A Microcomputer-based Synthesis of Blissymbols from Key Components to Facilitate Language Acquisition in Severely Disabled People

by

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This Dissertation is dedicated to
Zehava Bitton
for her Love, Patience and Support

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Abstract

Blissymbolics is a semantically-based graphic language which was originally developed as universal channel of communication to promote world peace. Instead, this logical and unambiguous symbol system has been adopted as a communication-enhancement system for pre-reading non-speaking children, and it is now ranked as the most comprehensive and effective graphic system used within augmentative communication.

Over the years, a number of multi-functional programmes designed to manipulate microcomputer-based assembly of Blissymbols have been developed. Although some of these applications have become rather popular, none of them is based on a mechanism which provides their users with a cognitive access to the stored symbol vocabulary.

The present research was initiated and devised with an underlying goal to gain an insight into some of the most potent characteristics of Blissymbolics, and then, with the backing of the findings, offer a microcomputer-based interface featuring a cognitive technique designed to facilitate retrieval, manipulation, teaching and learning of Blissymbols.

In recent years, many researchers have studied Blissymbolics as an AAC system. Most of them investigated the interrelationship between iconicity and Blissymbol learnability and established that there is a positive correlation between the two. However, none of their papers addressed the need to formulate a method of increasing the perceived transparency and translucency of symbols so their learnability would increase as well. According to the 'Semantographic' method which is proposed herein, this goal can be achieved by making the users more aware of the inner-structure of the symbols they use, and by systematically teaching them the meaning assigned to each of the components (i.e. "key symbols") which form these symbols. Two studies were set to investigate how effective the proposed method really is. In the first study, 43 subjects were asked to guess the meaning of 30 Blissymbols twice. Before the subjects repeated their task they were shown an analysis of the inner-structure of the symbols as well as the meaning represented by each of their components. Results of the *McNemar Test* which was performed on the data obtained from the two tasks, clearly indicated that there was a significant positive change in the ability of the subjects to guess the meaning of the symbols after they were exposed to their sub-component composition and to the assigned meaning of each component. In the second study, 35 subjects were asked to evaluate, on a 7-point scale, the degree to which each of the same 30 Blissymbols represents its assigned gloss. Immediately afterwards the subjects were asked to repeat the same task, but this time they were shown an analysis of the inner-structure of the symbols as well as the meaning represented by each of their components. Results of the *Statistical Analysis* which was performed on the data obtained from the two tasks clearly indicated that there was a significant increase in the perceived translucency of the symbols after the subjects were exposed to their component composition and to the assigned meaning of these components.

These results along with some of the basic characteristics of Blissymbolics combine to constitute the rationale behind the hypothesis that the semantic processing of Blissymbols by proficient Blissymbolics users correlates positively with the users' awareness of the inner-structure of the symbols and their knowledge of the meaning represented by the "key elements" which compose them. A study called *Multidimensional Scaling of Blissymbolics Data* was set to examine this rationale. Two groups of subjects were independently assigned one task each. The first group was asked to sort 100 Blissymbols according to a perceived dominant component in the composition of the symbols. The second group was asked to catego-

rize semantically the English glosses of the same 100 Blissymbols. *The Kruskal-Shepard Non-Metric Scaling* which was applied to each of the data sets revealed a significant correlation between the graphic sorting of the symbols and the semantic categorization of their glosses. This correlation validated the proposition that the semantic comprehension of Blissymbols is to a large extent manifested by either a conscious or an automatic synthesis of their sub-structure elements and that the same process is most likely to occur when proficient Blissymbolics users need to recall the graphic representation of a symbol.

Next, it is argued that the inclusion of the 'Semantographic Approach' (which is shown to be compatible with a model of thinking skills), in the overall teaching strategy for Blissymbolics would not only facilitate the learnability and memorability of the symbols, but also contribute to the cognitive development and literacy of those who would be taught by its principles. Furthermore, a semantographically-based retrieval technique is argued to resolve the cognitive problems encountered by users of most present Blissymbol-interfaces. The blueprint of the proposed technique calls for a special microcomputer-based symbol-library where each stored Blissymbol would be assigned a semantographic "component-code" (i.e. a logical sequence of a few "key-symbols" representing its semantic associations). To retrieve a symbol, users would not necessarily have to remember its exact component-code. Instead, they could depend on their semantographic training in order to intelligently guess the relevant code. This new technique (i.e. of enabling users to access stored Blissymbols by referring to their semantic content and retrieve them by logically relating to some or all of their component parts), is, in fact, an emulation of the natural way linguistic entities are generated, stored and recalled.

The application which has been developed on the basis of the proposed semantographic principle is **HyperBliss** 3.0 ©, a large and a comprehensive Apple® Macintosh™-based programme written in the HyperCard™ environment. The programme includes a number of useful utilities designed to satisfy the various needs of Blissymbol communication and learning. Among others, the programme features a user-friendly Blissymbol communication interface emulating the natural retrieving process of stored Blissymbols, a tutor facility for semantographic teaching of Blissymbols, a sophisticated symbol library that is simple to maintain, a print-shop for easy drawing of existing and new Blissymbols, and desktop facilities to print symbol-charts and personalized Bliss-dictionaries.

Finally, the proposed semantographic approach to Blissymbol teaching and retrieving and its successful implementation in **HyperBliss**, necessitates an introduction of a new Blissymbolics User-Model to highlight the immense potential and opportunities inherent in the application. According to the new model, individuals who have sufficient cognitive ability to learn the structure of Blissymbolics and relate to its principles can:

Utilize Blissymbolics as an expressive language system and as a natural environment for the implementation of the semantographic approach; turning the system's own characteristics, principles, imagery and structure into: (1) a powerful pedagogic tool to stimulate thinking processes and develope the thinking skills necessary to the acquisition and advancement of literacy; and (2) an efficient and cognitively consistent access to the entire Blisssymbol vocabulary - thus exploiting its full communicative potential.

Introduction

Section 1 of this introductory chapter briefly defines the scope of Augmentative and Alternative Communication (AAC) as a field, highlights its main goals, and presents the link between the field and the present study. Section 2 begins with an abbreviated historical perspective of Blissymbolics up to its present status as the most comprehensive and effective graphic system used within augmentative communication. The chapter ends with a description of the most important characteristics and strengths of the system.

Augmentative and Alternative Communication

The Scope of the Field

Augmentative and Alternative Communication is defined as "all communication which supplements or augments speech" (Vanderheiden & Yoder, 1986). The need for AAC arises when severe communication disorders limit or deny the role of natural speech as a channel for the basic communication needs of an individual. These disorders result from a variety of physical, language and/or cognitive impairments (Beukelman & Garret, 1986).

Internationally, AAC has become a core science in the field of Rehabilitation Technology. It is now accepted that comprehensive treatment of multiple handicaps which include speaking disability should offer an appropriate solution to the prime need of the individual: Communication. This need is arguably the most serious and often the most neglected.

The ability to respond, converse, and convey coherent messages can ease the frustration of severely disabled people and help them achieve a more rounded physical and emotional existence. With AAC, conventional physical therapy becomes more efficient because a "communicative" patient can offer the therapist valuable feedback. Furthermore, AAC technology enables non-speaking pupils to explore new linguistic horizons which are otherwise out of their reach. Being "communicatively independent" gives disabled people better prospects of integration with the community at large. Job placement, for instance, is no longer an impossible task. Complementary AAC technology can help those who under different circumstances impose an unnecessary burden on the ever shrinking welfare budgets to become self supporting and even tax payers (Shalit & Boonzaier, 1990b).

The Main Objectives of the Field

Professionals in this field constantly investigate, experiment with, and refine both existing and new innovative AAC techniques. Two of their primary goals are (**a**) to develop strategies for a more effective and efficient use of available AAC techniques and aids; and, subsequently, (**b**) to develop appropriate teaching materials and training procedures for mastery of these communication-aids and AAC techniques (Vanderheiden & Yoder, 1986).

The Reason for the Present Study

The raison d'etre for the present study are the very same objectives mentioned above. This research was initiated and performed with an underlying goal to gain insight into some of the most potent characteristics of Blissymbolics, and then, with the backing of the findings, offer a microcomputer-based interface featuring a cognitive technique designed to facilitate retrieval, manipulation, teaching and learning of Blissymbols.

The System of Blissymbolics

Historical Perspective

Blissymbolics is a semantically-based graphic language. Its inventor, Charles K. Bliss, hoped that as a logical and unambiguous writing system Blissymbolics would become a universal channel of communication to promote world peace (Bliss, 1965). Instead, In 1971, Shirley McNaughton[1], then a special education teacher within an inter-

disciplinary team at The Ontario Crippled Children's Centre[2] in Toronto, introduced Blissymbolics as a communication-enhancement system for pre-reading non-speaking children (McNaughton, 1985). Ever since this symbol system was adapted for the benefit of communicatively impaired individuals, they have been provided with comprehensive communication opportunities previously denied. As an alternative communication system, Blissymbolics is advantageous to people with multiple disabilities because it enables them to communicate and converse effectively with minimal 'actuations'. Moreover, Blissymbolics transcends traditional orthographic literacy. The semantic basis of the system makes it possible for pre-reading users to transmit meaningful and comprehensive messages without the need to be familiar with the writing system of their audience (Shalit & Boonzaier 1990b). Consequently, Blissymbolics gained considerable momentum and a great deal of popularity (Archer, 1977; Blau, 1983; Clark, 1984; Luftig & Bersani 1985; McNaughton & Kates, 1980; McNaughton, 1985; Fristoe & Lloyd, 1979; Yovetich & Pavio 1980; and Yovetich & Young, 1988). Although many other forms of graphic systems have been developed over the past 10 years, Blissymbolics is still ranked as the most comprehensive and effective graphic system used within augmentative communication (McNaughton, 1988).

Basic Features[3]

A number of powerful characteristics make Blissymbolics the unique graphic communication system it is. First and foremost, as a semantically-based language, its essence is to convey meaning in a pure, absolute and unambiguous form with no reference whatsoever to phonics. Most of the core vocabulary of the system is based on a relatively small set of approximately 120 "Key Symbols"[4], each representing a root, or, a primary meaning. The generic nature of these component-parts, together with a logical associative rule-base and a number of simple strategies, enable proficient users to expand their symbol vocabulary fairly easily, and to understand, with no apparent difficulty, new symbols depicting both abstract and concrete concepts.

All Blissymbols derive from a fixed set of graphic forms consisting of the following shapes:

* **Standard geometric shapes:** e.g. 
* **Other geometric shapes**: e.g. 
* **International signs**: e.g. 0 1 2 3 
* **Punctuation marks**: e.g. , . ? !

The entire body of Blissymbols can be divided into three major classes:

* **Pictographs** (e.g. "grapes") 
* **Ideographs** (e.g. "feeling") 
* **Arbitrary symbols** (e.g. "the") 

A pictograph depicts the outline shape of its word referent-gloss while an ideograph only creates a graphic association with its gloss. An arbitrary symbol, on the other hand, bears no relationship to the concept it represents. Blissymbols in all three classes can appear in different types of symbols:

* **a single shape of a Key Symbol** (e.g. "wheel")
* **a superimposed compound** (e.g. "wheelchair") 
* **a sequenced compound** (e.g. "teacher") 

Another very important feature of the system is demonstrated by Hehner in her book "Blissymbols For Use" (Hehner, 1980). Hehner shows how Blissymbols can be grouped into meaning categories where symbols in each group relate to each other semantically by virtue of shared similarities in their component composition. This phenomenon is illustrated below by some members of the meaning category "Music" (Hehner, 1980: pp.161-162):

note music musician song singer concert hall

Iconicity & Blissymbol Learnability

Section 1 of this chapter begins with a summary of terminology relevant to iconicity and Blissymbol learnability, followed by a review of AAC research which deals with the interrelationship between the two. Since all the authors whose work is reviewed in this section claim that Blissymbol learnability positively correlates with iconicity, it ends with a proposal for a way to increase Blissymbol transparency and translucency. Two studies were set to investigate how effective the proposed method really is. Sections 2 & 3 describe these studies. In the first, 43 subjects were asked to guess the meaning of 30 Blissymbols twice. In the second time the subjects were shown an analysis of the inner-structure of the symbols as well as the meaning represented by each of their components. Results of the McNemar test which was performed on the data obtained from the two tasks, clearly indicated that there was a significant positive change in the ability of the subjects to guess the meaning of the symbols after they were exposed to their component composition and to the assigned meaning of each component. In the second study, 35 subjects were asked to evaluate, on a 7-point scale, the degree to which each of the same 30 Blissymbols represents its assigned gloss. Immediately afterwards, the subjects were asked to repeat the same task, but this time they were shown an analysis of the inner-structure of the symbols as well as the meaning represented by each of their components. Results of the statistical analysis which was performed on the data obtained from the two tasks indicated that there was a significant increase in the perceived translucency of the symbols after the subjectswere exposed to their component compostion and to the meaning of their components.

The Effect of Iconicity on Blissymbol Learnability

Terminology[5]

Iconicity is referred to as a continuum reflecting the degree of visual relationship between symbols and their glosses as perceived by people learning the symbols. Iconicity has high and low ends termed **transparency** and **opaqueness** respectively, and an intermediate marking point, closely positioned to the transparency end, called **translucency**. An opaque or arbitrary symbol bears no relationship whatsoever to its assigned meaning, whereas an iconic, or, transparent symbol depicts its referent in a manner that makes the gloss of the symbol highly guessable (this is why transparency is also referred to as **guessability**). In contrast to a transparent symbol, the meaning of a translucent one is not necessarily apparent, but, when both the symbol and its gloss are present, the relationship between them is perceived to be of a high degree. Two other terms, **representativeness** and **concreteness**, ought to be mentioned in conjunction with the previous ones. Representativeness is the degree to which a given symbol is perceived to be representing its word referent. Although representativeness is essentially the same as translucency, Yovetich and Young (1988) argue that these two terms should not be used interchangeably because representativeness is integrally tied to Pavios's Dual Coding Model and thus its theoretical application distinctly differs from that of translucency. Concreteness measures the degree of the picturability of a word, i.e. how easily can a particular word evoke the image of what it reresents.

Review of Related Research

Considerable effort has been devoted over the past decade to establish ways to rate the iconicity level of Blissymbols and use these ratings to further investigate what influence the perceived transparency or translucency of Blissymbols has on their learnability and memorability.

Yovetich and Pavio (1980) conducted three of the early experiments which were set to study representativeness and concreteness as stimulus attributes of Blissymbols. Results of their studies demonstrated that learnability of Blissymbols positively correlates with the representativeness values of these symbols. In addition, they found representativeness to be the most effective characteristic for both short and long term memory of Blissymbols.

Yovetich (1985) found Representativeness to be a reliable psychological attribute of Blissymbols which has a positive effect on their learnability.

Yovetich and Young (1988) examined the influence which symbol representativeness and the concreteness of its assigned gloss have on the "guessability" (transparency) of a Blissymbol. They found that the dimension of symbol representativeness significantly affected the "guessability" of its word referent.

Unlike Yovetich et al. who prefer the term representativeness, Luftig and Bersani (1985) use the term translucency. They found translucency to be a key psycholinguistic variable mediating and linking between a Blissymbol and its gloss, thus facilitating as well as enhancing the learnability of the symbol. In addition, Luftig and Bersani found that translucency has its greatest influence in the early phases of the learning process.

Fuller (1987) also studied the effect of translucency upon the learnability of Blissymbols and found it to be a potent variable in the learning of Blissymbols by both children and adults.

