.1 Data analysis and statistical procedures

Care was taken that participants received their corresponding numbered booklets when they were handed out. This was done to keep a balance between objectivity and traceability. Symbols were not numbered in the participants' booklets and the order in which the symbols appeared in the different booklets differed from day to day. However, the researcher kept master-copies of the booklets with the corresponding words next to each symbol, as well as tables with all the relevant data.

The raw data was captured using MS Excel software. The data was plotted per participant, per booklet, per symbol in the format "s" for a smiley, "n" for neutral and "f" for a frown. The scores were double-checked by an independent research reviewer to eliminate typing and transfer errors. At the end of the three-day period, the data was computerized for statistical

analysis with the SAS statistical package version 9.1. Mean scores and standard deviations were calculated to provide information on the spread of distribution. The Friedman Test, which is an extension of the Sign Test (Brink, 1999), was used as it evaluates differences between more than two conditions where the same or related participants are tested on each condition. Effect size indexes were calculated for results that showed statistically significant differences. The analysis of the data was done with the help of the Department of Statistics at the University of Pretoria.

3.7 SUMMARY

This chapter described the methodology of the research. It included the aim of the research and the objectives necessary to meet it. Research phases, including a description of the pilot study followed. Criteria for selection and a description of the participants, materials and equipment with respect to the main study are included. Finally, data collection, recording and analysis were discussed.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter describes the research results of the study. The results focus on the two aims of the study, namely:

- the translucency ratings on first exposure and
- the translucency ratings on multiple exposures.

The results are described in terms of these two aims and form the primary outcomes of the study. Specific symbols that contribute to the findings are discussed. Symbols showing the highest and lowest translucency ratings respectively, are listed.

Supplementary to this, the results of a comparison with the Quist *et al*., study (1998) is presented. The symbols with the highest and lowest translucency ratings from the US and Dutch population groups, as well as those from the current study, are listed and discussed.

4.2 DIFFERENCES IN TRANSLUCENCY RATINGS OVER THE THREE DAYS

Since the data is categorical (possible values being only 1, 2 or 3) a Friedman non-parametric test was applied to determine whether differences in translucency ratings over the three days were statistically significant (McMillan & Schumacher, 2001). Table XII shows the scores for the three days. It also includes the *p*-values obtained from the Friedman test.

TABLE XII Mean and *p*-values for Booklets A and B

	DAY 1		DAY 2		DAY 3		Result from Friedman's test
	Mean	STD	Mean	STD	Mean	STD	*p*-value
Booklet A	1.5779	0.2827	1.3899	0.3241	1.3880	0.2974	0.0001*
Booklet B	1.5266	0.3586	1.4368	0.3729	1.3865	0.3215	0.0164*

*Statistical significance is indicated with an asterisk

The objective of repeating the procedure three times over three days was to determine the effect of repeated exposure on the translucency ratings, thus establishing the learnability of the symbols. Table XII shows a significant difference in the mean values of the symbols over the three days, at a 95% significance level (p-value ≤ 0.05). However, when examining the data it is clear that the differences lay between Day 1 and Day 2. More specific tests were needed to determine the nature of the differences and therefore the effect size index was calculated. This is summarized in Table XIII.

TABLE XIII Effect size index

	Mean	**STD**	**Effect size**
Booklet A			
Day 1 – 2	0.1879438	0.2407562	0.76 (moderate to large)
Day 2 – 3	0.0019231	0.1846386	0.01 (small)
Day 1 – 3	0.1898669	0.2982916	0.62 (moderate)
Booklet B			
Day 1 – 2	0.0898220	0.2141231	0.41 (small – moderate)
Day 2 – 3	0.0502451	0.1878264	0.26 (small)
Day 1 – 3	0.1400671	0.2218645	0.62 (moderate)

Effect size indexes can only be calculated on statistically significant data (McMillan & Schumacher, 2001). Effect size indexes of close to 0.2 are regarded as small effects; indexes of about 0.5 as medium or moderate effects, and 0.8 and above as large effects (McMillan & Schumacher, 2001).

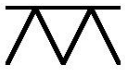
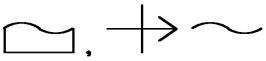
At first glance the results show only a small to moderate effect size index for Day1-Day2, Day1-Day2 and Day1-Day3. However, if Booklet A and Booklet B are considered independently, a moderate to large effect size index between Day1 and Day 2 for Booklet A is noticed. This indicates significant differences in translucency ratings between these two days for symbols used in Booklet A.

For practical purposes the original list used in the Quist study was randomly split between Booklets A and B. The difference in results is coincidental, but suggests a meaningful variation in the results of individual symbols.

When a Friedman test (McMillan & Schumacher, 2001) was applied to the individual symbols, it was found that of the 93 symbols only seven showed significant differences on a

95% level over the three days (Booklet A contained all seven symbols). These symbols are displayed in Table XIV.

TABLE XIV The seven symbols displaying significant differences over the three days

No	Symbol	Symbol name	Mean Day 1	STD Day 1	Mean Day 2	STD Day 2	Mean Day 3	STD Day 3	*p*-value
3		animal	2.4118	0.7831	1.3823	0.6970	1.6176	0.8170	0.0002
8		bird	2.0000	0.8876	1.1765	0.4586	1.1471	0.4357	0.0024
62		pig	2.2353	0.8896	1.5588	0.8236	1.5294	0.7876	0.0133
49		lving-room	2.0857	0.8531	1.4286	0.6981	1.4571	0.8168	0.0149
52		money	2.1428	0.8793	1.4857	0.7811	1.8571	0.8452	0.0309
44		hold	2.0000	0.8528	1.3529	0.6458	1.5588	0.8236	0.0347
83		swimming pool	1.9091	0.8048	1.4242	0.7513	1.4545	0.7111	0.0494

The results discussed thus far suggest that the difference in translucency ratings lie between Day 1 and Day 2, as presented in Figure 1.

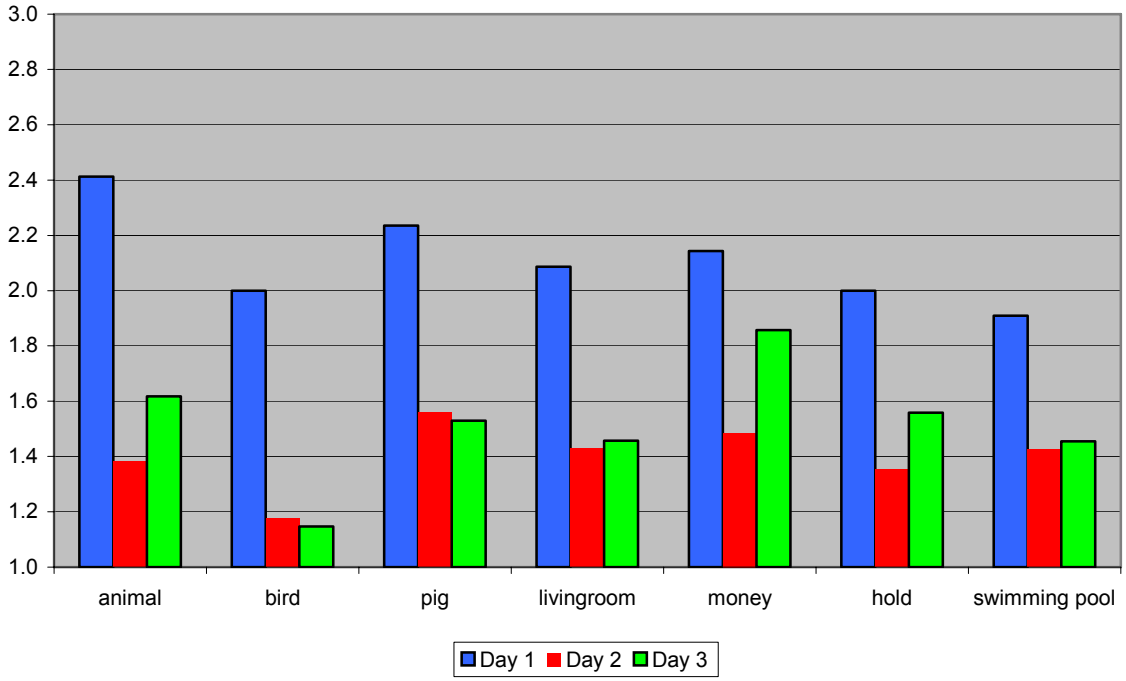


FIGURE 1 **The mean values for the seven symbols displaying significant differences over the three days**

It was important to determine the influence of these seven symbols on the overall results. The Friedman test was thus repeated, excluding data of these seven symbols.