All researchers whose work is reviewed above agree that a high degree of perceived translucency of a Blissymbol greatly facilitates its learnability, and has a positive effect on its memorability. In fact, they all firmly believed that symbol translucency should be seriously considered by educators and clinicians especially when deciding on the initial lexicon they wish to teach to their pupils or patients: Fuller (1987), for instance, concludes his dissertation suggesting that: *"...educators may want to consider choosing initial lexical items which have a high visual representation between symbol and referent."* Luftig and Bersani (1985) end their paper commenting vis á vis the positive correlation between translucency and Blissymbol learnability: *"...implications can be drawn for the choice of lexicons to-be-taught as well as possible instructional methods for best teaching of Blissymbols..."* Yovetich (1985), in his dissertation recommends that: *"...time and effort should be devoted towards improving the overall representativeness of the [Blissymbol] system."* Yovetich and Young (1988) conclude that: *"In teaching symbols it is important to consider first, those symbols which are highly representative of a concrete concepts, and second those symbols which are highly representative of abstract concepts which are important to the individual."*

Conclusions

If indeed the perceived transparency and translucency of Blissymbols bear such an important influence on their teaching and learning, then more efforts should be directed towards an investigation of means which can increase the transparency or translucency values measured for the symbols by their potential users.

A McNemar Test for Signicance of Changes in Transparency (Guessability) of Blissymbols

Objective

The objective of the present study was to investigate if prior awareness of the inner-structure of Blissymbols and knowledge of the meaning represented by each of their components can increase the transparency values measured for the symbols, or, in other words, can these conditions create an environment which would make the assigned glosses of these symbols more guessable.

Design

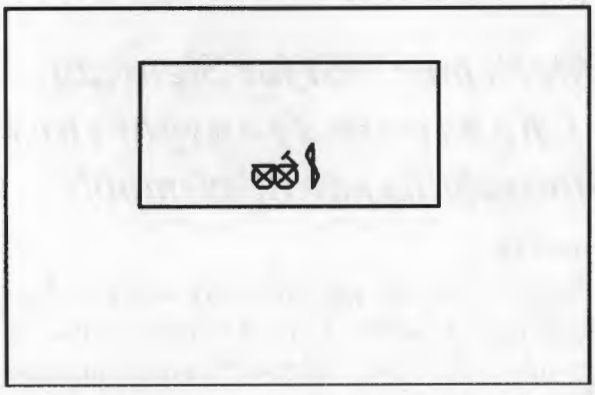
A comparison between two sets of results of the McNemar Test for Significance of Changes[6] performed on data obtained from two related tasks carried out by the same group. The first task: guessing the meaning of 30 Blissymbols. The second: guessing the meaning of the same 30 Blissymbols, but this time with the component composition of each symbol analyzed and the meaning of each component present.

Subjects

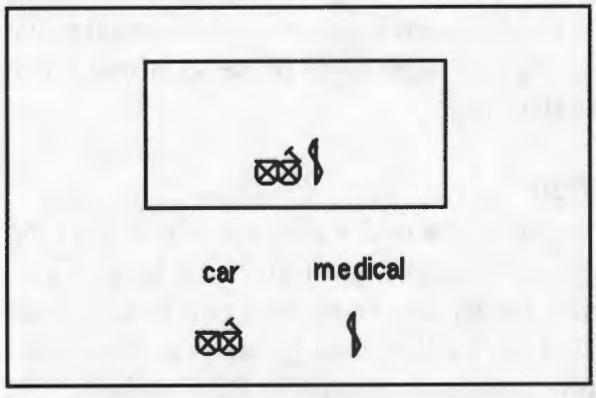
The subjects were 43 standard 8 pupils[7] at a private high school. The group was a mixture of boys and girls. The average age of the participants was 15. All the subjects were native speakers of English, and none was familiar in any way with Blissymbolics prior to the experiment.

Materials

Each subject received a package containing: (**a**) an instructions-sheet. (**b**) one brown envelope. (**c**) two white envelopes numbered "1" and "2" respectively. (**d**) two sets of 30 [9cm X 6cm] cards. Every card in envelop "1" featured one Blissymbol in a rectangle frame, whereas the cards in envelope "2" featured the same Blissymbols but beneath each symbol there were present the components composing the symbol along with their assigned meaning as illustrated below:



An example of a card in envelope "1"



An example of a card in envelope "2"

The 30 Blissymbols which were selected for the study from the Yovetich (1985) data are divided into two groups (Table 1). The the first group consisted of symbols which were reported by Yovetich as **H**igh (>3.9) on both the **R**epresentativeness and the **C**oncreteness dimensions. These 15 symbols were labeled **HRHC**. The symbols in the second group were reported by Yovetich as **L**ow (<3.1) on both of these same dimensions and were labeled **LRLC**.

***Table 1** - The 30 Blissymbols which were selected for the study*

Group A - HRHC (R>3.9 C>3.9)	Group B - LRLC (R<3.1 C<3.1)
1 ambulance	16 always
2 cabin	17 anyone
3 Christmas	18 belief
4 family	19 death
5 forest	20 different
6 furniture	21 dream
7 home	22 few
8 library	23 freedom
9 outside	24 hatred
10 river	25 how
11 shore	26 idea
12 sunset	27 lend
13 top	28 maybe
14 valley	29 safety
15 wide	30 science

Procedure

The subjects were not informed of the true nature and purpose of the experiment. Instead, they were told their sincere help was required to test the guessability of 30 icons which were especially invented for a new computerized puzzle for severely disabled children. First, the subjects were asked to open envelope "**1**", take the cards out of the envelope and shuffle them. Then, they were instructed to examine the symbol drawn on each card, guess its meaning and write their guess above the symbol. 20 minutes later, the subjects were asked to put the cards back into envelope "**1**" and place that envelop inside the brown one. Next, the subjects were asked to repeat the exercise with the cards they found in envelope "**2**", except, this time, they were told to make use of the new "helpful clues" (i.e. the components and their meaning) which were provided beneath the symbol on eachcard.

The McNemar Test

The data obtained from the two parts of the experiment consisted of 43 observations (i.e. the number of subjects) on 30 bivariate random variables (**Xi** , **Yi**), i =1,2,....30 representing the 30 Blissymbol-cards in their two forms: (**1**) without their components explained (represented by "**X**"), and, (**2**) with their components explained (represented by "**Y**"). Each pair of cards (**Xi** , **Yi**) was mutually independent, and for all **Xi** and **Yi** there were two categories, "**0**" and "**1**" - i.e. *"correct guess"* and *"wrong guess"* respectively. The four possible combinations of responses are explained below:

a ***(+ +) : the number of subjects who guessed correctly the meaning of the symbol in both parts of the experiment (i.e. before and after the component composition of the symbol and the meaning of each component were revealed to the subjects).***

b (+ -) : the number of subjects who guessed the meaning of the symbol in the first time, but failed in the second.

c ***(- -) : the number of subjects who failed to guess the meaning of the symbol in the first time, but were successful in the second.***

d ***(- -) : the number of subjects who failed to guess the correct meaning of the symbol in both parts of the experiment.***

Table 2 - Two by Two contingency table summarizing the data which were collected for each symbol

	$Y_i=0$	$Y_i=1$
$X_i=0$	**a (++)** the number of pairs where $X_i=0$ $Y_i=0$	**b (+−)** the number of pairs where $X_i=0$ $Y_i=1$
$X_i=1$	**c (−+)** the number of pairs where $X_i=1$ $Y_i=0$	**d (−−)** the number of pairs where $X_i=1$ $Y_i=1$

Classification of the Y_i and X_i

Results

The computations for the observations on all 30 Blissymbols appear in table 3 below. They were arranged in four columns resembling the 2 x 2 contingency table above. There is also a fifth column listing the results of the Test Statistic which for the McNemar test is usually written:

$$T1 = \frac{(b-c)^2}{b+c}$$

Discussion

The *chisquare* values in tables 3a and 3b represent the significance of changes in the perceived transparency (guessability) of the respective symbols as caused by the information which was revealed to the subjects in the second part of the experiment

Table 3 a - Results of the McNemar Test

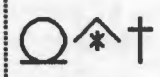
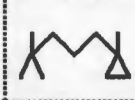
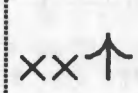
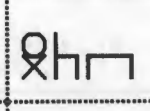
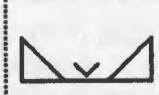
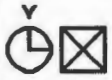
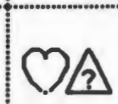
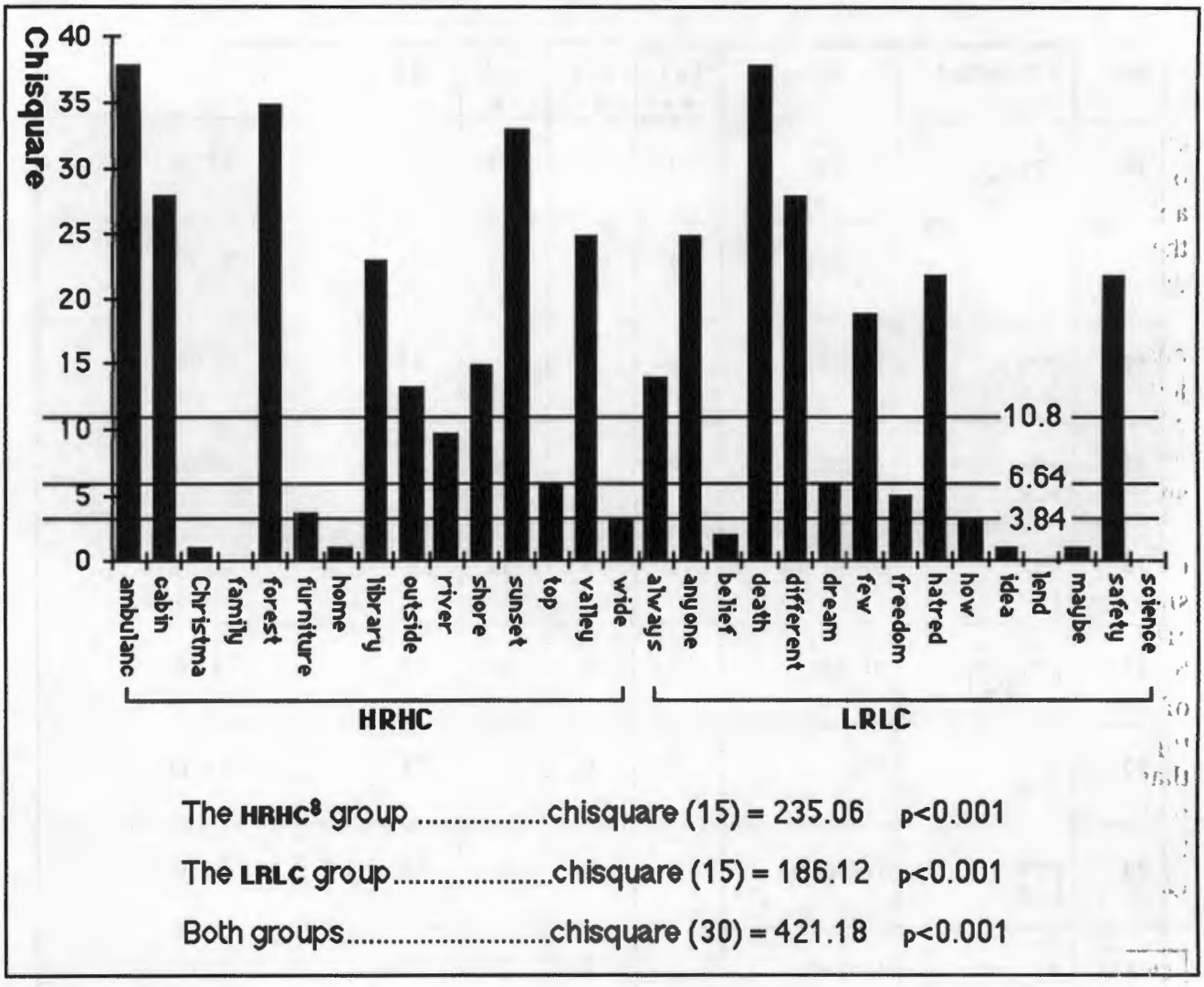
No	Symbol	Gloss	(a) ++	(b) +-	(c) -+	(d) --	T_1
1		ambulance	3	0	38	2	38.00
2		cabin	0	0	28	15	28.00
3		Christmas	0	0	1	42	1.00
4		family	0	0	0	43	0.00
5		forest	5	0	35	3	35.00
6		furniture	3	3	10	27	3.77
7		home	7	5	9	22	1.14
8		library	2	0	23	18	23.00
9		outside	3	1	16	23	13.24
10		river	0	3	17	23	9.80
11		shore	4	0	15	24	15.00
12		sunset	1	1	36	5	33.11
13		top	0	0	6	37	6.00
14		valley	5	0	25	13	25.00
15		wide	0	0	3	40	3.00

Table 3 b - Results of the McNemar Test

No	Symbol	Gloss	(a) ++	(b) +−	(c) −+	(d) −−	T_1
16		always	0	0	14	29	14.00
17		anyone	0	0	25	18	25.00
18		belief	0	0	2	41	2.00
19		death	0	0	38	5	38.00
20		different	3	1	31	8	28.12
21		dream	0	0	6	37	6.00
22		few	0	0	19	24	19.00
23		freedom	0	0	5	38	5.00
24		hatred	1	0	22	20	22.00
25		how	0	0	3	40	3.00
26		idea	0	0	1	42	1.00
27		lend	0	0	0	43	0.00
28		maybe	0	0	1	42	1.00
29		safety	0	0	22	21	22.00
30		science	0	0	0	43	0.00

Graph 1 - Results of a McNemar test for significance of changes in the ransparency of 30 Blissymbols



Overall, 421.18 more correct guesses - ($p<0.001$) for the meaning of the 30 Blissymbols were recorded by the subjects after they were shown the component composition of the symbols and the respective meaning of each component. Graph 1 reveals that the majority of the symbols, (70%), had a significant increase ofmore than 3.84 - ($_p<0.05$) in the number of correct guesses, while 15 of the 30 symbols, (50%), had an impressive increase of at least 10.8 or above - ($_p<0.001$). Only 3 symbols (10%) scored no correct guesses in either task, and just 6 symbols, (20%), had a increase of less than 3.84 - ($_p<0.05$) in the number of correct guesses.

Graph 1 shows that HRHC symbols were easier to guess than the LRLC symbols. The HRHC symbols, with their components and their respective meaning known had a total of 235.06 more correct guesses, whereas the LRLC symbols had only 186.12 more correct guesses under the same circumstances. Nevertheless, for both groups the increase in correct guesses was significant - ($_p<0.001$).

Another important observation is summarized in graph 2. It is a comparison between two phenomena: *positive* and *negative* effects which the introduction of the components and their meaning had on the correctness of the guesses recorded by the subjects in respect to each symbol. **Positive Effect** reflects the number of subjects who guessed the symbol wrongly before and correctly after the component composition of the symbols and the meaning of each component were revealed to them. **Negative Effect** reflects

the number of subjects who guessed the symbol correctly before and wrongly after the component composition of the symbols and the meaning of each component were revealed to them.

3 symbols: "family", "to lend" and "science", (10%), were not affected either positively or negatively. In other words, no subject was able to guess any of them either before or after the component composition of the symbols and the meaning of each component were revealed.

21 of the symbols, (70%), were affected positively only. In other words, while many subjects guessed them wrongly the first time and correctly the second, there were no subjects who guessed these symbols correctly the first time and wrongly in the second time.