Table XV shows the mean values of Day 1, 2 and 3, excluding the seven symbols mentioned in the previous paragraph.

TABLE XV **Mean and *p*-values excluding seven symbols**

Booklet	DAY 1		DAY 2		DAY 3		Result from Friedman's test
	Mean	STD	Mean	STD	Mean	STD	*p*-value
Booklet A	1.5115	0.2717	1.3905	0.3211	1.3823	0.2918	0.0017*
Booklet B	1.5266	0.3586	1.4368	0.3729	0.3215	0.3215	0.0164*

* Statistical significance is indicated with an asterisk

Despite the exclusion of the seven symbols discussed in the previous section, the results of the Friedman test indicated significant differences in the translucency ratings of symbols over the three days, on a 95% level (p-value ≤ 0.05).

To investigate the differences the effect size test was done by excluding the seven symbols. Table XVI provides the results of the effect size test.

TABLE XVI Results of the effect size test

	Mean	STD	Effect size
Booklet A			
Day 1 – 2	0.1210518	0.2337177	0.51 (moderate)
Day 2 – 3	0.0081319	0.1808340	0.04 (small)
Day 1 – 3	0.1291838	0.2884786	0.44 (small - moderate)
Booklet B			
Day 1 – 2	0.0898220	0.2141231	0.41 (small – moderate)
Day 2 – 3	0.0502451	0.1878264	0.26 (small)
Day 1 – 3	0.1400671	0.2218645	0.62 (moderate)

Effect size indexes can only be calculated on statistically significant data (McMillan & Schumacher, 2001). Effect size indexes of close to 0.2 are regarded as small effects; indexes of about 0.5 as medium or moderate effects, and 0.8 and above as large effects (McMillan & Schumacher, 2001).

When an effect size test was calculated with this data, all the effect sizes were within the small to moderate range. This indicates that there are more symbols, other than the seven that were excluded, showing differences in translucency ratings over the three days.

In conclusion, significant differences in the translucency ratings between Day 1 and Day 2 were found, as well as between Day 2 and Day 3 (at a 95% significance level with p-value $\leq$ 0.05). However, the effect size index indicated that the difference lies between Day 1 and Day 2 and exposure on Day 1 had led to the recognition of more symbols on Day 2. These results support Basson's findings (2005) that although participants in the study's control group had not received any training, significant differences were found between the first and second exposures. This finding can be attributed to the single exposure the participants had to the symbols during the pre-test procedure

4.3 TRANSLUCENCY RATINGS ON FIRST EXPOSURE (DAY 1)

One objective of the study was to give an indication of the translucency ratings on first exposure. Table XVI provides the first 31 symbols (⅓ of the total number of 93 symbols)

with the highest translucency ratings on first exposure. The mean values, standard deviation and ranking of the symbols are also presented.

TABLE XVII Symbols with highest translucency rating

No	Gloss	Symbol	Mean	Rank	STD
39	glass		1	1	0.0000
73	seven		1	1	0.0000
84	table		1	1	0.0000
57	one		1.0303	4	0.1741
88	toothbrush		1.0303	4	0.1741
5	banana		1.0588	6	0.2388
28	eye		1.0588	6	0.2388
79	stairs		1.0606	8	0.2423
34	fork		1.0882	9	0.3788
46	house		1.0882	9	0.2879
22	curtains		1.0909	11	0.2919
93	worm		1.1176	12	0.4093
85	teeth		1.1429	13	0.3550
24	down		1.1471	14	0.5004
53	moon		1.1471	14	0.4357
65	push		1.1471	14	0.4357
71	scissors		1.1471	14	0.4357
89	truck		1.1471	14	0.4357
14	camp		1.1765	19	0.4586
27	enter		1.1818	20	0.5276
30	first		1.2059	21	0.4786
38	girl		1.2059	21	0.4786

No	Gloss	Symbol	Mean	Rank	STD
77	soup		1.2059	21	0.5382
6	beautiful		1.2353	24	0.4960
43	heart		1.2353	24	0.6060
66	question		1.2647	26	0.6656
29	fall		1.2941	27	0.6291
40	glasses		1.2941	27	0.6291
42	hear		1.2941	27	0.5789
59	package		1.2941	27	0.6291
2	alike		1.3529	31	0.7337

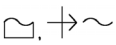
The three symbols rated most translucent by the participants had a mean value of one and a standard deviation of 0. These symbols are nr. 39 (glass), 73 (seven) and 84 (table). The first 11 symbols all had a mean value of less than one. The first third of the symbols had a mean value of less than 1.3.

Of the first 31 symbols, the symbol with the greatest standard deviation was symbol nr. 2, “alike”. The mean for “alike” was 1.3529 and the standard deviation 0.7337. “Alike” was ranked lowest of the first 31 symbols.

The fact that “alike” has the lowest ranking and the highest standard deviation in this list, does not necessarily indicate that the standard deviation increases with the mean. For instance, symbol nr. 42 (hear) is ranked 27 th with a standard deviation of 0.5789 and a mean value of 1.2941 while symbol nr. 66 (question) had a higher mean value (Mean = 1.2647) and a lower standard deviation (0.6656).

Table XVIII presents the 31 least translucent symbols (the bottom third).

TABLE XVIII Symbols with lowest translucent ratings

No	Gloss	Symbol	Mean	Rank	STD
9	black		1.7059	63	0.8359
26	elbow		1.7353	64	0.8279
68	room		1.7353	64	0.8279
74	skirt		1.7353	64	0.8981
16	careful		1.7647	67	0.8896
18	cheese		1.7647	67	0.8187
86	tennis		1.7647	67	0.8549
91	woman		1.8235	70	0.9365
12	bring		1.8529	71	0.7836
33	foot		1.8823	72	0.8077
51	mask		1.8823	72	0.9134
83	swimming pool		1.9091	74	0.8048
32	food		1.9118	75	0.9331
87	toilet		1.9118	75	0.8658
19	chop		1.9394	77	0.8638
61	paper towel		1.9412	78	0.8856
8	bird		2	79	0.8876
44	hold		2	79	0.8528
48	lady		2.0294	81	0.9040
80	sugar		2.0294	81	0.8343
31	flowers		2.0588	83	0.9192
49	living-room		2.0857	84	0.8531
60	pants		2.1176	85	0.8796
52	money		2.1428	86	0.8793
75	sneeze		2.1471	87	0.8214

No	Gloss	Symbol	Mean	Rank	STD
41	grandmother		2.2059	88	0.7699
69	sausage		2.2059	88	0.8083
20	coat		2.2121	90	0.8572
62	pig		2.2353	91	0.8896
64	policeman		2.2941	92	0.8359
3	animal		2.4118	93	0.7831

The first symbol in the bottom third of the list, is symbol nr. 9 (black) with a mean value of 1.7059, and a standard deviation of 0.8359. The last symbol in the list and thus the symbol with the lowest translucency rating is symbol nr. 3 (animal) with a mean value of 2.4118 and a standard deviation of 0.7831. Symbol nr. 64 (policeman) was rated second last in this list with a mean value of 2.2941 and a standard deviation of 0.8359. Symbol nr. 62 (pig) was rated third from the bottom with a mean value of 2.2353 and a standard deviation of 0.8896.

Symbol nr. 41 (grandmother) had the lowest standard deviation (STD = 0.7699) of the bottom third. The mean value for grandmother was 2.2059 and the ranking was 88th out of the 93 symbols. The symbol with the highest standard deviation in the bottom third was symbol nr. 91 (woman) with a standard deviation of 0.9365 and a mean value of 1.8235. It was ranked 70 out of 93.