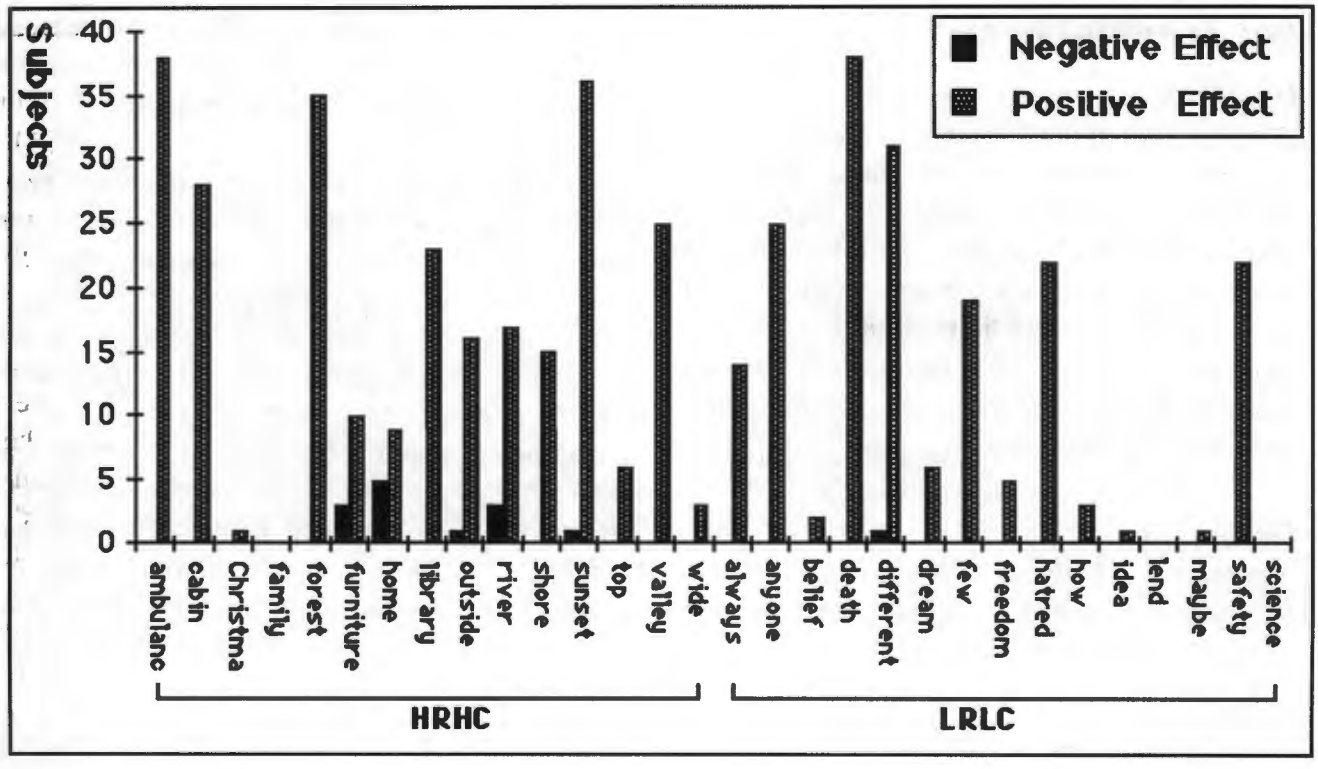
None of the 30 symbols showed only a negative effect. Indeed, six of the symbols showed both a negative effect and a positive effect. However, as it is highlighted in table 4 below, for each of these six symbols, knowledge of its component composition and the meaning represented by each component, helped rather than failed subjects to guess the meaning correctly (i.e. the positive effect was greater than the negative one):

Table 4 - Blissymbols for which the McNemar Test showed both positive and negative effects

Symbol	Negative Effect	Positive Effect
furniture	3	10
home	5	9
outside	1	16
river	3	17
sunset	1	36
different	1	31

Most intriguing, however, was the analysis of the answers recorded by the subjects for the symbol "home". At first, it was quite unclear why a relatively high number of subjects, (5), who guessed the symbol correctly the first time, changed their mind when the components of the symbol were revealed to them. The puzzlement intensified when the wrong answers were reviewed. The combination of "house" and "feeling" which represent the meaning of the two sequenced components of this symbol, inspired three subjects to change their mind about "home" and write "whore house". Two

***Graph 2** - Positive and negative effects of a KNOWN component composition (along with the meaning each component) on the transparency of 30 Blissymbols*



other subjects replaced "home" with "prostitute house", and a fifth substituted "home" with "escort agency". It was also noted that four subjects who did not guess the symbol correctly the first time also assigned similar glosses for this symbol after they were shown its component analysis...

A brief investigation resolved the mystery. No, the subjects did not copy the answers from one another. The reason rested in a special and most powerful presentation by a guest lecturer on "AIDS", which the subjects and their peers at the school attended only a couple of hours prior to the experiment. It seems that at least subconsciously the lecture left a strong impression on them.

Conclusions

The results of the present test would seem to indicate that there is a significant increase in the perceived transparency (guessability) of compound Blissymbols if subjects are aware of the inner-structure of the symbols, and know the meaning represented by each of the components.

A Test for Changes in Blissymbol Translucency

Objective

The objective of the present study was to investigate if prior awareness of the inner-structure of Blissymbols and knowledge of the meaning represented by each of their components can increase the translucency ratings of the symbols, or in other words, can these conditions create an environment which would make it easier to understand the connection between the symbols and their respective glosses.

Design

A comparison between two sets of results of a *t test* performed on data obtained from two related tasks carried out by the same group of subjects. The first task was to assign (on a 7-point scale) translucency values to 30 Blissymbols. The second task was to assign translucency values to the same 30 Blissymbols, but this time with the component composition of each symbol analyzed and the meaning of each component present.

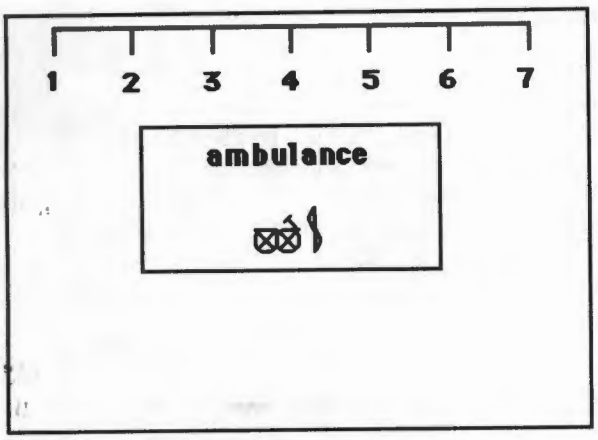
Subjects

The subjects were 35 standard 8 pupils studying at the same private high school of the previous group. However, none of these subjects was a member of the previous group or knew anything about the test. The present group too was a mixture of boys and girls. The average age of the participants was 15. They were all native speakers of English, and none of them was familiar in any way with Blissymbolics prior to the experiment.

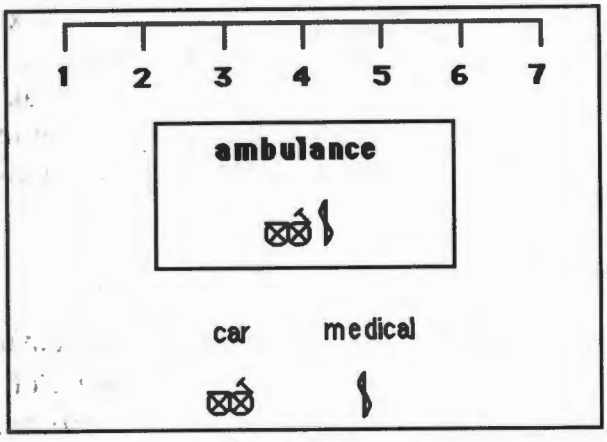
Materials

The same 30 Blissymbols used in the McNemar Test[9] were also used in the present study. Here too, the symbols were divided into two groups. The first group consisted of 15 symbols which were labeled **HRHC** because they were reported by Yovetich (1985) as **H**igh (>3.9) on both the **R**epresentativeness and the **C**oncreteness dimensions. The symbols in the second group were labeled **LRLC** because they reported by Yovetich as **L**ow (<3.1) on those same dimensions.

Each of the 35 subjects received a package containing: (**a**) an instructions-sheet. (**b**) one brown envelope. (**c**) two white envelopes numbered "1" and "2" respectively. (**e**) two sets of 30 [9cm X 6cm] cards. Every card in envelope "1" had a rectangle frame featuring one Blissymbol with its English gloss printed above it. The cards in envelope "2" featured the same Blissymbols and their English glosses, but beneath the rectangle frame there were the components composing that symbol along with their assigned meaning. As illustrated below, all cards, in both envelopes, had a 7-point scale drawn above the symbols:



An example of a card in envelope "1"



An example of a card in envelope "2"

Procedure

The subjects were not informed of the true nature and purpose of the experiment. Instead they were told their sincere help was required to assess how representative of their assigned meaning were some 30 icons especially invented for a new computerized puzzle for severely disabled children.

First, the subjects were asked to open envelope "1", take the cards out and shuffle them. Then, they were instructed to examine the symbol drawn on each card and indicate on the 7-point scale (where 1 was low and 7 high), the degree to which the symbol was representative of the English word printed above it. 20 minutes later the subjects were asked to repeat the exercise with the cards they found in envelope "2", except, this time they were told to take into consideration the new information (i.e. the components and their meaning), provided beneath the symbol on each card.

Results

Columns 3 & 4 in tables 5a and 5b below contain the means and standard deviations of the translucency values assigned by the subjects to the each of the 30 Blissymbols during the first task. Columns 5 & 6 contain the means and standard deviations of the translucency values assigned by the subjects to the symbols after the subjects were shown the components composing each symbol and the meaning represented by each component. Columns 7 & 8 contain the means and standard deviations of the differences between columns 3 & 4 and columns 5 & 6. These mean changes represent the increase or the decrease in the perceived translucency recorded by the subjects for each of the 30 symbols as a result of the information which was revealed to them about the symbols.

Discussion

The 30 symbols which feature in this test were selected were part of a large body of Blissymbols for which Yovetich (1985) measured and reported representativeness ratings. Therefore, it was necessary to check whether the ratings reported by Yovetich for the 30 Blissymbols resembled in any way the ratings recorded for them by the subjects who participated in the present test **before** they were shown the component composition of the symbols and the meaning represented by each of the components.

Graph 3 (page 20) illustrates a comparison between these two sets of translucency (representativeness)values. The comparison shows that Yovetich's set of ratings resembles very much the present set of ratings. In general, the subjects in the present test rated 25 symbols slightly higher than the ratings reported for the same symbols by Yovetich. Graph 3 reveals that the same trend is shared by the two sets of ratings. Both sets are similarly divided internally into two groups where symbols in the first group were rated higher than symbols in the in the second group . In fact, it is safe to say that the ratings recorded in the present study support, or confirm, those reported by Yovetich and vice versa.

Table 5a - Results of the Translucency Test

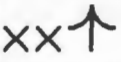
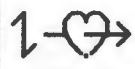
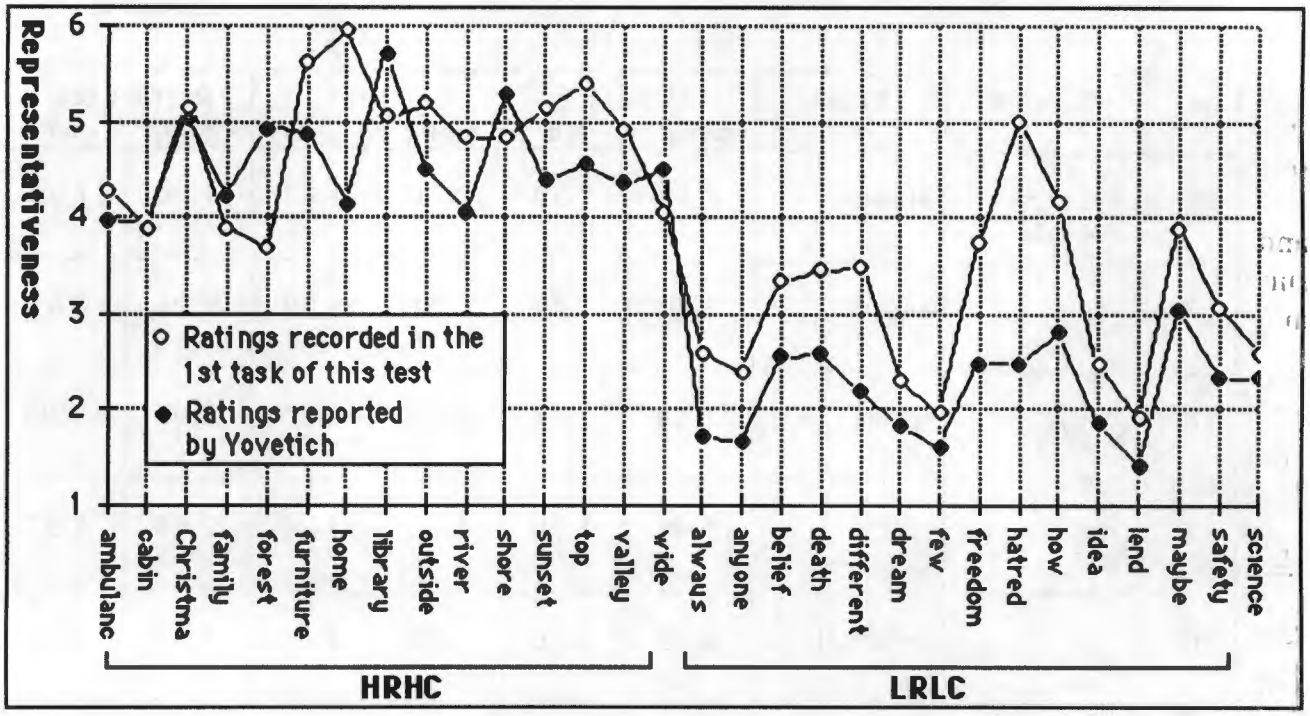
No	Symbol	Gloss	1st Task mean	1st Task sd	2nd Task mean	2nd Task sd	Difference mean	Difference sd
1		ambulance	4.29	1.72	6.06	1.16	1.77	1.85
2		cabin	3.89	1.62	4.23	1.65	0.34	2.06
3		Christmas	5.14	1.63	5.17	1.32	0.03	1.85
4		family	3.89	1.89	5.57	1.20	1.69	1.88
5		forest	3.69	1.51	5.63	1.11	1.94	1.70
6		furniture	5.63	1.57	5.51	1.25	-0.11	1.91
7		home	5.97	1.29	5.60	1.26	-0.37	1.48
8		library	5.06	1.43	5.80	1.26	0.74	1.72
9		outside	5.20	2.00	6.17	1.29	0.97	1.96
10		river	4.83	1.44	5.40	1.52	0.57	1.44
11		shore	4.83	1.69	5.80	1.16	0.97	1.64
12		sunset	5.14	1.67	6.49	0.85	1.34	1.76
13		top	5.40	1.46	5.40	1.48	0.00	1.81
14		valley	4.94	1.66	6.06	1.16	1.11	1.68
15		wide	4.06	1.55	4.60	1.65	0.54	2.16

Table 5b - Results of the Translucency Test

No	Symbol	Gloss	1st Task mean	1st Task sd	2nd Task mean	2nd Task sd	Difference mean	Difference sd
16		always	2.60	1.50	4.00	1.81	1.40	1.96
17		anyone	2.40	1.48	5.31	1.98	2.91	2.61
18		belief	3.34	1.68	3.83	3.83	0.49	1.99
19		death	3.46	1.74	6.09	1.20	2.63	1.97
20		different	3.49	1.88	4.83	2.04	1.34	1.73
21		dream	2.31	1.39	4.23	1.46	1.91	1.46
22		few	1.97	1.07	4.77	1.85	2.80	2.17
23		freedom	3.74	1.82	4.97	1.52	1.23	2.24
24		hatred	5.00	1.70	5.51	1.46	0.51	2.05
25		how	4.17	1.99	4.06	1.55	-0.11	2.14
26		idea	2.46	1.40	3.00	1.43	0.54	1.54
27		lend	1.91	1.25	4.11	1.83	2.20	2.23
28		maybe	3.89	1.71	4.91	1.50	1.03	2.05
29		safety	3.06	1.41	5.06	1.39	2.00	1.46
30		science	2.60	1.72	4.06	1.71	1.46	2.33

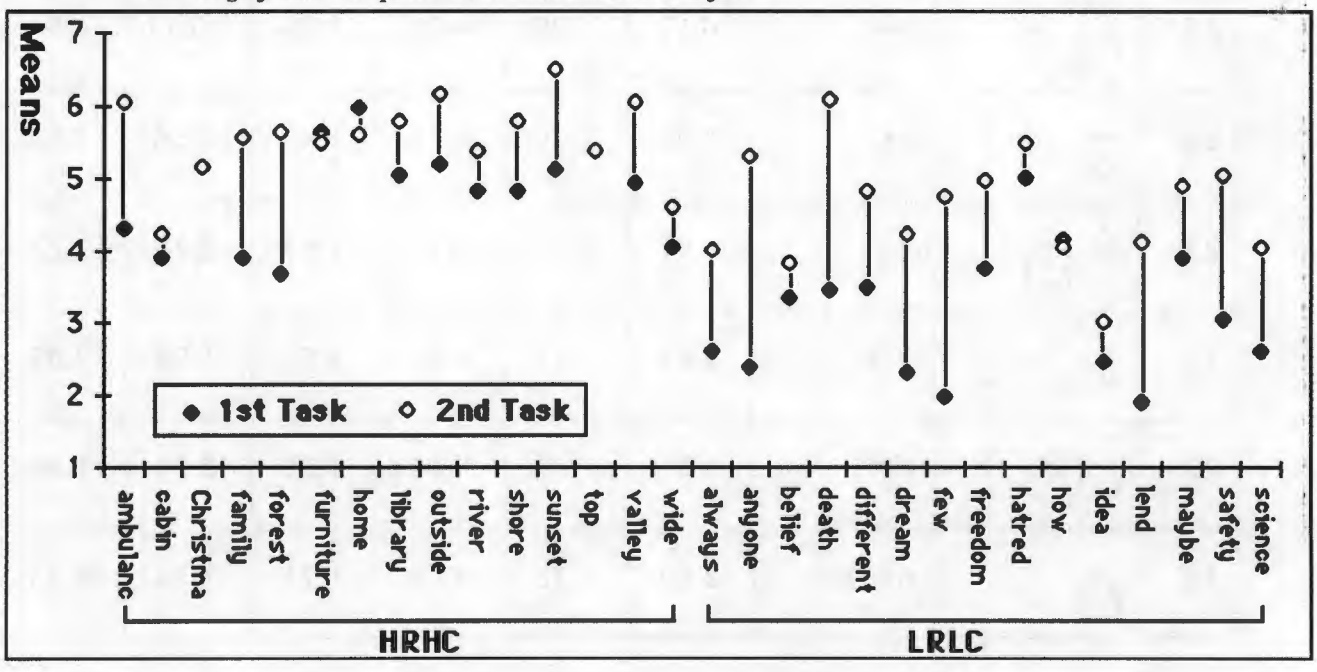
Graph 3 - *A comparison between independent translucency (Representativeness) ratings for the data*



Graph 4 below compares between the translucency values assigned to each of the 30 symbols by the subjects in the first and second task (i.e. before and after the component composition of the symbols and the meaning of each component were shown to the subjects).

The graph shows that 25 symbols, (83.3%), were perceived by the subjects to be more translucent when the inner-structure of the symbols and the meaning of their components were known them. For two symbols: "Christmas" and "top", (6.6%), the ratings in both tasks were identical or near identical; and for only 3 symbols, (10%), "furniture", "home" and "how", the ratings were slightly lower in the second task.

Graph 4 - *Translucency ratings for 30 Blissymbols before and after the inner-structure* of the *symbols and the meaning of each component were known to the subjects*



The heart and soul of thepresent analysis is a close examination of the mean changes in the perceived translucency for each of the 30 symbols which was caused by the introduction of the inner-structure of the symbols and the meaning of their components to the subjects.

Graph 5 below illustrates these changes, and table 6 shows their significancethrough a summary of the statistical analysis in the Graph and a Comparison between the HRHC & the LRLC groups.

Table 6 - Summary of Graph 5

Group	Symbols	Mean Change	Sd	t	P
HRHC	(1-15)	0.77	0.72	t(14)= 4.14	P<0.001
LRLC	(16-30)	1.49	0.92	t(14)= 6.30	P<0.001
Both	(1-30)	1.13	0.89	t(29)= 6.97	P<0.001

t(28) = -2.39 p<0.001

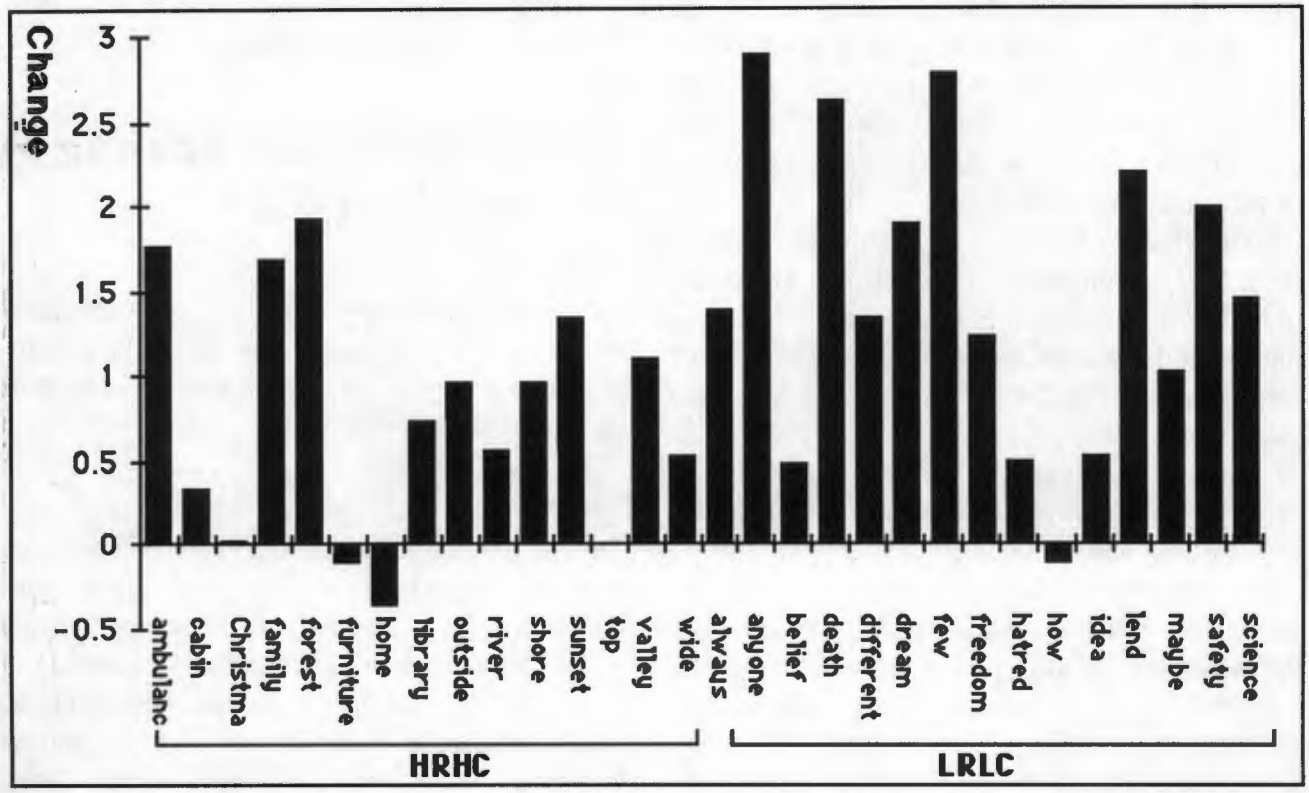
Graph 5 demonstrates that the overall change in the subjects' perception of the symbols as translucent was positive. In other words, after the subjects were made consciously aware of the component composition of the symbols and the meaning of each component they found 25 symbols, (83.3%), to be significantly more representative of their assigned word referent.

There was no difference in the subjects' response for one symbol "top" and very small (but positive) difference in their response for the symbol "Christmas". Only three symbols "furniture", "home" and "how" were thought by the subjects to be less representative of their word referent after the inner-structure of these symbols was shown to them. The reason for this paradoxial finding is not clear or important since the degree of the negative change was negligible.

Conclusions

The statistical analysis of the subjects' ratings would seem to indicate that awareness of the inner-structure of the symbols and knowledge of the meaning each of their components represents, cause a significant increase in the perceived translucency of the respective symbols.

Graph 5 - The mean change in the transluency ratings for 30 Blissymbols



The Semantic Processing of Blissymbols

The chapter begins with a presentation of the rationale behind the hypothesis that proficient Blissymbolics users, when needing to recall symbols or interpret their meaning, take advantage of an acquired or inherent awareness of the inner-structure of the symbols and knowledge of the meaning represented by the "key elements" which compose them. Section 2 outlines a study in which two groups of subjects were independently assigned one task each. The first group was asked to sort 100 Blissymbols according to a perceived dominant component in the composition of the symbols. The second group was asked to categorize semantically the English glosses of the same 100 Blissymbols. The Kruskal-Shepard Non-Metric Scaling which was applied to each of the data sets revealed a significant correlation between the graphic sorting of the symbols and the semantic categorization of their glosses. These findings validate the proposition that the semantic comprehension of Blissymbols is to a large extent manifested by either a conscious or an automatic synthesis of their sub-structure elements.

The Hypothesis

The results of the **McNemar Test** and of the **Test for Changes in Blissymbol-Translucency** seem to shed light on the fundamentals of the semantic processing of Blissymbols. If indeed a certain given condition, let us say, an awareness of the inner-structure of Blissymbols along with the knowledge of what is represented by each of their "key elements", does help to guess the meaning of the symbols and makes it easier to understand the connection between the graphic representation of the sybosand their assigned glosses, then it is very probable that this condition is very much responsible for the ability to process the semantic information which is carried within each Blissymbol. Further support to the proposition that there is a connection between the sub-structure of compound Blissymbols and the way their meaning is interpreted by proficient Blissymbolics users, lies in some of the inherent characteristics of this graphic system. One example is the possibility to sort Blissymbols into meaning categories where members of each category share at least one component in their composition.

The fact that Blissymbols are composed of a fixed number of meaning-bearing graphic elements and are governed by a logical syntactic system, allows for a parallel to be drawn between Blissymbols and words. Words too are constructed of smaller units. These units are called morphemes, and they constitute the minimal components of meaning and syntax in a language. In order to understand the meaning manifested by the formation of each word, speakers must have a conscious or a subconscious awareness of the morphemes in their language, and knowledge of the meaning their phonimic association evoke. This analogy leads to the hypothesis that proficient Blissymbolics users are consciously or subconsciously aware of the graphic inner-structure of the symbols they use, and they take advantage of their awareness when needing to recall a Blissymbol or interpret its meaning.

Multidimensional Scaling of Blissymbolics Data[10]

Objective

The present study was devised to investigate if indeed there is a correlation between the semantic processing of Blissymbols and the way their inner-structure is perceived.

Design

The study was designed as a comparison between two sets of results of the *Kruskal-Shepard Non-Metric Scaling* (Kruskal, 1964a; 1964b) performed on data obtained from different tasks carried out independently by different groups. The first task: graphic sorting of 100 Blissymbols according to the perceived dominant component in their com-

position. The second: semantic categorization of the 100 written English glosses of the respective Blissymbols.

Subjects

Three independent groups of subjects (A, B, and C) were selected to take part in the study. Group A consisted of 39 first year architecture students. They were assigned the graphic sorting task because, as a group, they were thought to have a better 'graphic perception' than the two other groups. Group B consisted of 36 matriculants[11] in the best English class of their private high school. They were assigned the semantic categorization task because, as a group, they were thought to be more 'language oriented' than the two other groups. Group C consisted of 48 first year statistics students who were chosen as a control group and assigned both tasks in succession.They were thought to be "neutral" in respect to the particular strengths of subjects in the other two groups. All of three groups were a mixture of males and females. The average age of the participants was 18. All members in groups A and B and two thirds of members in group C were native speakers of English. None of the subjects was familiar in any way with Blissymbolics prior to the study.

Materials

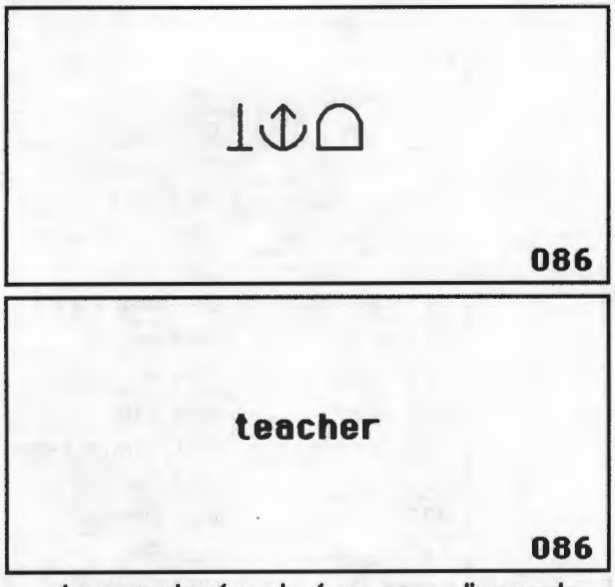
100 Blissymbols were selected for the study from the 1400 symbols which appear under different semantic categories in "Blissymbols For Use" (Hehner, 1980). Table 7 illustrates the five semantic categories of the 100 symbols: feeling; time; music; religion and thinking (Hehner, 1980). The list is a mixture of simple, sequenced, and superimposed symbols. Their word referents represent various parts of speech i.e. concrete and abstract nouns, verbs, adjectives, and adverbs.

Each subject received a package containing: (**a**) a pack of 100 [8cm x 10cm] white card (**b**) one numerically coded A4 brown envelope (**c**) seven numerically coded [9cm x 12cm] white envelopes (**d**) personal particulars slip (name, student id, sex, age, and native tongue) (**e**) instructions sheet.

***Table 7** - The 100 symbols in 5 semantic Categories.*

Music (13)	**Time (18)**
012 Composer	002 Always
014 Concert Hall	005 Appointment
014 Conductor	010 Clock
052 Melody	021 Early
054 Music	028 Finally
055 Musical note	038 Hour
056 Instrument	045 Late
057 Musician	060 Often
063 Orchestra	061 Once
076 Sing	065 Period
079 Singer	066 Periodical
080 Song	083 Suddenly
098 Whistle	088 Time
Thinking (38)	091 Turn
001 Advice	094 Usually
008 Calculate	095 Wait
009 Calculator	096 Wrist watch
013 Computer	097 When
016 Conscience	**Feeling (22)**
017 Correct	003 Angry
019 Decide	004 Anxious
020 Doubt	006 Bad
024 Explain	011 Comfortable
025 Fact	022 Envious
029 Forget	023 Excited
030 Forgive	026 Fear
034 Guess	027 Feeling
035 Guilt	031 Frustration
039 Idea	033 Good
040 Incorrect	036 Happy
041 Intelligent	037 Harmony
042 Invent	043 Jealous
044 Knowledge	047 Lonely
046 Learn	048 Love
050 Mathematics	049 Lucky
051 Meaning	064 Patience
053 Mind	071 Proud
058 Nonsense	074 Sad
059 Observe	076 Shame
062 Opinion	089 Troubled
067 Point of view	093 Upset
069 Plan	**Religion (9)**
073 Right	007 Belief
075 Science	018 Creation
082 Student	032 God
084 Suggestion	068 Prayer
085 Teach	070 Priest
086 Teacher	072 Religion
087 Think	077 Sin
092 Understand	075 Sinner
099 Worry	090 Truth
100 Wrong	

While subjects who were assigned the graphic sorting task (i.e. group A) received cards featuring Blissymbols, subjects who were assigned the semantic categorization task (i.e. group B) received cards featuring the English glosses corresponding to those symbols. Members of group C who were assigned both tasks received both pack of cards in succession. For computation purposes, each pair of corresponding cards (i.e. a Blissymbol card and its word referent card) was coded with an identical identification number:



An example of a pair of corresponding cards

Procedure

Before receiving their packages, the subjects were deliberately deceived. The architecture students in group A were told that they had to complete a compulsory test set by their department to check their 'graphic perception'. The Matric students in group B were told they had to complete an English proficiency test as part of their calculated mark. The subjects in group C were told the test was a cross-departmental survey aimed to establish a profile of students' graphic and semantic perception.