The three concepts with the greatest standard deviation were:
Nr 31 (flowers) mean = 2.0588, STD = 0.9192 and ranking of 83
Nr. 32 (food) mean = 1.9118, STD = 0.9331 and ranking of 75
Nr. 91 (woman) mean = 1.8235, STD = 0.9365 and ranking of 70

4.4 SPOILED RESPONSES

The total number of responses per day was calculated by multiplying the total number of test items in each booklet (Booklet A contained 53 test items and Booklet B 46 items) by the number of participants (35). By dividing the spoiled responses by the number of test items, the percentage of spoiled responses was determined. For Day 1 and Day 2 the percentage

was negligible. The percentage for Day 3 was significantly higher as one participant was absent. Despite the higher percentage for Day 3, the results were still considered reliable. Table XIX gives a summary of spoiled responses.

TABLE XIX Spoiled responses

	DAY 1		DAY 2		DAY 3	
	Booklet A1	**Booklet B1**	**Booklet A2**	**Booklet B2**	**Booklet A3**	**Booklet B3**
Useable	1850	1608	1847	1608	1802	1562
Spoiled	5	2	8	2	53	48
Total	1855	1610	1855	1610	1855	1610
Percentage	0.27%	0.12%	0.43%	0.12%	2.86%	2.98%

Booklet A contained seven extra practise items.

One participant was absent on Day 3.

Table XIX shows that the influence of spoiled responses on the overall data was very low and was deemed negligible.

4.4 COMPARISON OF STUDIES

The current study was based on a study done by Quist *et al*., (1998). A comparison was made between the current study and the rankings from the US and Dutch participants. The methodology, including word lists, rating scales, instructions etc. was based on the Quist study (1998). The methodology was, however, expanded on by including subsequent exposure (Day 2 – Day 3) in order to consider the learnability of symbols.

Care must be taken when comparing results of the current study with results found in the Quist *et al*., study (1998) because of the number of variables that differs between the studies. Obvious variable differences include the language and the culture of participants. Other variables such as parental education level, exposure to books and pictures could also be significant.

It is important to note that four of the original symbols in the Quist *et al*., study (1998) namely *pepper, purple, peak and shower*, were excluded from the current study after the familiarity rating (Chapter 3). This might also have influenced the outcome of the

comparison between the studies. Table XX presents the 31 symbols (one third) with the highest translucency ratings.

TABLE XX The 31 symbols (one third) with the highest translucency ratings

Current study		Dutch		US	
Word	**Rank**	**Word**	**Rank**	**Word**	**Rank**
glass	1	one	1	down	1
seven	1	moon	2	one	2
table	1	seven	3	glasses	3
one	4	heart	4	seven	4
toothbrush	4	curtains	5	moon	5
banana	6	glasses	6	house	6
eye	6	down	7	fork	7
fork	9	question	8	heart	8
house	9	eye	9	first	9
curtains	11	cheese	10	package	10
worm	12	house	11	eye	11
teeth	13	first	12	truck	12
down	14	table	13	cheese	13
moon	14	mask	14	table	14
push	14	teeth	15	mask	15
scissors	14	fork	16	hear	16
truck	14	truck	17	banana	17
camp	19	nose	18	nose	18
enter	20	banana	19	iron	19
first	21	hear	20	question	20
girl	21	camera	21	teeth	21
soup	21	enter	22	girl	22
beautiful	24	push	23	camera	23
heart	24	glass	24	glass	24
question	26	tennis	25	soup	25
fall	27	worm	26	scissors	26
glasses	27	money	27	push	27
hear	27	beautiful	28	elbow	28
package	27	package	29	tennis	29
alike	31	fun	30	enter	30
doll	31	girl	31	living-room	31

When examining the 31 symbols with the highest translucency ratings, for all three studies, 24 symbols (77%) in the list of the current study can be found in the list of the Dutch study. If the list for the current study is compared with the list of the US study, 23 symbols (74%) can be found in both. When the lists of the US and Dutch studies are compared, 26 symbols (84%) appears in both lists. Of the 31 highest ranked symbols in the current study, 21 symbols (68%) can be found in the lists for both the Dutch and US studies.

Of the first ten symbols for the current study, only 'toothbrush' and 'curtain' cannot be found in the lists for the Dutch and US studies.

The 31 symbols (one third) with the lowest translucency ratings are presented in TableXXI.

TABLE XXI The 31 symbols (one third) with the lowest translucency ratings

Current study		Dutch		US	
Word	**Rank**	**Word**	**Rank**	**Word**	**Rank**
brain	62	foot	56	black	56
black	63	school	57	drum	57
elbow	64	mop	58	begin	58
room	64	Friday	59	school	59
skirt	64	read	60	machine	60
careful	67	toothbrush	61	camp	61
cheese	67	cut/chop	62	careful	62
tennis	67	black	63	brain	63
woman	70	hold	64	scream	64
bring	71	skirt	65	mop	65
foot	72	room	66	outside	66
mask	72	spider	67	sneeze	67
swimming pool	74	food	68	alike	68
food	75	scream	69	read	69
toilet	75	candy	70	room	70
cut/chop	77	camp	71	woman	71
paper towel	78	outside	72	soldier	72
bird	79	paper towel	73	toothbrush	73
hold	79	brain	74	carrot	74
lady	81	sneeze	75	skirt	75
flower	83	carrot	76	hold	76

Current study		Dutch		US	
Word	**Rank**	**Word**	**Rank**	**Word**	**Rank**
living-room	84	coat	77	candy	77
pants	85	lady	78	coat	78
money	86	grandmother	79	grandmother	79
sneeze	87	soldier	80	sweet	80
grandmother	88	animal	81	policeman	81
sausage	88	sweet	82	animal	82
coat	90	pants	83	food	83
pig	91	sausage	84	foot	84
policeman	92	policeman	85	pants	85
animal	93	woman	86	sausage	86

When examining the 31 symbols with the lowest translucency ratings, for all three studies, 18 symbols (58%) in the list of the current study can be found in the list of the Dutch study. If the list for the current study is compared with the list of the US study, 16 symbols (52%) can be found in both. When the lists of the US and Dutch studies are compared, 26 symbols (84%) appears in both lists. Of the 31 lowest ranked symbols in the current study, 15 symbols (48%) can be found in the lists for both the Dutch and US studies.

From the last ten symbols for the current study, only ‘living-room’, ‘money’ and ‘pig‘ cannot be found in the lists for the Dutch and US studies.

4.5 SUMMARY

In this chapter the findings of the study were presented and discussed. The results revealed that a second exposure had a significantly positive effect on the translucency values on Day 2. A third exposure had a smaller effect on the translucency ratings. The symbols respectively rated as high translucent and low translucent symbols, were listed and discussed. A brief comparison was made with results found in the Quist *et al*., (1998) study.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 SUMMARY OF RESULTS AND CONCLUSIONS

This chapter contains a summary of the results of the study and the conclusions. The study's strenghts and limitations are noted and discussed. Recommendations for future research are made.

The main purpose of this research was to obtain translucency ratings of 93 selected Blissymbols as rated by 35 typically developing six- and seven-year-old Setswana-speaking children. A non-experimental descriptive design was used. The results indicate that the translucency ratings of the majority of the selected Blissymbols ranged from moderate to high.

A further objective was to obtain translucency ratings on the second and third exposures in order to determine the learnability of these symbols. The results revealed that a second exposure had a significantly positive effect on the translucency values. A third exposure had a smaller effect on the translucency ratings. The results support Basson's findings (2005) that although participants had not received any training, significant differences were found between the first and second exposures.

A brief comparison was made between the current study and the Quist *et al*., study (1998). The results revealed that there was a correlation in findings between the current study and the Dutch and US studies (Quist *et al*., 1998).