All participants were asked to fill in their personal particulars, and then, in order to ensure random sorting of the cards, the subjects were instructed to shuffle their packs of cards a number of times. The instruction sheet vis á vis the task which was given to members of group **A** read:

"...Your task is to sort the symbols into a minimum of 5 or a maximum of 7 groups. All symbols in every group you create must share what you perceive as a dominant component in their composition. Length and complexity of the symbols should not be considered. Note that there must be at least 2 cards in each group."

The corresponding part of the instruction sheet given to members of group **B** read:

"... Your task is to sort the English words into a minimum of 5 or a maximum of 7 semantic groups. Namely, all words in every group you create must relate to the same semantic category. You must consciously decide which semantic categories should serve as reference. Note that there must be at least 2 cards in each group. The groups can be a mixture of nouns, verbs, adjectives etc."

Members of group C were assigned the graphic sorting first and the semantic categorization immediately afterwards.

All subjects were instructed to ignore the three-digit reference numbers printed on the right-hand bottom of the cards. After 25 minutes which were allocated for each task, the subjects were asked to place each group of cards they had created in a white envelope, and then put all the white envelopes into the brown envelope.

Organization and Analysis of the Data

After each group of subjects completed its assigned task, a counting procedure was used to compute how many members of that particular group had placed a unique combination of cards (card i and card j) in the same white envelope.

Since precisely 100 cards were used for each task, the counting procedure resulted in a matrix **X** with 100 rows and 100 columns. Each element $X(i,j)$ represents the number of cases that cards i and j were sorted into the same group. Matrix **X** is, in fact, a similarity-matrix because a large element $X(i,j)$ indicates that a high proportion of the subjects in the particular group considered the Blissymbols, or, the English words on cards i and j to be similar; namely, sharing the same dominant component in their composition, or belong to the same semantic category respectively.

Four similarity-matrices were constructed. One for the graphic sorting of the symbols by group A, another for the semantic categorization of the glosses of the symbols by group B, a third for the graphic sorting of symbols by group C

and a fourth for the semantic categorization of the glosses by that same group.

The Kruskal-Shepard Scaling was preferred because it generates a 'map' (a low dimensional configuration) from a similarity-matrix in such a way that the rank ordering of the similarities is preserved. Therefore, those cards (symbols or words) which were judged most similar were expected to be placed closest together on the 'map', and those judged least similar placed further apart.

The extent to which the objective fails to be satisfied is measured by a concept known as the **'stress'** of the configuration (Kruskal, 1964a). A special algorithm of the scaling (Greenacre & Underhill, 1982) which searches for a configuration that comes closest to satisfying the aforementioned objective was applied to each of the four similarity-matrices[12].

Results

The low dimensional configurations for all four similarity-matrices are presented in the following pages. Considering the fact that 100 cards were used in the study, it should be noted that the 'stress' measured for each of the four configurations is relatively low. In other words, all four configurations enjoy a high goodness of fit, and thus should be regarded as **'good'** data. Table 8 below lists the stress figures measured for the configurations:

***Table 8** - Stress fifures for the configurations*

Task	Group	Conf	Stress
Graphic sorting of Blissymbols	A: Arcnitecture students	1	0.2131
Semantic categorization of English words	B: Language students	2	0.1923
Graphic sorting of Blissymbols	C: Statistics students	3	0.1950
Semantic categorization of English words	C: Statistics students	4	0.1840

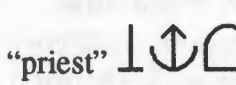
Discussion

In order to make the comparison easier for the reader, the English words in configurations **2** and **4** were replaced with the corresponding Blissymbols . Each of the four configurations features a number of Blissymbol-clusters. Most of these clusters are clearly defined. Some clusters, however, are not so distinct because they are internally divided into smaller visible sub-groups. Each Blissymbol-cluster in configurations **1** and **3** can be identified by the particular graphic shape which was perceived by the respective group of subjects as the dominant component in the composition of the Blissymbols which form the cluster. Similarly, each cluster in configurations **2** and **4** can also be identified by a particular graphic shape. But, there, the shared Blissymbol-component represents the meaning category to which the subjects of the respective group assigned those Blissymbols. In all four configurations, almost every distinct cluster has a few Blissymbols that pull away from their natural graphic or semantic group. These few intriguing exceptions too are examined and discussed immediately following each configuration.

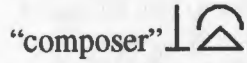
Configuration 1

Configuration **1** represents the sorting of 100 Blissymbols into groups by 39 architecture students. Their sorting resulted in in five Blissymbol clusters. Four of these clusters are clearly distinct (i.e. there are big gaps between them). They can be easily identified by the components:  :  :  : **and**  : which represent the "feeling"; "time"; "music"; and "religion" meaning categories respectively . The fifth cluster is identified by the component  which represents the "thinking" meaning category. This cluster is internally divided into three highly visible sub-groups. Naturally, the major sub-group which includes the largest number of symbols is "thinking". The second sub-group ("Knowledge") includes eight Blissymbols which feature the component  in their

composition. Many of the subjects believed it was an independent group. The third sub-group consists of only three Blissymbols ("science", "truth" and "mathematics"). These symbols have the two components  and  in their composition. It appears that many of the subjects thought the component  to be more dominant than  Therefore, these symbols were sorted together with the "religion" symbols. As a result the "science" sub-group is placed between the "thinking" and the "religion" clusters .

Note that unlike the symbol "teacher"  which is member of the "knowledge" sub-group of the "thinking" cluster, the symbol "priest"  is found in the "religion" cluster. This is most likely due to the fact that all subjects in group A viewed the component  as more dominant than the component  . Two other symbols, members of the "thinking" cluster, "computer" and "calculator"  , are drawn away from their cluster towards the "time" cluster. Some of the subjects viewed the component  , which resembles the component  , as the dominant component in the composition of these two symbols, and thus sorted them together with the "time" symbols.

The symbols "religion"  and "belief" are found in the "feeling" cluster. It appears that most of the subjects in this group considered the component  as more dominant than the component  .

Another exception features the symbols "composer"  and "melody" . They are placed in the gap between the "music" and the "thinking" clusters because At least half of the subjects gave the  component priority over the  component.

Of course, the other half of the group thought otherwise.

Configuration 2

Configuration **2** represents the semantic categorization of 100 English words by 36 language students. The sorting resulted in five clusters of words. Four of the clusters are quite concentrated and have big gaps between them. They can be identified by the  components which represent the "feeling"; "time"; "music"; and "religion" meaning categories respectively. The fifth cluster is made of words that belong to the semantic category "thinking" and identified by the component. Although this cluster is rather scattered, it can still stand as a defined group.

The word "harmony" is placed in the gap between the "feeling" and the "music" clusters, but closer to the latter. It is so because most of the subjects in this group associated the word with its musical connotation and only a few associated "harmony" with an emotional state. Obviously, there was no way for the subjects to know which of the two meaning categories is more appropriate for this word. Blissymbolics users, however, would not have such a problem. The symbol itself contains a clue (i.e. the component), which clearly indicates that the word referent of the symbol belongs to the "feeling" category.

In contrast to the last example, the symbol "patience" seems to be somewhat ill constructed. In configuration **1** the symbol was placed in the midst of the "time" cluster, but in this configuration the word referent of the symbol is placed very close to the "feeling" cluster. The conclusion is that the symbol provides no semantographic clue which would connect, or, relate it in any way to the "feeling" category.

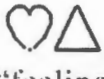
Other interesting exceptions are, for instance, words like "conscience" and "doubt", which many subjects decided to sort into the "feeling" category.

The comparison between the present configuration and configuration **1** reveals a high and clear correlation between the graphic sorting of the symbols by the the first group of subjects and the semantic categorization of the English referents of the respective symbols by the second group of subjects.

Configuration 3

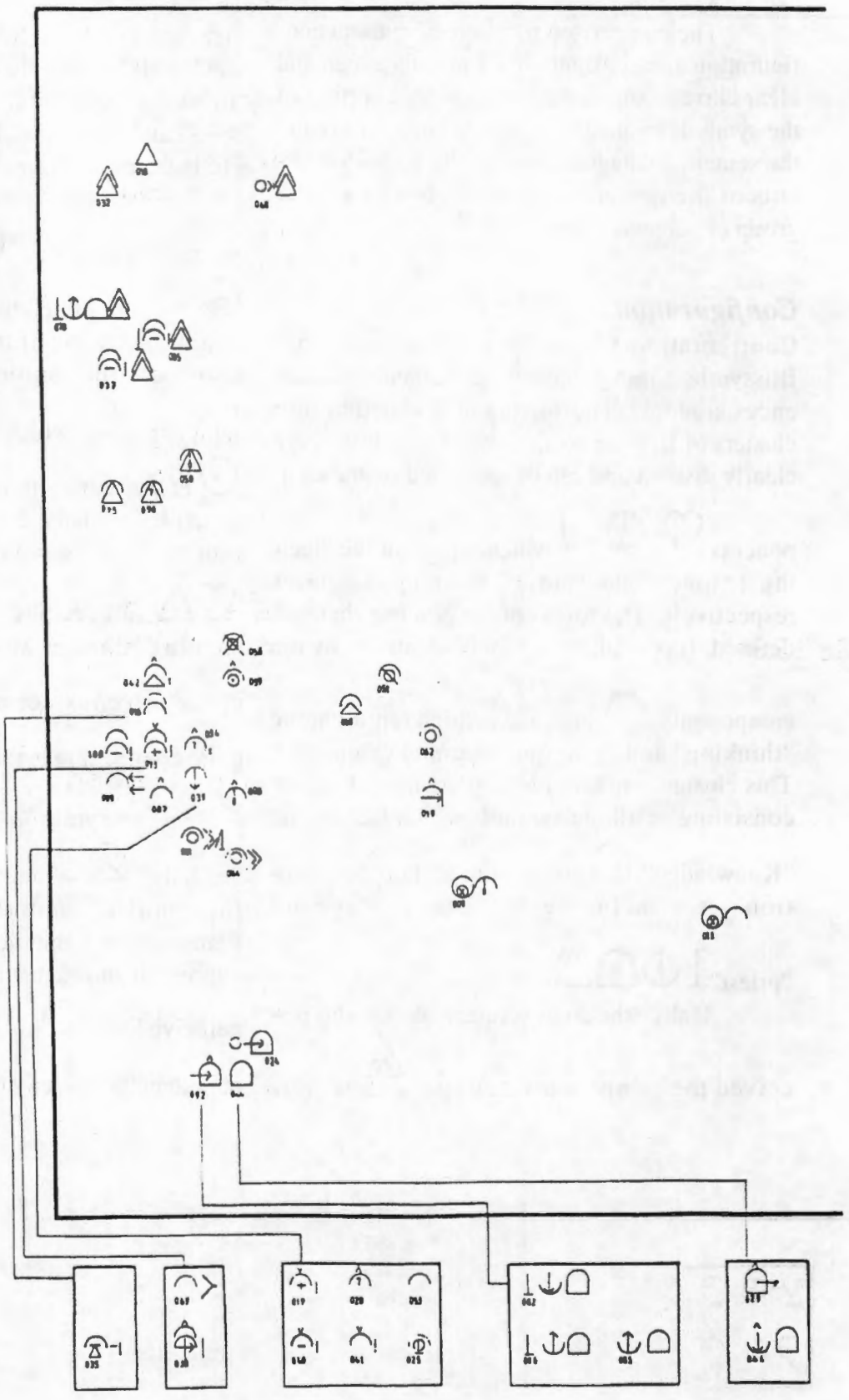
Configuration **3** represents the sorting of 100 Blissymbols into groups by 48 mathematical sciences students. The sorting of resulted in four clusters of Blissymbols. Three of the clusters are clearly distinct and can be identified by the components  which represent the "feeling"; "time"; and "music" meaning categories respectively. The forth cluster is somewhat less defined. It is made of symbols identified by the components  and  which represent the "thinking" and "religion" meaning categories. This cluster contains a highly visible sub-group consisting of all the symbols which feature the "Knowledge"  component in their composition -including the symbol "priest"  .

Unlike the architecture students who perceived the components  and  as more dominant then the  component, most of the mathematical sciences students gave priority to the  component over the other two. Therefore, the symbols "truth", "belief", "math", "sin", and "sinner" are well mixed with the other "thinking" symbols. The symbols "prayer", "God" and "creation", however, are pulled away a little from the cluster.

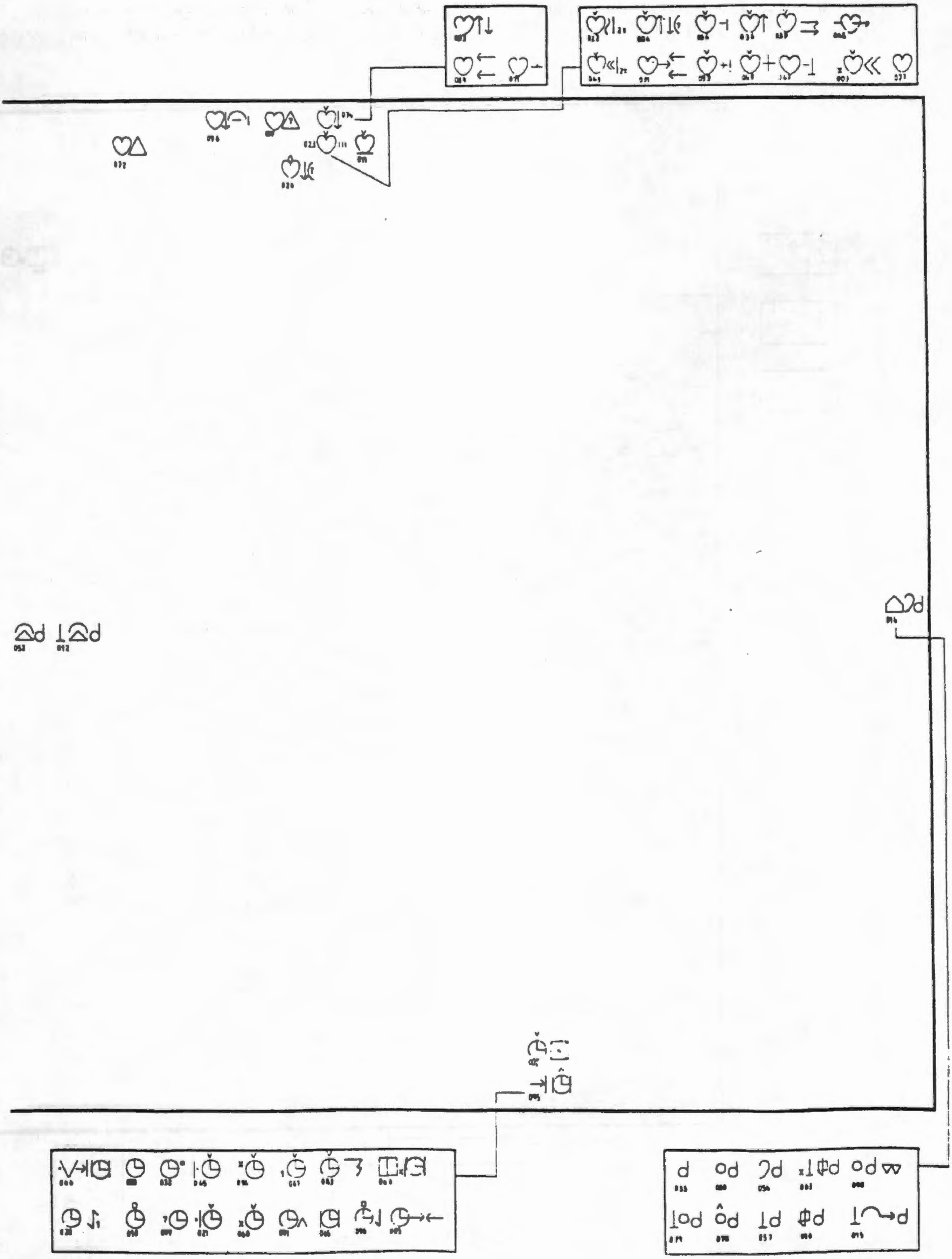
Two other members of the "thinking" cluster , "computer"  and "calculator"  , are pulled towards the "time" cluster. Again, like some of the architecture students, some of the subjects thought that the component  which resembles the component  is the dominant one in the composition of these two symbols and thus sorted them together with the "time" symbols. The symbols "religion"  and "belief" are found in the "feeling" cluster. Most of the subjects in this group too considered the component as more dominant than the component.

The symbols "composer"  and "melody" are placed in the gap between the "music" and the "thinking" clusters ("melody" is found very close to the "thinking" cluster). It shows that most subjects in this group perceived the component as more dominant than the component.

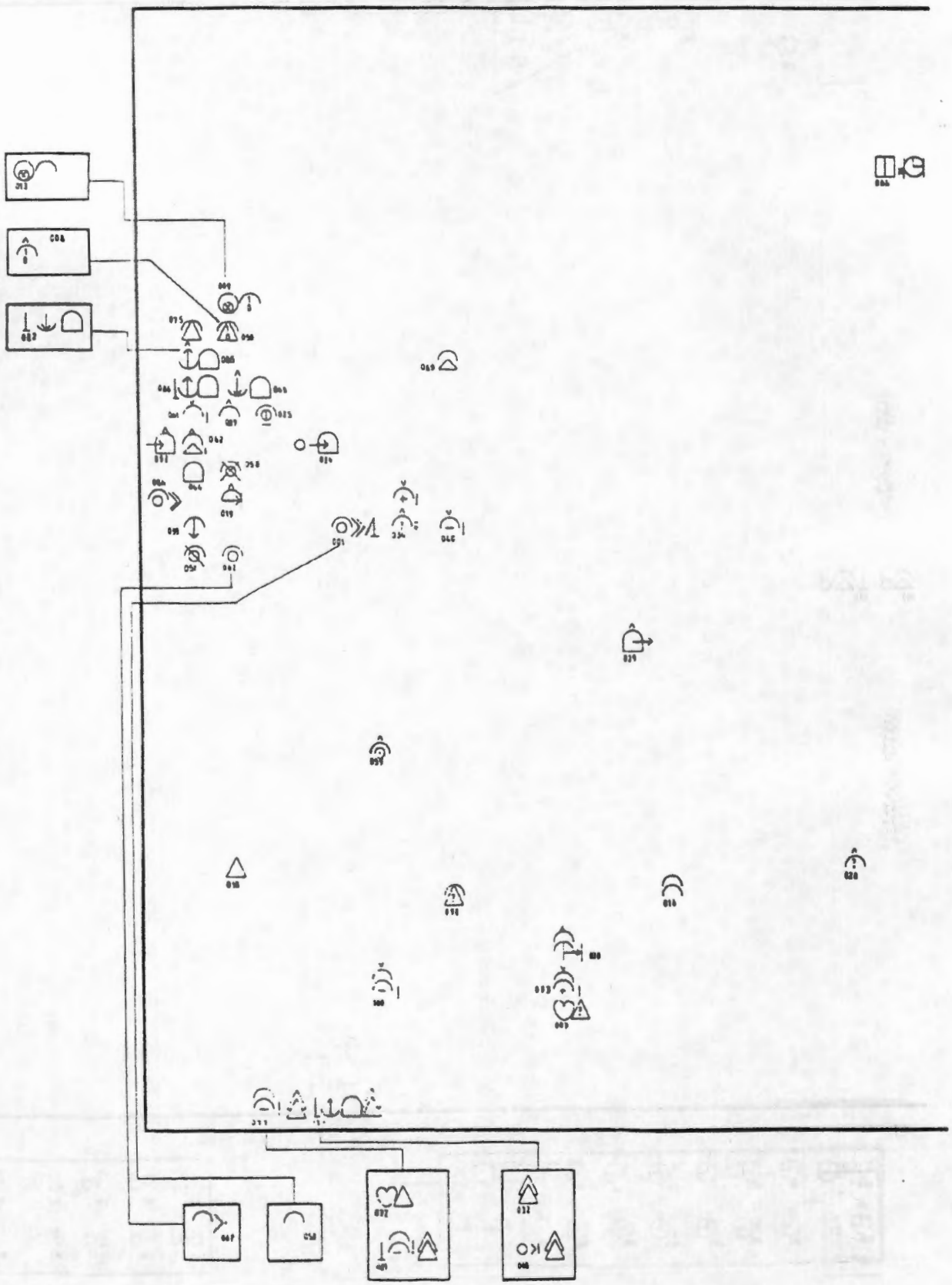
Configuration 1 *- The Kruskal Shepard non-metric scaling of the graphic sorting of 100 Blissymbols by 39 Architecture students*

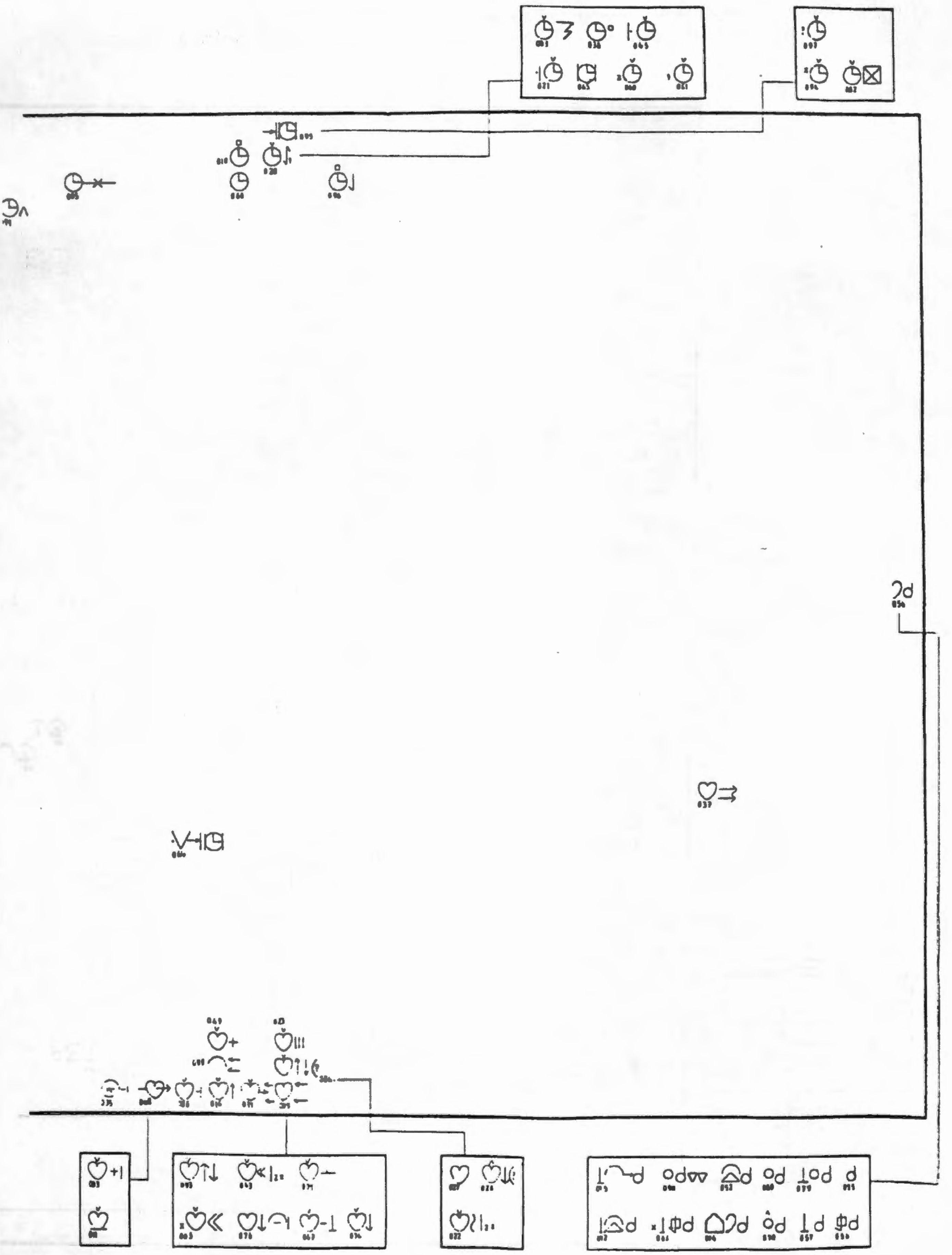


Shalit, 1991

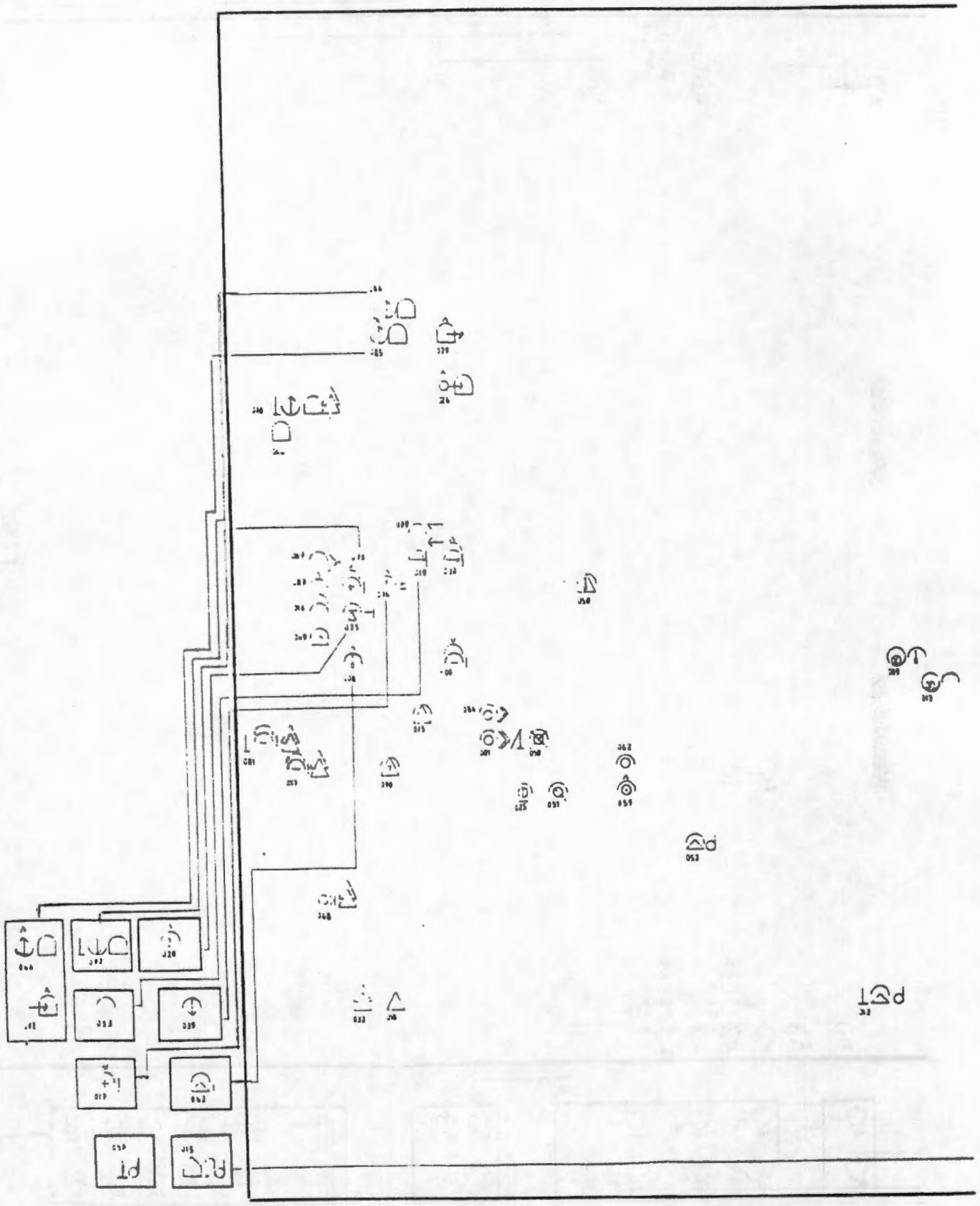


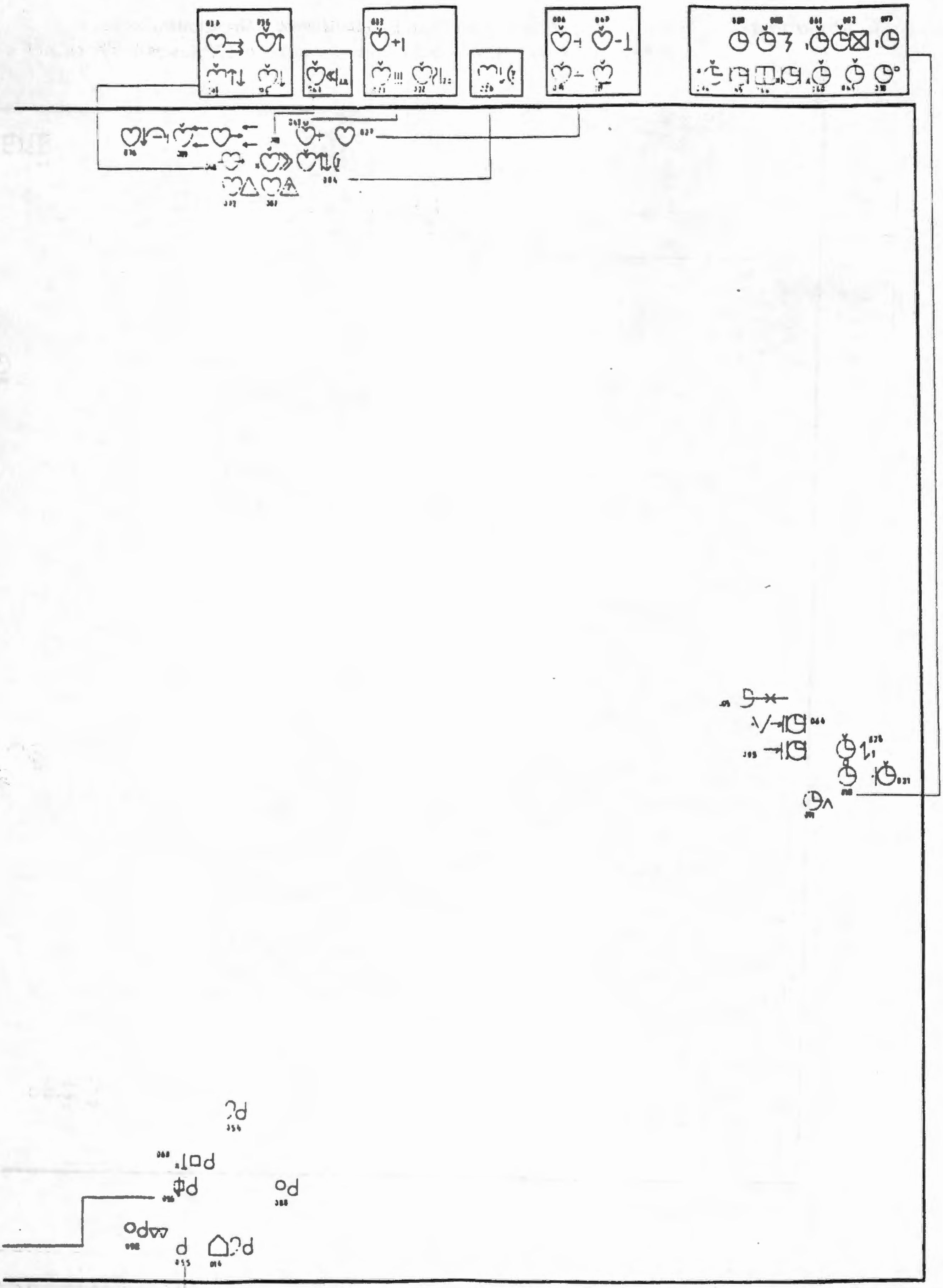
Configuration 2- *The Kruskal Shepard non-metric scaling of the semantic categorization of 100 English words by 48 Language students*