5.2 CRITICAL EVALUATION OF THE STUDY

a. The fact that the methodology is based on a previous study (Quist *et al*., 1998) is regarded as a strength. The methodology was repeated and symbols were selected from the same pool of words as that used in the Quist *et al*., (1998) study, thereby strengthening the validity of the results (McMillan & Schumacher, 2001).

b. The study took a further step by investigating the learnability of selected Blissymbols by including subsequent exposures.

c. The selected words were furthermore approved by two independent judges (Chapter 3). The judges were asked to eliminate concepts probably not familiar to the selected participants. The selected words, however, do not necessarily reflect words that are part of Setswana children's everyday language use. This familiarity rating process should have been refined in order to eliminate less well-known concepts. Although the analysis of daily conversations of the target population in their natural environment is a lengthy task, more representative and familiar concepts might have been obtained.

d. The list of words as used in the Quist *et al*., (1998) study was not equally representative of all the different word categories or word classes (e.g. nouns, verbs, adjectives etc.). It would have been more meaningful to select an equal number of words from each word class or category, as different word classes may have different translucency ratings.

e. The translation process (described in Chapter 3) employed in the study provided a reliable translation, thus strengthening the validity of the results.

f. The integrity of the data collection was preserved by involving an independent rater to evaluate the procedure.

5.3 RECOMMENDATION FOR FUTURE RESEARCH

a. When investigating translucency ratings over a specific period (or with multiple exposures), it is recommended that symbols, which are generally considered as "low translucent symbols" are selected. Since the potential for improvement in ratings is bigger, the impact of repeated exposure to AAC symbols on translucency ratings will be clearer.

b. The selection of symbols is important and should be a good representation of all word classes or categories e.g. verbs, nouns and adjectives. Most words from one category may have higher or lower translucency ratings as most words from another category. (Mizuko & Reichle, 1989).

c. Iconicity and translucency should be studied among different cultural populations in Southern Africa to determine the effect of cultural differences on translucency ratings . These studies should be conducted among children (of different ages) and on adults in different communities.

d. Research should also be expanded to include developmentally delayed populations with different disabilities. Very little research has been done on these populations and the translucency ratings may differ from studies done so far.

5.4 SUMMARY

A brief comparison was made between the current study and the original Quist (1998) study on which it was based. The original study only looked at translucency ratings on first exposure, but the present study expanded on this by also looking at repeated exposure. Results related to the first exposure showed that the translucency ratings of the majority of the selected Blissymbols ranged from moderate to high. A critical evaluation of the study was also presented, followed by recommendations for future research.

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APPENDIX A : Letter to obtain permission of parents and Parent questionnaire (English and Setswana)

Centre for Augmentative and Alternative Communication
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INTERFACE

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2004 T-Systems Age of Innovation & Sustainability Awards: Excellence in Innovation and Sustainability: Social
2003 National Science & Technology Awards: Corporate Organization over the last ten years.
2002: Shirley McNaughton Award for Exemplary Communication received from the International Society for Augmentative and Alternative Communication
1998: Rolex Award for Enterprise: Associate Laureate
1995: Education Africa Presidential Award for Special Needs

1 September 2005

Dear Sir/Madam

Re: Request for permission for your child to participate in a research study.
I am at present reading for a master's degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. Part of the course requirements is that I need to conduct a research study.

Not all children are able to communicate by using speech. These children have to make use of alternative means of communication to express their needs and feelings. One way is by pointing at picture-like symbols on a communication board.

What I would require of your child is to be available for 30-45 minutes for three days. Your child will be asked to mark how much the symbol/picture looks like the word it stands for. Your child can at any time withdraw from the study if you so wish. Arrangements will be made with the school to schedule a time.

Your child's name will not be reflected on the answer sheets. All information will be treated in the strictest confidence in line with the ethical requirements of the University of Pretoria.
I would appreciate it if you would grant permission for your child to participate in this study. It will be of great assistance to future children with severe communication difficulties, as well as to the educators who are entrusted with their education.

Please complete the questionnaire.

Yours truly

Anlie du Preez

Reply form

I, _____parent/guardian of _____ grant permission for my child to participate in the research study on graphic symbols under the auspices of the University of Pretoria.

I understand that information will be confidential and that data obtained can by used for future studies, if necessary.

Signed: _____Date: _____

Please complete the following questionnaire

1. Does your child have problems hearing? Yes/No
   Describe:_____
2. Does your child have difficulty seeing? Yes/No
   Describe:_____
3. Does your child have any difficulties with learning? Yes/No
   Describe:_____
4. What is the child's home language?_____
5. What is the father's home language?_____
6. What is the mother's home language? _____

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Centre for Augmentative and Alternative Communication
Sentrum vir Aanvullende en Alternatiewe Kommunikasie
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1 Seetebosigo 2005

Go Motsadi/Batsadi

Ke ithutela dikerii ya Masters ya dithuto tsa Augmentative and Alternative Communication (AAC) kwa Yunibesiting ya Pretoria mo nakong ya jaanong. Bontlha bongwe jwa ditlhokego tsa khoso ke gore ke tlhoka go dira thuto ya dipatlisiso.

Ga se bana botlhe ba ba kgonang go tlhaeletsana ba dirisa puo. Bana bano ba dirisa ditsela tse dingwe go tlhaeletsa le go supa ditlhoko le maikutlo a bona. Tsela nngwe ke go supa matshwao seka-ditshwantsho mo lomating lwa tlhaeletsano.

Se ke tla se lopang mo ngwaneng wa gago ke gore a nne teng metsotso e le 30-45 malatsi a le mararo. Ngwana wa gago o tla kopiwa go tshwaya gore a supe/kaye gore setshwantsho/letshwao le tshwana go le go kae le lefoko le le emetseng setshwantsho kana letshwao leo. Ngwana wa gago a ka nna a ikgogela kwa morago mo thutong e ka nako nngwe le nngwe fa o eletsa jalo. Go tla dirwa dithulaganyo le sekolo go tlhoma nako ya go kopana.

Leina la ngwana wa gago ga le ne le bonadiwa mo dipampiring tsa dikarabo. Ditshedimosetso tsotle di tla tsewa e le dikhupamarama, mo e le go latedisa ditlhokego kana ditopo tsa maitsholo tsa Yunibesiti ya Pretoria. Dipholo tsa thuto le tsona di tla anamisiwa. Ke ka itumela fa o ka fa tetla gore ngwana wa gago a tseye karolo mo thutong e. Go dira jalo go tla naya thuso e kgolo go bana ba mo isagong ba tla nnang le mathata a a tseneletseng a tlhaeletsano/go bua, gape go tla thusa barutabana ba ba filweng maikarabelo a go ba ruta. Tswetswe tlatsa potsopatlisiso**.**

Weno e le ruri

Anlie du Preez

Foromo ya phetolo

Nna, _____motsadi/motlhokomedi wa ga _____ ke naya tetla ya gore ngwanake a tseye karolo mo thutong ya patlisiso ka matshwao/dikao tse di supang ka ditshwantsho, e e tla dirwang ke Yunibesiti ya Pretoria.

Ke tlhaloganya gore tshedimosetso e tla nna khupamarama le gore dinewa kana data e e amogetsweng e ka nna ya dirisediwa dithuto tse di tla dirwang mo lobakeng lo lo tlang , fa go tlhokafala.

Tshaeno: _____Letlha:_____

Tsweetswee tlasa potsopatlisiso e e latelang

1. A ngwana wa gago o na le bothata jwa go utlwa? Ee/Nnyaa
   Tlhalosa:_____
2. A ngwana wa gago o na le bothata jwa go bona? Ee/Nnyaa
   Tlhalosa:_____
3. A ngwana wa gago o na le bothata jwa go ithuta? Ee/Nnyaa
   Tlhalosa:_____
4. Puo ya kwa gae ya ngwana ke eng? _____
5. Puo ya kwa gae ya rraagwe ngwana ke eng? _____
6. Puo ya kwa gae ya mmaagwe ngwana ke eng? _____

APPENDIX B : Original list of concepts as in Quist study (Quist *et al.*, 1998) and Dutch translation

WORD LIST 1		WORD LIST 2	
Practice items		**Practice items**	
1. stairs		1. stairs	
2. crayon		2. crayon	
3. boy		3. boy	
4. pillow		4. pillow	
5. sugar		5. sugar	
6. woods		6. woods	
7. hour		7. hour	
Test items		**Test items**	
1. hold	26. bag	1. glasses	26. swimming pool
2. camp	27. curtains	2. school	27. money
3. mask	28. banana	3. fun	28. purple
4. room	29. bring	4. first	29. policeman
5. animal	30. spider	5. scream	30. toilet
6. read	31. woman	6. peak	31. first
7. hold	32. drum	7. front	32. fall
8. swim	33. girl	8. mop	33. alike
9. camera	34. house	9. turn	34. truck
10. food	35. mountain	10. soldier	35. above
11. pepper	36. candy	11. coat	36. push
12. paper towel	37. fork	12. school	37. pig
13. toothbrush	38. chop	13. Friday	38. cheese
14. brain	39. bring	14. doll	39. beautiful
15. enter	40. girl	15. black	40. iron
16. soup	41. careful	16. begin	41. glass
17. scissors	42. pants	17. table	42. purple
18. hear	43. eye	18. sneeze	43. teeth
19. down	44. one	19. machine	44. tennis
20. question	45. seven	20. truck	45. shower
21. flowers	46. package	21. moon	46. begin
22. carrot	47. bird	22. outside	47. worm
23. pants	48. house	23.heart	48. grandmother
24. nose	49. skirt	24.sausage	49. lady
25. foot	50. elbow	25.sweet	50. living-room

Dutch Translation of original list of concepts

Word list 1		Word list 2	
English word	**Dutch Translation**	**English word**	**Dutch Translation**
1. hold	vasthouden	1. glasses	bril
2. camp	kamp	2. school	school
3. mask	masker	3. fun	pret
4. room	kamer	4. first	eerste
5. animal	dier	5. scream	schreeuwen
6. read	lezen	6. peak	spitz
7. hold	vasthouden	7. front	voorkant
8. swim	zwemmen	8. mop	dweil
9. camera	kamera	9. turn	omslaan
10. food	voedsel	10. soldier	soldaat
11. pepper	peper	11. coat	jas
12. paper towel	keukenrol	12. school	school
13. toothbrush	tandenborstel	13. Friday	Vrijdag
14. brain	hersenen	14. doll	pop
15. enter	binnen gaan	15. black	zwart
16. soup	soep	16. begin	begin
17. scissors	schaar	17. table	tafel
18. hear	horen	18. sneeze	niezen
19. down	beneden	19. machine	machine
20. question	vraag	20. truck	vrachtwagen
21. flowers	bloemen	21. moon	maan
22. carrot	wortel	22. outside	buiten
23. pants	broek	23.heart	hart
24. nose	neus	24.sausage	worst
25. foot	voet	25.sweet	zoet
26. bag	zak	26. swimming pool	zwembad
27. curtains	gordijnen	27. money	geld
28. banana	banaan	28. purple	paars
29. bring	brengen	29. policeman	politieman
30. spider	spin	30. toilet	wc
31. woman	vrouw	31. first	eerste
32. drum	trommel	32. fall	herfst
33. girl	meisje	33. alike	gelijk
34. house	huis	34. truck	vrachtwagen
35. mountain	berg	35. above	boven
36. candy	snoepje	36. push	duwen
37. fork	vork	37. pig	varken
38. chop	snijden	38. cheese	kaas
39. bring	brengen	39. beautiful	mooi
40. girl	meisje	40. iron	ijzer
41. careful	voorzichtig	41. glass	glas
42. pants	broek	42. purple	paars
43. eye	oog	43. teeth	tanden
44. one	een	44. tennis	tennis
45. seven	zeven	45. shower	douche
46. package	pakket	46. begin	begin
47. bird	vogel	47. worm	worm
48. house	huis	48. grandmother	grootmoeder
49. skirt	jurk	49. lady	mevrouw
50. elbow	elleboog	50. living-room	woonkamer

APPENDIX C : Results of familiarity rating. Proposed list of concepts to be used in study

WORD LIST 1		**WORD LIST 2**	
Practice items		**Practice items**	
1.stairs		1.stairs	
2.crayon		2.crayon	
3.boy		3.boy	
4.pillow		4.pillow	
5.sugar		5.sugar	
6.woods		6.woods	
7.hour		7.hour	
Test items		**Test items**	
1.hold	26.bag	1.glasses	26.swimming pool
2.camp	27.curtains	2.school	27.money
3.mask	28.banana	3.fun	28.purple
4.room	29.bring	4.first	29.policeman
5.animal	30.spider	5.scream	30.toilet
6.read	31.woman	6.peak	31.first
7.hold	32.drum	7.front	32.fall
8.swim	33.girl	8.mop	33.alike
9.camera	34.house	9.turn	34.truck
10.food	35.mountain	10.soldier	35.above
11.pepper	36.candy	11.coat	36.push
12.paper towel	37.fork	12.school	37.pig
13.toothbrush	38.chop	13.Friday	38.cheese
14.brain	39.bring	14.doll	39.beautiful
15.enter	40.girl	15.black	40.iron
16.soup	41.careful	16.begin	41.glass
17.scissors	42.pants	17.table	42.purple
18.hear	43.eye	18.sneeze	43.teeth
19.down	44.one	19.machine	44.tennis
20.question	45.seven	20.truck	45.shower
21.flowers	46.package	21.moon	46.begin
22.carrot	47.bird	22.outside	47.worm
23.pants	48.house	23.heart	48.grandmother
24.nose	49.skirt	24.sausage	49.lady
25.foot	50.elbow	25.sweet	50.living-room

The following words were excluded: **purple, shower, pepper and peak**

APPENDIX D : Example of letter to translators

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27 April 2005

Dear

Thank you very much for your willingness to participate in this study. I want to assure you that all information gathered by me will be treated confidentially.
I am studying the iconicity of certain communication symbols for Setswana-speaking children. Iconicity is the degree to which a symbol visually represents its referent. I am planning to show 6-7-year-old children a collection of symbols devided into two booklets. A Setswana-speaking research assistant will read the words. The children will then mark to what extent each symbol represents the specific concept.

I have included the symbols that are represented in the two booklets, as well as a questionnaire with this letter. Please fill in the questionnaire before you start translation.
A panel of three translators, including you, will do the first translation in Setswana. Each translator will work independently. Discrepancies between translations will be discussed, should they occur. I can only accept a translation if all three translators agree on it.
The first agreement will be translated back into English by another panel of three translators. This is to see whether the translation into Setswana is indeed valid. If some discrepancies occur, both panels of translators will have to meet, to reach the final version of the translation.

Please let met know once you have finished. I will collect the translation and compare it to that of the other translators. I will let you know as soon as possible whether a meeting will be necessary.

Thanks once again for your support!

Regards

Anlie du Preez

BIOGRAPHIC DATA: TRANSLATORS

QUALIFICATION	
OCCUPATION	
TIME IN OCCUPATION	
MOTHER TONGUE	
OTHER LANGUAGES	
EXPERIENCE WITH ENGLISH TO SETSWANA TRANSLATION	
EXPERIENCE WITH SETSWANA TO ENGLISH TRANSLATION	

APPENDIX E : Results of first translation from English into Setswana and First consensus

Word	Translator #1	Translator #2	Translator #3	First Concensus
above	mo godimo	godimo	godimo	godimo
alike	tshwanang	go tshwana	tshwanang	tshwanang
animal	phologolo	pholoholo	phologolo	phologolo
bag	kgetse	kgetse	kgetsi	kgetsi
banana	panana	panana	panana	panama
beautiful	ntle	bontle	bontle	bontle
begin	thoma	simolola	simolola	simolola
bird	nonyane	nonyane	nonyane	nonyane
black	ntsho	bontsho	ntsho	ntsho
boy	mosimane	mosimane	mosimane	mosimane
brain	boboko	boko	boboko	book
bring	tlisa	tlisa	tlisa	tlisa
camera	khemera	camera	khamera	setshwantsha
camp	kampa	thibelela	kampa	kampa
candy	semonamone	dimonamone	semonamone	semonamone
careful	ka tlhokomelo	ka tlhokomelo	tlhokomela	tlhokomela
carrot	segwete	segwete	segwere	segwete
cheese	kase	kase	tshisi	kase
chop	rema	rema	rema	rema
coat	baki	kobo	baki	jase
crayon	kerayone	kheraeyone	phensele ya mmala	kheraeyone
curtains	kgaretene	garateine	garatene	garatene
doll	mpopo	popi	mpopi	popi
down	tlase	tlase	tlase	tlase
drum	moropa	meropa	moropa	moropa
elbow	sekgono	sekgono	sekgono	sekgono
enter	tsena	tsena	tsena	tsena
eye	leitlho	leitlho	leitlho	leitlho
fall	letlhafula	wa	wa	go wa
first	ntlha	wa ntlha	ntlha	wa ntlha
flowers	sethunya	malomo	malomo	dithunya
food	dijo	dijo	sejo	dijo
foot	leoto	lonao	lenao	lenao
fork	foroko	foroko	foroko	foroko
Friday	labohlano	labotlhano	labotlhano	labotlhano
front	pele	kwapele	pele	kwa pele
fun	tlhapedi	lethabo	tshameko	lethabo