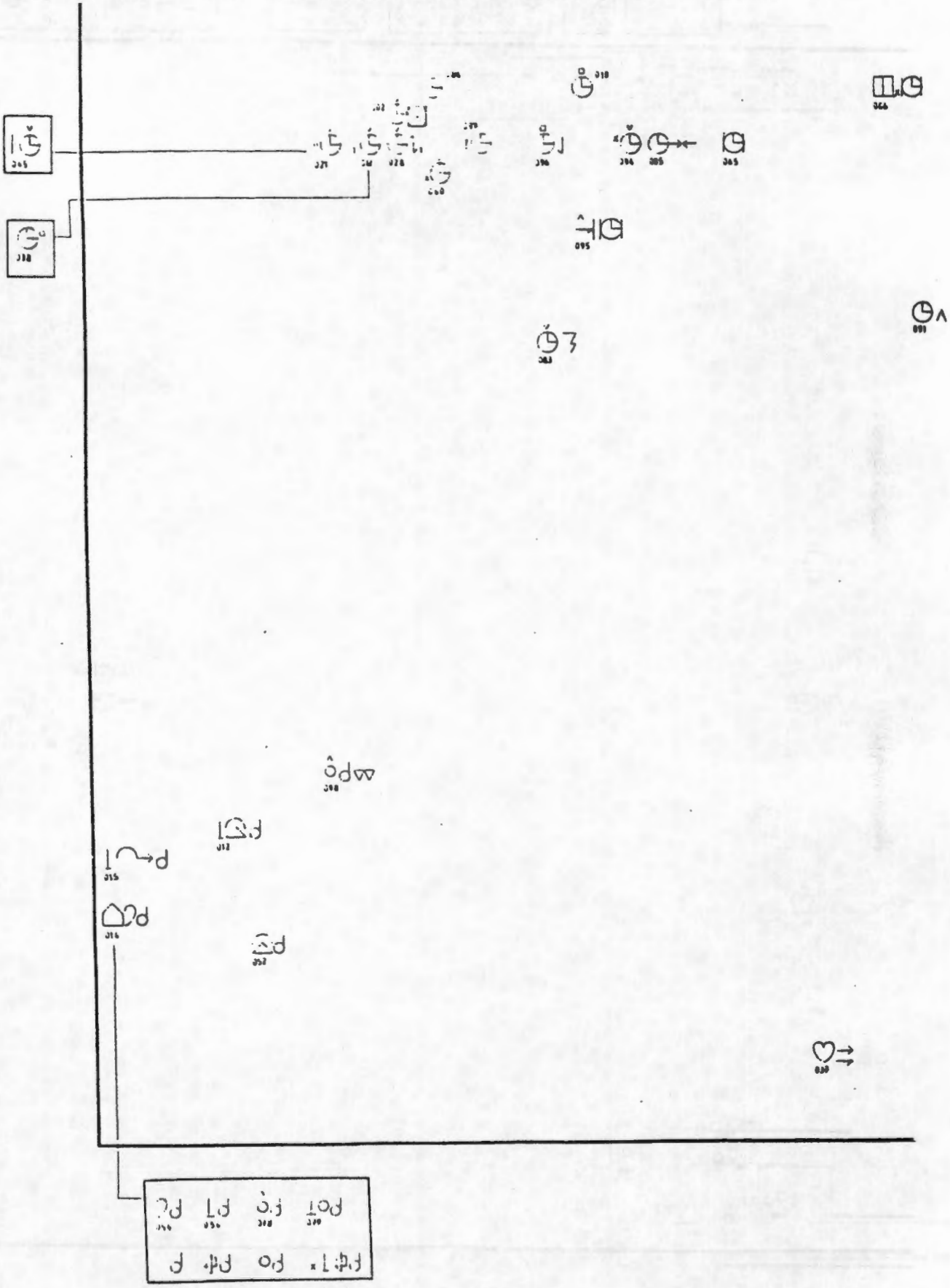


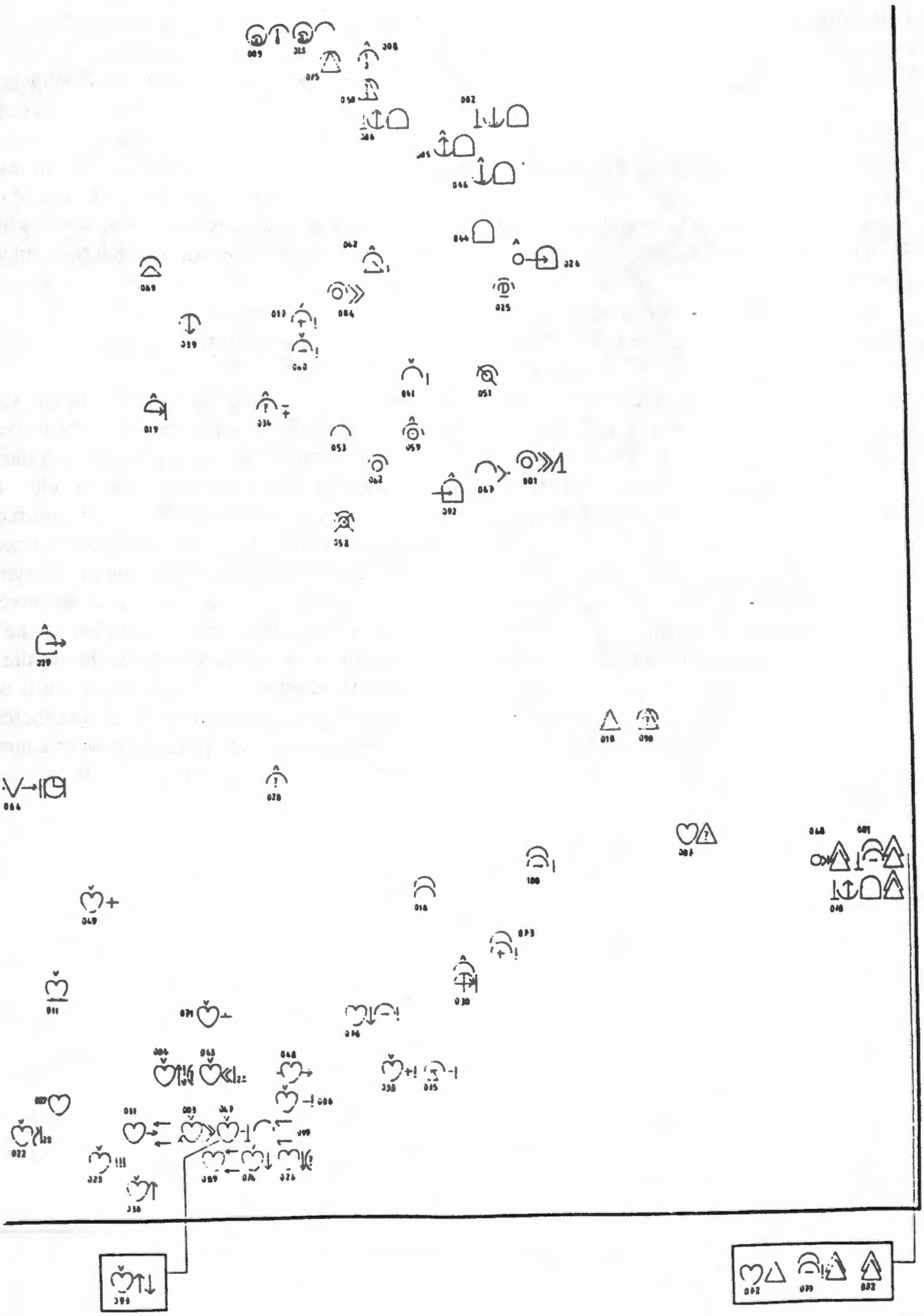
Configuration 3 - ***The Kruskal Shepard non-metric scaling of the graphic sorting of 100 Blissymbols by 48 Mathematical Sciences students***





Configuration 4 - ***The Kruskal Shepard non-metric scaling of the semantic categorization of 100 Blissymbols by 48 Mathematical Sciences students***





Configuration 4

Configuration **4** represents the semantic categorization of 100 English words by 48 mathematical sciences students. The sorting resulted in five visible clusters of symbols, however, this configuration is not so concentrated like the previous three. Only two of the clusters, "music" and "time", are separated with considerably big gaps from the other three clusters - "feeling", "thinking", and "religion". The gaps between these three clusters feature border-line words like "conscience", "wrong", "right", "forgive", "doubt", "forget", "belief" and "truth". The "knowledge" sub-group here is not as independent as it is in configurations **1**, **2**, & **3**. Exactly as it is in configuration **2**, the word "harmony" is placed in the gap between the "feeling" and "music" clusters, and the word 'patience" is found with the "feeling" cluster.

A comparison between configuration **4** and configuration **3** shows a high correlation between the graphic sorting of the symbols and the semantic categorization of the English referents of the symbols by the same group of subjects. The results are very similar to those obtained from the comparison between configuration **2** and configuration **1** where the two tasks were carried out by two different groups of subjects.

Furthermore, a comparison between configuration **1** and configuration **3** and a comparison between configuration **4** and configuration **2** indicates that in both pairs of configurations feature very similar trends in the preference of dominant components and thus in the sorting by the different groups of subjects which performed the same task.

Conclusions

The high correlation between the graphic sorting of the symbols and the semantic categorization of their word referents, as illustrated in the configurations above, would seem to provide statistical evidence in support of the fundamental proposition that there is a significant connection between the semantic processing of Blissymbols and the way their inner-structure is perceived. In other words, the results as revealed by the configurations validate the hypothesis that the semantic comprehension of Blissymbols is to a large extent manifested by either a conscious or an automatic synthesis of their sub-structure elements.

The Semantographic Approach

The first section of this chapter describes the essence of the proposed semantographic approach to the teaching of Blissymbols, and argues that its inclusion in the overall teaching strategy for this language would facilitate the learnability and memorability of the symbols which are being taught. Section 2 demonstrates that the semantographic approach is compatible with a model of thinking skills and therefore it is capable of contributing to the cognitive development and literacy of those who would be taught by its principles. Section 3 presents the conflict between the nature of Blissymbolics and the non-cognitive way its users are often required by computerized applications to manipulate Blissymbols. The semantographic principle is offered as a basis for a retrieval technique designed to provide users with a cognitive access to stored Blissymbols by referring to their semantic content and to retrieving them by logically relating to some or all of their component parts.

The Semantographic Approach to Blissymbol Teaching

Definition

The essence of the proposed semantographic approach to the teaching of Blissymbols is to make the learners aware of the inner-structure of the symbols which are being taught, tell them the meaning of the key elements which compose the symbols, and then show the learners how these components combine to form the semantic entity represented by each symbol.

Theoretical Basis

It has already been established that Blissymbols which are judged as more transparent or more translucent are **easier** to learn and remember than Blissymbols which are perceived less transparent or translucent[13] therefore the inclusion of the semantographic method as a major component in the teaching strategy for Blissymbols would probably enhance their learnability and memorability. This assumption is supported by Fristoe & Bristow (1982) who found that subjects who had the logic behind the symbols explained to them learned the symbols better than subjects who were taught the symbols through other methods. Hooper & Lloyd (1990) also hypothesized that it would be easier to learn Blissymbols if the elements of the symbols are explained than if they were not explained. Further substantial evidence is provided by the *McNemar Test for Significance of Changes in Transparency of Blissymbols* and by the *Test for Changes in Blissymbol Translucency*.[14] The two tests respectively demonstrate that cognizance of the semantic elements which form Blissymbols can bring aboutasignificant increase in their perceived-transparency and translucency.

The Compatibility of the Semantographic Approach with a Model of Thinking Skills

Background

In recent years, professionals in the AAC field have begun to seek ways to ensure that AAC systems would not remain an end, but rather a vehicle for the promotion of literacy amongst the individuals who use them. Literacy, however, means more than just its raw definition, because the ability to read and write is dependent on certain cognitive skills without which no transmission or reception of meaningful, coherent, and purposeful content is possible. So, in order to advance the degree of literacy in a pupil, it is first necessary to help him/her develop and reach an appropriate level of thinking skills. Therefore, all curricula, syllabi, teaching-aids and teaching methods should be compatible with at least one of the currently available *thinking skills models*. An example for such a model is Robert Gagne's *Model of Hierarchy of Thinking Skills*.[15] The table below lists in hierarchical order the items in Gagne's Model:

Problem-Solving Skills	Learning new combinations and applications for previously learned rules.
Rule-Learning Skills	Responding to a class of situations with a class of performances because the stimulus and the performance are predictably related.
Concept-Learning Skills	Generalization of a concept across classes.
Classification Skills	Classification by physical characteristic or abstract property.
Identification Skills	Naming objects, classes of objects, actions, etc.
Discrimination Skill	Making distinctions, perceiving differences.

The Semantographic Technique vis á vis a Model of Thinking Skills

The following paragraphs evaluate the semantographic method and the steps it suggests to follow when teaching Blissymbols against Gagne's Model. The evaluation is based on table 10 (item by item from bottom to top), and it is illustrated with relevant examples.

(a) Discrimination Skills

The most fundamental intention of the semantographic method is to teach Blissymbolics users that compound symbols are composed of individual meaning-bearing components. But before the pupils learn the semantic value carried by each component they are trained to make **visual distinctions** between single similar components;

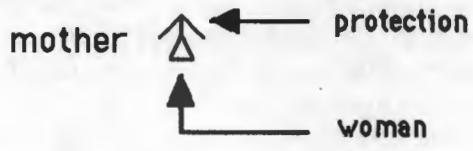
e.g. ↑ ↓ ← → ;

to perceive **combinatory differences** between whole symbols:

e.g. ⇳ ⇵ ;

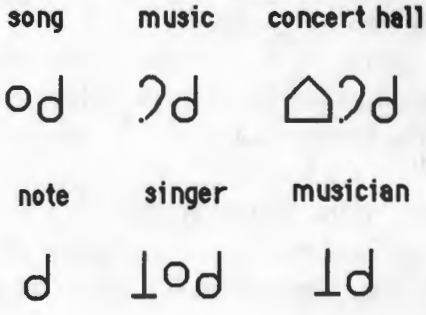
(b) Identification Skills

The next step taken by the semantographic approach is to teach, by name, the key symbols (or elements) from which all Blissymbols are composed, and reveal the basic concept each of these components represents. The users are therefore learn to **dentify** the key symbols within compound Blissymbols:

e.g. 

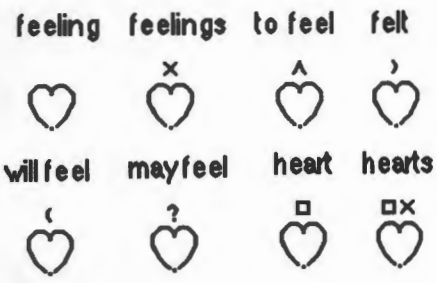
(c) Classification Skills

Having become familiar with the graphic representation of the key symbols and with the concepts they represent, the users are shown how Blissymbols can be grouped into meaning categories where symbols in each group relate to each other semantically by virtue of shared physical similarities in their component composition. In other words, the users learn to **classify** Blissymbols by a physical characteristic. Due to the nature of Blissymbolics, is in most cases, it also means to classify by an abstract property.

e.g. 

(d) Concept Learning Skills

After experiencing and understanding the process of semantographic classification of compound Blissymbols, the introduction of indicators presents an opportunity of teaching Blissymbolics users the nature and role of grammatical concepts such as plurality, tense, descriptors etc.. Since the functionality of these concepts is equal in all meaning-based classes of compound symbols, the learners are, in fact, taught how to **generalize** grammatical concepts (i.e. plurality, tense, mood, aspect, concretization, abstractness etc.) across meaning-based classes of symbols:



e.g.