Word	Translator #1	Translator #2	Translator #3	First Concensus
girl	mosetsana	mosetsana	mosetsana	mosetsana
glass	galase	galase	galase	galase
glasses	borele	digalase	digalase	digalase
grandmother	mmeniogolo	nkoko	mmemogolo	nkoko
hear	utlwa	utlwa	utlwa	utlwa
heart	pelo	pelo	pelo	pelo
hold	tshwara	tshwara	tshwara	tshwara
hour	ura	ura	ura	ura
house	ntlo	ntlu	ntlo	ntlo
iron	tshipi	tshipi	tshipi	tshipi
lady	mme	mme	lekgarebe	mme
living-room	phaposi	phaposi	phopose ya bonno	phaposi bojela
machine	motshini	motshini	matshine	motshini
mask	mmamatlhwana	mmampakisi	mmamatlhwana	mmampakisi
money	madi	chelete	tshelete	madi
moon	ngwedi	ngwedi	ngwedi	ngwedi
mop	semonyela	?	mopo	mopo
mountain	thaba	thaba	thabo	thaba
nose	nko	nko	nko	nko
one	nngwe	nngwe	nngwe	nngwe
outside	lentle	kwantle	kwa ntle	kwa ntle
package	paki	sephutelo	ngata	sephuthelwana
pants	borukgwe	borogwe	borokgwe	borokgwe
paper towel	toulo	toulo	toula ya pampiri	toula ya pampiri
pig	kolobe	kolobe	kolobe	kolobe
pillow	mosamo	mosamo	mosamo	mosamo
policeman	lepodisa	lepodisi	leotlana	lepodisi
push	kgorometsa	garametsa	kgarametsa	kgarametsa
question	potso	potso	potso	potso
read	bala	buisa	buisa	buisa
room	phaposi	phaposi	phapose	phaposi
sausage	boroso	boroso	borose	borose
school	sekolo	sekolo	sekolo	sekolo
scissors	sekere	sekere	sekere	sekere
scream	kua	goa	goa	goa
seven	supa	supa	supa	supa
skirt	mosese	mosese	mosese	mosese
sneeze	?	tshimola	ethimola	ethimola
soldier	lesole	lesole	lesole	lesole
soup	sopo	sopo	sopo	sopo

Word	Translator #1	Translator #2	Translator #3	First Concensus
spider	segokgo	segokgo	segokgo	segokgo
stairs	ditepese	matatabelo	sepalamo	matatabelo
sugar	sukiri	sukiri	sukiri	sukiri
sweet	botshe	monate	monate	monate
swim	thuma	thuma	sapa	thuma
swimming pool	bothumelo	bothumelo	lekadiba la go thuma	bothumelo
table	tafole	tafole	tafole	tafole
teeth	meno	meno	meno	meno
tennis	thenese	tenesi	thenese	thenese
toilet	boithomelo	ntlwana	boithomelo	boithusetso
toothbrush	segotlhameno	segotlhameno	borase ya meno	segotlha meno
truck	lori	rori	koloi e kgolo	llori
turn	pitikologa	jika	menola	no consensus
woman	mosadi	mosadi	mosadi	mosadi
woods	sekgwa	sekgwa	dikgang	dikgang
worm	seboko	seboko	seboko	seboko

APPENDIX F : Translation results

First concensus and blind back translation

Word	First consensus	Blind back translation
above	godimo	above
alike	tshwanang	alike
animal	phologolo	animal
bag	kgetsi	bag
banana	panana	banana
beautiful	bontle	beautiful
begin	simolola	begin
bird	nonyane	bird
black	ntsho	black
boy	mosimane	boy
brain	boko	brain
bring	tlisa	bring
camera	khamera	camera
camp	kampa	camp
candy	simonamone	sweet*
careful	tlhokomela	take care *
carrot	segwete	carrot
cheese	kase	cheese
chop	rema	chop
coat	jase	coat
crayon	kheraeyone	crayon
curtains	garatene	curtains
doll	popi	doll
down	tlase	down
drum	moropa	drum
elbow	sekgono	elbow
enter	tsena	enter
eye	leitlho	eye
fall	go wa	fall
first	wa ntlha	first
flowers	dithunya	flowers
food	dijo	food
foot	lenao	foot
fork	foroko	fork
Friday	labotlhano	Friday
front	kwa pele	front
fun	lethabo	joy / gladness*
girl	mosetsana	girl
glass	galase	glass
glasses	digalase	glasses
grandmother	nkoko	grandmother
hear	utlwa	hear
heart	pelo	heart
hold	tshwara	hold
hour	ura	hour
house	ntlo	house

Word	First consensus	Blind back translation
iron	tshipi	iron
lady	mme	mother *
living-room	phaposi bojela	dining room*
machine	motshini	machine
mask	mmampakisi	mask
money	madi	money
moon	ngwedi	moon
mop	mopo	maize *
mountain	thaba	mountain
nose	nko	nose
one	nngwe	one
outside	kwa ntle	outside
package	sephuthelwana	package
pants	borokgwe	trousers*
paper towel	toula ya pampiri	paper towel
pig	kolobe	pig
pillow	mosamo	pillow
policeman	lepodisi	police officer*
push	kgarametsa	push
question	potso	question
read	buisa	read
room	phaposi	room
sausage	borose	sausage
school	sekolo	school
scissors	sekere	scissors
scream	goa	shout *
seven	supa	seven
skirt	mosese	dress *
sneeze	ethimola	sneeze
soldier	lesole	soldier
soup	sopo	soup
spider	segokgo	spider
stairs	matatabelo??	steps*
sugar	sukiri	sugar
sweet	monate	delicious / enjoyable *
swim	thuma	swim
swimming pool	bothumelo	swimming pool
table	tafole	table
teeth	meno	teeth
tennis	thenese	tennis
toilet	boithusetso	toilet
toothbrush	segotlha meno	toothbrush
truck	llori	lorry *
turn		turn
woman	mosadi	woman
woods	dikgang	news *
worm	seboko	worm

Translations marked with * differed from the original.

Blind back translation and Second concencus

Word	Blind back translation	Second consensus
candy	sweet	dimonamone
careful	take care	ka tlhokomelo
fun	joy / gladness	lethabo*
lady	mother	mme*
living-room	dining room	phaposi bojela*
mop	maize	mmopo
pants	trousers	borukhu
policeman	police officer	lepodisi*
scream	shout	goa*
skirt	dress	sekhete
stairs	steps	matatabelo*
sweet	delicious / enjoyable	monate*
truck	lorry	llori*
woods	news	dikgang

Translations marked with * were regarded as correct although the back translation differed from the original English words.

Second consensus and Second back translation

Word	Second consensus	Second back translation
candy	dimonamone	sweet
careful	ka tlhokomelo	careful
mop	mmopo	mop
pants	borukhu	pants
skirt	sekhete	skirt
woods	dikgang	woods

APPENDIX G : Verbatim instructions to the participants in English as in the Quist study (Quist *et al*., 1998), and Setswana

Verbatim instructions in English

"Hello, this is ----------. She is here today to ask for your help in a very important project that will help children who cannot speak to communicate with special pictures called Blissymbols."

"On your desk you have a booklet. On each page of this booklet, there is a Blissymbol followed by three faces – *one with a frown, one with the mouth drawn straight, and one with a smile*. You will be asked to draw a circle around the face that best describes how much the Blissymbol looks like what it stands for (show example) e.g. "Not at all", "some" or "a lot"? For example, this Blissymbol *looks a lot like*...so I draw a circle around……but this Blissymbol *does not look at all like*…so I draw a circle around. ……And this Blissymbol *looks somewhat like*…….so I draw a circle around…"

"Let's try some." (The students work through each practise item on their practise page, one at a time. After each item, students are asked which face they drew a circle around. Clear discrepancies are discussed. When the five practise items are completed, the teacher continues)

"Good! Now let's do this with the Blissymbol in your booklet. Listen to me closely and draw a circle around the right face after I tell you the word."

Verbatim instructions to the participants in Setswana

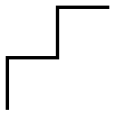
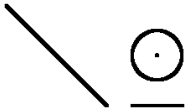
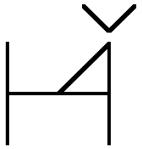
"Dumelang, yo ke ----------. O fano go kopa thuso ya lonamo porojekeng e e botlhokwa thata e e tla thusang bana ba ba sakgoneng go bua gore ba tlhaeletse ka ditshwantsho tse di faphegileng te di bidiwang Blisssymbols."

"Mo tesekeng ya gago go na le bukana. Mo tsebeng nngwe le nngwe ya bukana eno, go na le Blissymbol e e salwang morago ke difatlhego tse tharo – *se sengwe se dilotse, se sengwe se tshwantshitswe molomo o o tlhamaletseng, se sengwe se na le monyenyo.* O tla lopiwa go tshwantsha sediko go polotologa sefatlhego se se tlhalosang go gaisa tse dingwe ka fa Blissymbol e tshwanang ka teng le selo se e se emetseng (supa sekao) sekao, "ga e tshwane gotlhelele", "ka bontlha bongwe", "thatathata"? Sekao, Blissymbol eno *e tshwana thatathata le. ……..Jalo* ke tshwantsha sediko go potologa……Mme Blissymbol eno *ga e tshwane gotlhelele le……..*jalo ke tshwantsha sediko go potologa …….Le Blissymbol eno *e tshwana ka bontlha bongwe le……..*ka jalo ke tshwantsha sediko go potologa……."

"A re leke tse dingwe." (Baithuti ba dira ka ditshwantsho tsa ikatiso mo tsebeng ya ikatiso, setshwantsho se le sengwe ka nako. Morago ga setshwantsho sengwe le sengwe baithuti ba bodiwa gore ba tshwantshitse sediko go potologa sefatlhego sefe. Go tla buisanwa ka tse di farologaneng go iponatsa. Fa go weditswe ditshwantsho tsa ikatiso tse tlhano, morutabana o tswelela pele)

Go molemo! Jaanong a re dire jalo re dirisa diblissymbol tse di mo bukaneng tsa lona. Lo ntheetse ka kelotlhoko mme lo tshwantshe sediko go polotologa setshwantsho se se lolameng fa ke sena go lo bolelela lefoko."

APPENDIX H : Example of Booklet

APPENDIX I : Allowed prompts and comments to the participants in English and Setswana

Allowed promts and comments in English

Choose the picture that you think goes with what I'm saying.

Look at all the pictures before you choose.

You are doing well, keep it up.

Don't copy from your neighbour.

Mark only one picture.

Look up when you are finished.

Yes

No

A little bit

Allowed prompts to the participants in Setswana

Tlhopa setshwantsho se o akanyang gore se tsamaelana le se ke se buang.

Lebelela ditshwantsho tsotlhe pele o tlhopa.

O dira sentle thata, tshwara ka thata.

Se kope mo go yo o ntsent nae.

Tshwaya setshwantsho se le sengwe fela.

Ntsha tlhogo fa o feditse

Ee

Nnyaa

Go le gonnye

Checklist

Question/Prompt																
Choose the picture that you think goes with what I'm saying																
Look at all the pictures before you choose.																
You are doing well, keep it up.																
Don't copy from your neighbour.																
Mark only one picture.																
Look up when you are finished.																
Yes																
No																
A little bit																

Question/Prompt																
Tlhopa setshwantsho se o akanyang gore se tsamaelana le se ke se buang																
Lebelela ditshwantsho tsotlhe pele o tlhopa.																
O dira sentle thata, tshwara ka thata.																
Se kope mo go yo o ntsent nae.																
Tshwaya setshwantsho se le sengwe fela																
Ntsha tlhogo fa o feditse																
Ee																
Nnyaa																
Go le gonnye																

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APPENDIX J : Permission Request Form sent to the Gauteng Department of Education to obtain permission to conduct research in Gauteng schools

GAUTENG DEPARTMENT OF EDUCATION

RESEARCH REQUEST
REQUEST TO CONDUCT
AND/OR OFFICES OF THE
EDUCATION

FORM
RESEARCH IN INSTITUTIONS
GAUTENG DEPARTMENT OF

1. PARTICULARS OF THE RESEARCHER

1.1	**Details of the Researcher**
Surname and Initials:	Du Preez
First Name/s:	Anna Elizabeth (Anlie)
Title (Prof / Dr / Mr / Mrs / Ms):	Mrs.
Student Number (if relevant):	S 88297722
ID Number:	690514 0132 089
1.2	**Private Contact Details**
Home Address	PO Box 8409
	Birchleigh
Postal Code:	1621
Tel: 011-393 3178	
Cell: 083 324 7915	
Fax: 011-976 1038	
E-mail: ***anlie_piet@mweb.co.za***	

2. PURPOSE & DETAILS OF THE PROPOSED RESEARCH

2.1	Purpose of the Research (Place cross where appropriate)	
Undergraduate Study – Self		
Postgraduate Study – Self		X
Private Company/Agency – Commissioned by Provincial Government or Department		
Private Research by Independent Researcher		
Non-Governmental Organisation		
National Department of Education		
Commissions and Committees		
Independent Research Agencies		
Statutory Research Agencies		
Higher Education Institutions		

2.2	Full title of Thesis / Dissertation / Research Project
The translucency of Blissymbols as rated by typically developing Setswana speaking learners.	

2.3	Value of the Research to Education (Attach Research Proposal)
A very high incidence of children in South Africa have little or no functional speech. One strategy would be to make a communication board containing picture-like symbols to represent ideas. The individual points to these pictures to indicate what he or she wants to communicate. **The iconicity of a symbol is the degree to which the symbol visually represents its referent. If a symbol is highly iconic, it is easy for individuals to learn to use it. Most of the symbols currently in use in South**	

Africa were developed in the United States of America. This is a dilemma since iconicity is culture-bound: people from different cultures will view the same symbol differently. We therefore cannot simply use the American symbols without taking into account the many different cultures in our country and our schools.

I am planning to investigate the translucency (one aspect of iconicity) of Blissymbols, for Setswana speaking children aged 6 –7.

2.5	**Student and Postgraduate Enrolment Particulars (if applicable)**
Name of institution where enrolled:	University of Pretoria
Degree / Qualification:	BLog
Faculty and Discipline / Area of Study:	Centre for Augmentative and Alternative Communication
Name of Supervisor / Promoter:	Prof. E. Alant

2.6	**Employer (where applicable)**
Name of Organisation:	Con Amore School
Position in Organisation:	Speech Therapist
Head of Organisation:	Mrs. T.K. Gieselbach (principal)
Street Address:	Sable Road
	Esther Park
Postal Code:	
Telephone Number (Code + Ext):	011-976 1037
Fax Number:	011-976 1038
E-mail:	

2.7	**PERSAL Number (where applicable)**

1	3	6	6	6	7	0	3

3. PROPOSED RESEARCH METHOD/S

(Please indicate by placing a cross in the appropriate block whether the following modes would be adopted)

3.1 ***Questionnaire/s (If Yes, supply copies of each to be used)***

YES	**X**	**NO**	

3.2 *Interview/s (If Yes, provide copies of each schedule)*

YES		**NO**	**X**

3.3 ***Use of official documents***

YES		**NO**	**X**
If Yes, please specify the document/s:			
Documents which relate to Organisational Development			

3.4 ***Workshop/s / Group Discussions (If Yes, Supply details)***

YES		**NO**	**X**

3.5 ***Standardised Tests (e.g. Psychometric Tests)***

YES		**NO**	**X**
If Yes, please specify the test/s to be used and provide a copy/ies			

4. INSTITUTIONS TO BE INVOLVED IN THE RESEARCH

4.1 ***Type of Institutions (Please indicate by placing a cross alongside all types of institutions to be researched)***

INSTITUTIONS	**Mark with X here**
Primary Schools	X
Secondary Schools	
ABET Centres	
ECD Sites	
LSEN Schools	
Further Education & Training Institutions	
Other Head Office personnel including Boksburg	

4.2 ***Number of institution/s involved in the study (Kindly place a sum and the total in the spaces provided)***

Type of Institution	**Total**
Primary Schools	1 OR 2
Secondary Schools	
ABET Centres	
ECD Sites	
LSEN Schools	
Further Education & Training Institutions	
Other	
GRAND TOTAL	1 0R 2

4.3 ***Name/s of institutions to be researched (Please complete on a separate sheet if space is found to be insufficient)***

3.2 Name/s of Institution/s
Setloane Primary School (Tembisa)

4.4 **District/s where the study is to be conducted**. ***(Please indicate by placing a cross alongside the relevant district/s)***

3.3 District	
Johannesburg East	
Johannesburg South	
Johannesburg West	
Johannesburg North	
Gauteng North	
Gauteng West	
Tshwane North	
Tshwane South	
Ekhuruleni East	
Ekhuruleni West	**X**
Sedibeng East	
Sedibeng West	

If Head Office/s (Please indicate Directorate/s)
Across directorates

NOTE:

If you have not as yet identified your sample/s, a list of the names and addresses of all the institutions and districts under the jurisdiction of the GDE is available from the department at a small fee.

Number of learners to be involved per school (Please indicate the number by gender)

Grade	1		2		3		4		5		6	
Gender	B	G	B	G	B	G	B	G	B	G	B	G
Number	3	5										

Grade	7		8		9		10		11		12	
Gender	B	G	B	G	B	G	B	G	B	G	B	G
Number												

Number of educators/officials involved in the study (Please indicate the number in the relevant column)

Type of staff	***Educators***	***HODs***	***Deputy Principals***	***Principal***	***Lecturers***	***Office Based Officials***
Number	1					

Are the participants to be involved in groups or individually?

Participation	
Groups	**X**
Individually	

Average period of time each participant will be involved in the test or other research activities (Please indicate time in minutes)

Participant/s	***Activity***	***Time***
		90 Minutes

Time of day that you propose to conduct your research.

School Hours	***During Break***	***After School Hours***
X	X	

School term/s during which the research would be undertaken

First Term	***Second Term***	***Third Term***
	X	

DECLARATION BY THE RESEARCHER	
I declare that all statements made by myself in this application are true and accurate.	
I have taken note of all the conditions associated with the granting of approval to conduct research and undertake to abide by them.	
Signature:	
Date:	2005.04.22

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DECLARATION BY SUPERVISOR / PROMOTER / LECTURER	
I declare that: -	
The applicant is enrolled at the institution / employed by the organisation to which the undersigned is attached.	
The questionnaires / structured interviews / tests meet the criteria of: Educational Accountability Proper Research Design Sensitivity towards Participants Correct Content and Terminology Acceptable Grammar Absence of Non-essential / Superfluous items	
Surname:	Du Preez
First Name/s:	Anna Elizabeth
Institution / Organisation:	Centre for Augmentative and Alternative Communication
Faculty / Department (where relevant):	Humanities
Telephone:	012-420 2001
Fax:	012-420 4389
E-mail:	alant@libarts.up.ac.za
Signature:	
Date:	2005.04.26

N.B. This form (and all other relevant documentation where available) may be completed and forwarded electronically to (or Nomvula Ubisi (nomvulau@gpg.gov.za). The last 2 pages of this document must however contain the original signatures of both the researcher and his/her supervisor or promoter. These pages may therefore be faxed (011 355 0512)or hand delivered. Please mark fax - For Attention: (fax) or hand deliver (in closed envelope) to Nomvula Ubisi (Room 525), 111 Commissioner Street, Johannesburg.

APPENDIX K : Permission from Gauteng Educational Department to conduct study

29-07-'05 13:46 FROM- T-014 P02/03 U-597

UMnyango WezeMfundo
Department of Education

Lefapha la Thuto
Departement van Onderwys

Date:	**20 July 2005**
Name of Researcher:	**Anna Du Preez**
Address of Researcher:	**P.O. Box 8409**
	Birchleigh
	1621
Telephone Number:	**(011) 3933178**
Fax Number:	**(011) 9761038**
Research Topic:	**Translucency ratings of Blissymbols by typically developing Setswana speaking children**
Number and type of schools:	**2 Primary Schools**
District/s/HO	**Ekurhuleni West**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

Permission has been granted to proceed with the above study subject to the conditions listed below being met, and may be withdrawn should any of these conditions be flouted:

1. ***The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.***
2. ***The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.***
3. ***A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.***

Office of the Senior Manager – Strategic Policy Research & Development
Room 525, 111 Commissioner Street, Johannesburg, 2001 P.O.Box 7710, Johannesburg, 2000
Tel: (011) 355-0488 Fax: (011) 355-0286

4. *A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Senior Manager (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher must supply the Senior Manager: Strategic Policy Development, Management & Research Coordination with one Hard Cover bound and one Ring bound copy of the final, approved research report. The researcher would also provide the said manager with an electronic copy of the research abstract/summary and/or annotation.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Senior Manager concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

ALBERT CHANEE
ACTING DIVISIONAL MANAGER: OFSTED

The contents of this letter has been read and understood by the researcher.	
Signature of Researcher:	
Date:	

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APPENDIX L : Letter to school to obtain permission to conduct research

Centre for Augmentative and Alternative Communication
Sentrum vir Aanvullende en Alternatiewe Kommunikasie
&
INTERFACE

2004 T-Systems Age of Innovation & Sustainability Awards: Excellence in Innovation and Sustainability: Social
2003 National Science & Technology Awards: Corporate Organization over the last ten years.
2002: Shirley McNaughton Award for Exemplary Communication received from the International Society for Augmentative and Alternative Communication
1998: Rolex Award for Enterprise: Associate Laureate
1995: Education Africa Presidential Award for Special Needs

University of Pretoria

website: http://www.up.ac.za/academic/caac
Fax/Faks: (012) 420 – 4389
Tel: (012) 420 – 2001
E-mail: erna.alant@up.ac.za
Faculty of Education / Fakulteit Opvoedkunde
Centre for Augmentative and Alternative Communication
Sentrum vir Aanvullende en Alternatiewe Kommunikasie
University of Pretoria, Lynnwood Road
PRETORIA, 0002
SOUTH AFRICA

Dear

I am a Masters student in AAC (Alternative and Augmentative Communication) at the University of Pretoria and as part of my study need to do research among junior school learners. Ms Mpho Maunatlala from North-West Educational Department referred me to you.

My study involves evaluating Blissymbols, an alternative communication tool, in a South African context. For this purpose, I am looking for 35 six to seven year old typically developing Setswana-speaking learners. Their home language and language of tuition must be Setswana.

With this letter, I want to ask your permission to do the research in your school.

All information gathered in the process will be confidential. The results of the study would be available to you if you so wish. Please complete the attached form and kindly fax it through to 011-976 1038. If you have any queries please contact me on
083 324 7915.

Regards

Anlie du Preez
Speech Therapist/Audiologist

Reply form

With this letter I _____ principal of

_____(School) give permission to Anlie du Preez

to conduct research on the learners at my school.

Signed_____

Date_____

APPENDIX M : Letter from school to give permission to conduct research

Seotloane Primary
School
PO Box 145
TEMBISA
1628

With this letter I Miss M. Francinah T Motaung principal of Seotloane Primary School (school) give permission to Anlie du Preez to conduct research on the learners at my school.

Signed Motaung

Date 28/04/05.

Received Time 28. Apr. 12:05