(e) Rule Learning Skills

Although the system of Blissymbolics is governed by a set of logical rules, these fundamental rules, nevertheless, do not create the underlying meaning represented by the symbols. The meaning of each symbol comes to realization through a synthesis of the total semantic value of its elements. Therefore, according to the semantographic approach, a prerequisite for the learning of these rules is the users ability to relate to the meaning of compound symbols through an understanding of the interrelationship among their components. The rules keep the system clean from "semantic noise", and therefore enable the users of this graphic communication medium to perform precise, unambiguous and coherent communication acts.

(f) Problem Solving Skills

Unfortunately, AAC-dependent individuals very often face communication problems. Some of these problems relate to the limitations inherited in the systems they use. Most of the problems, however, are caused by the users own inability to take maximum advantage of what their AAC systems can offer, because they were never taught or trained to develop appropriate strategies for efficient utilization of their communication-aids and AAC techniques. A problem common to most Blissymbolics users is the need to come up with new symbols to represent concepts not yet covered by their system. It so happens though, that the system of Blissymbolics does offer its users a number of strategies and principles designed to refine and expand the Standard Vocabulary (i.e. a set of officially approved symbols). Among these principles are: the use of the grammatical indicators; the use of special symbols (e.g. *the pointer*, *the opposite meaning symbol, part (of)* etc.); and the use of *related symbols* (i.e. symbols which are in the same class or "symbol family") to substitute classifiers within compound sequenced symbols in an attempt to make meanings more specific.[16] Mastery of the methodological steps which are highlighted by the semantographic approach enables Blissymbolics users to proficiently utilize these principles in order to manipulate the system and its governing rules so it would be possible for them to predict the formation of symbols they wish to create, refine the meaning of existing symbols, or guess the meaning of symbols they have never seen before.

Conclusions

The evaluation above conclusively shows that the semantographic approach to the teaching of Blissymbols is indeed compatible with the spirit and goals of the Gagne's thinking skills model. It is, therefore, apparent that the strengths of the semantographic method are not limited to the narrow domain of Blissymbol learnability. It seems that the proposed method, as a pedagogic tool, has an enormous potential to positively influence the cognitive development of Blissymbolics users who would be taught the language by its principles, because it can stimulate thinking processes and create an appropriate environment for gradual advancement of literacy and open thinking.

The Semantographic Principle as a Basis for a Cognitive Blissymbol Retrieval Technique

The Inherent Problem in Most Computerized Applications for Blissymbolics

Over the last 10 years a number of multi-functional programmes which manipulate stored sets of Blissymbols have been developed[17]. None of these programmes, however, allows a cognitive approach by which the user can interface the stored "lexicon" through a logically consistent symbol retrieving procedure[18]. For example, the

most popular programme to date, "Talking BlissApple™" (Kelso & Vanderheiden, 1980), has been translated into several languages, and has faithfully served Blissymbolics users around the world for more than a decade. However, the programme is not a good mechanism for users to access large vocabularies because each symbol stored in Talking BlissApple™ must be retrieved by calling the arbitrary numerical code assigned to it. Users must therefore rely on auxiliary boards or otherwise memorize long lists of cognitively non-related numbers associated with the symbols. Since meaning is the inherent strength of Blissymbolics, there is an apparent serious conflict between the nature of the system and the non-cognitive way its users are often required to manipulate its subsets.

The Semantographic Principle as a Solution to the problem

The Multidimensional Scaling Study has clearly shown that the semantic processing and recall of Blissymbols is directly related to their inner-structure. Therefore, it is proposed that the semantographic Approach should be used as the underlying principle in the design of an interface through which users would be able to access microcomputer-based Blissymbol-libraries cognitively. In other words, each Blissymbol stored in a special microcomputer-based symbol-library would be assigned a semantographic "component-code" i.e. a logical sequence of a few "key-symbols" representing its semantic content. To retrieve a symbol, users would not necessarily have to remember its exact component-code. Instead, they could depend on their semantographic training in order to intelligently guess the relevant code.

The primary goal of the semantographic method is to teach the learner how Blissymbols are systematically constructed from key components to represent concepts in a meaningful (not necessarily depicting) way. Researchers, in other fields, have shown that meaningfulness stimulates memory by providing effective retrieval-cues. For instance, Colin Rose, in his book "Accelerated Learning" (Rose, 1985; pp. 46-47), tells of an experiment by Craik and Tulving who in 1975 asked subjects to remember words on one of three bases: (i) the visual appearance of the words; (ii) their sound; and (iii) their meaning. The results revealed that encoding on the basis of meaning was three to four times stronger and more effective. But to learn Blissymbols semantographically also means to understand the underlying principles which govern their formation, and to be subconsciously trained to "think" in Blissymbolics. According to Rose (1985, p. 46):

> *"Mastering the principles is a way of achieving a great deal of memory with the minimum amount of effort expended on encoding... principles trigger lots of recall.... when we understand the principle involved we have given the subject meaning and personal relevance, and thus we have filed it in our own particular memory-library reference file..."*

Therefore, a semantographically-based retrieval technique can resolve the cognitive problems encountered by users of most present Blissymbol-interfaces because enabling users to access stored Blissymbols by referring to their **semantic content** and retrieve them by logically relating to some or all of their **component parts** is, in fact, an emulation of the natural way linguistic entities are generated, stored and recalled.

HyperBliss

HyperBliss 3.0 © is a large and a comprehensive Apple® Macintosh™-based programme written in the HyperCard™ environment. It includes a number of useful utilities designed to satisfy the various needs of Blissymbol communication and learning. The programme features a friendly Blissymbol communication interface emulating the natural retrieving process of stored Blissymbols, a tutor facility for semantographic teaching of Blissymbols, a sophisticated symbol library that is simple to maintain, a print-shop for easy drawing of existing and new Blissymbols, and desktop facilities to print symbol-charts and personalized Bliss-dictionaries. Section 1 of the chapter is an overview of the system1. The remaining sections provide a detailed description of the integrated parts of the programme as well as a systematic guidance to their proficient use.

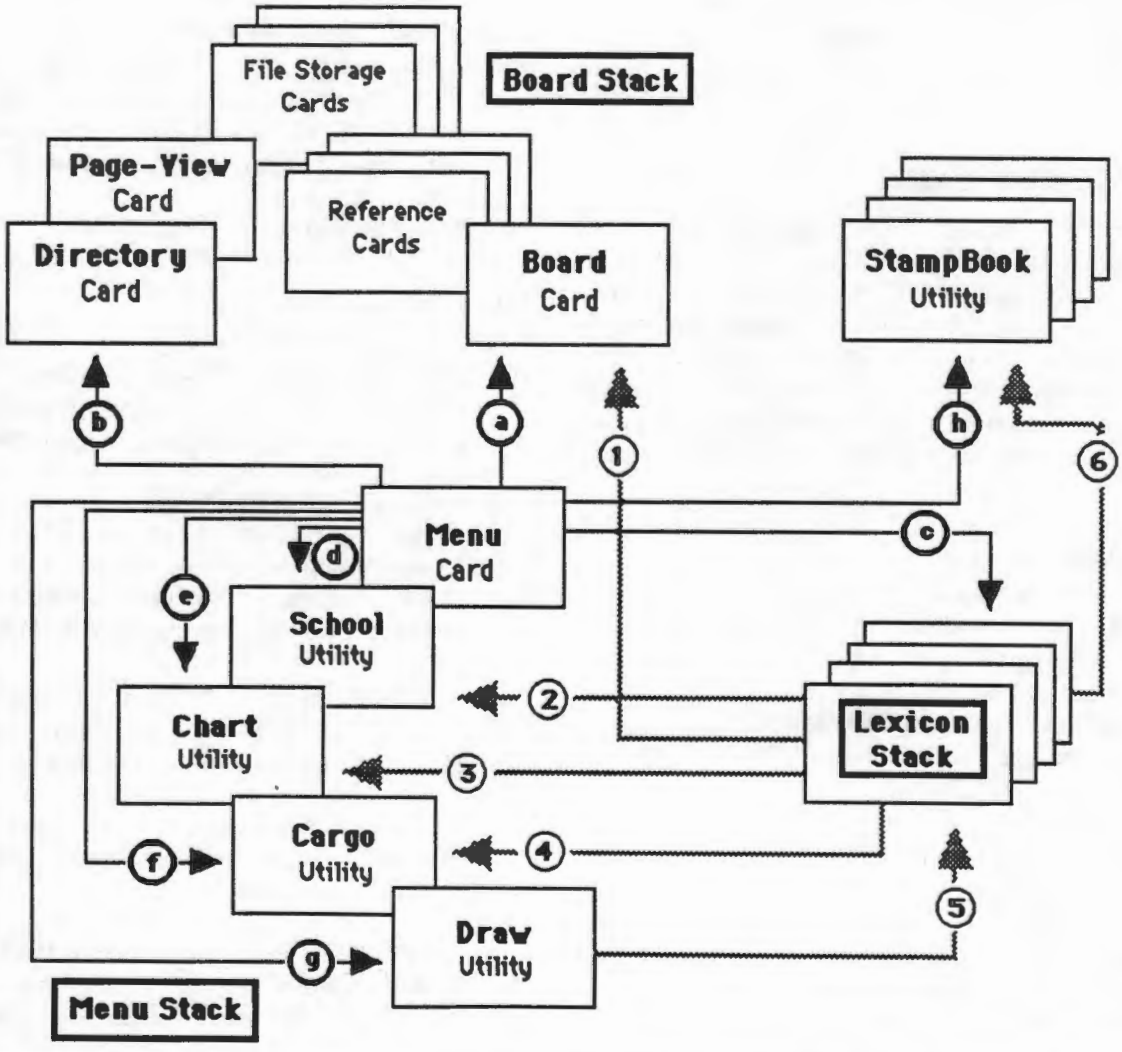
An Overview

HyperBliss is consisted of three integral components in the form of four HyperCard™ stacks:

I. The Board Stack

Board: a unique Bliss communication inter face. It allows users to access a large symbol vocabulary through a cognitive and logically consistent symbol retrieving procedure. **Document:** a utility which displays the entire current Bliss file. **Directory:** a utility which allows the user to access any of the Bliss files he/she had created on the Board Card and saved through the Document Card. **Reference Cards:** these are system cards which store the retrieval index, the frequency and recency tables, and the macros.

Chart 1 - HyperBliss: An Overview



II. The Lexicon Stack

All the Bliss data which are retrieved through the the Board Stack or manipulated within the various utilities originate in the Lexicon Stack. Therefore, without a well maintained lexicon stack HyperBliss cannot function properly.

III. The Menu & The StampBook Stack

The utilities were devised to provide professionals who assist Bliss-users with convenient tools which can make their work more efficient and less frustrating. **Menu:** a crossroads point for all HyperBliss parts. **School:** a versatile semantographic teaching-aid for Blissymbols. **Chart:** a tool for designing, creating and editing Blissymbol-displays. **Cargo:** a utility for assembling Bliss data to be exported to external text-files. **Draw:** a special utility which facilitates the drawing of Blissymbols. **StampBook:** a utility which facilitates the assembling and printing of Bliss dictionaries in a "stamp-book" format.

Chart 1 on the previous page presents an overview of the components which form HyperBliss. The chart highlights the major liaisons betwfeen the Menu Card and the other parts of the system (note that only the Board and the Directory are directly accessible to one-switch users). Also illustrated in the chart are the 6 primary flow-channels of Bliss-data from and to the Lexicon Stack.

The Menu Card

The Menu Card is a crossroads point and a service centre for all HyperBliss parts. It features 9 navigation buttons and 3 service buttons. **Warning**: Although it is possible to browse through HyperCard™ using other means, it is, nevertheless, obligatory to move from one HyperBliss part to another via the buttons and menus which it provides. Any other practice may crash the system or cause severe problems for some HyperBliss operations.

Navigation Buttons

Board: Opens the Board Stack.
Directory: Opens the Directory Card.
Exit: Quits HyperBliss and HyperCard™.
draw: Opens the Stencil Card.
Lexicon: Opens the Lexicon Stack.
Chart: Opens the Board Card.
School: Opens the School Utility.
Cargo: Opens the Cargo Utility.
StampBook: Opens the StampBook Stack.

Service Buttons

HyperBliss: Reveals information about HyperBliss.
Compaction: Compacts the Stacks.
Configuration: Prompts a special menu.

Configuration Menu

1. Click button Configuration to reveal the Configuration Menu.
2. Click the relevant item on the menu

Speech

You may turn the speech "ON" or "OFF" [The Default is "ON"]. HyperBliss, however, will still issue verbal commands which are associated with Macros, the Document Card, the Directory Card etc.

1. Choose Gloss Fields from the Configuration Menu.
2. Click your preference in the subsequent dialogue-box.

Reset Frequency & Recency

You may reset all the Frequency & Recency values to nil:

1. Choose *Reset Frequency & Recency* from the *Configuration* Menu.
2. If indeed you wish to proceed then click OK.

Clear Macros

You may clear all the macros which were created and stored in the Board Stack:

1. Choose *Clear Macros* from the *Configuration* Menu.
2. If indeed you wish to proceed then click OK.

Gloss Fields and Bliss Fields

You may show or hide either the gloss fields or the Bliss Fields on the Board Card and the Document Card:

1. Choose *Gloss Fields* from the *Configuration* Menu.
2. Indicate in the subsequent dialogue-box which fields you want to deal with.
3. Click your preference (i.e. *Hide* or *Show*).

The Scanning Mechanism

When you choose *Scanning* from the *Configuration Menu* you activate a scanning mechanism which takes effect only in the Menu Card and in the Board Stack. It is designed for users who are not able to control mouse movement on the screen and thus require a One-Switch Interface. The scanning mechanism highlights in turn all mouse-click sensitive areas on the screen. Therefore, the user need not worry about moving the mouse from one location on the screen to another. Instead, he/she must wait for the particular icon or field to be highlighted and only then click the mouse as one would normally do.

Before the scanning begins HyperBliss asks you to indicate (in seconds) the length of scanning intervals which suit the ability of the current user. If you fail to enter a value between 0.5 and 20 then the default (2 seconds) is assumed.

When the scanning is active only two of the navigation buttons (Board, Directory) and the white background square are highlighted in turn.

The scanning mechanism is governed by loop routines, and in some cases by nested loop routines. HyperBliss, therefore, provides you with an *escape route* for each such loop. The white background square is your escape rou-

te for this screen. If you click it when it's highlighted, then the scanning will be cancelled.

Compaction of Stacks

Free and unused space is often accumulated in active HyperCard™ stacks. HyperBliss stacks are no different. It is important to make this space available for your system through compaction. The process usually takes a few minutes (among other factors it depends, of course, on how big the stack is). Be patient and don't try to stop it. The Beach Ball Cursor will be spinning while compaction is applied.

When you click Button *Compact* [see Figure 1] a series of dialogue boxes will appear and ask for your permission to compact the respective stack. If indeed you wish to compact that stack then click OK.

The Board Card

The Board card is a unique Bliss Communication Board with additional features designed to enhance communication and facilitate text editing. What makes HyperBliss unique as an interface, is the fact that it allows users to access a large library of symbols through a cognitive and logically consistent symbol retrieving procedure. HyperBliss users must apply their acquired knowledge of Blissymbolics to synthesize, consciously or subconsciously, the precise or an approximate (even partial) graphic representation of the concept or object they wish to "talk" about. The retrieval mechanism is augmented by an adaptive-predictive capability. The algorithm "learns" the Bliss communication patterns of the user. It constantly updates frequency, recency, and pairing tables which reflect the user's symbol selection history. By manipulating these records, the system is able to predict the most likely selection trajectory to be taken by the user. Therefore, a frequently used system can offer its user (from the beginning of almost every selection process) an "intelligently" priortized list of potential Blissymbols to choose from. In addition, there is a **Macro** facility which is, in fact, extension to the meaning-based retrieval mechanism of HyperBliss.

Data Fields

The Text-Field: Displays the current portion of the Bliss-Text that is being created by the user. The text can bescrolled linearly 5 symbols a t a time (see button *Fwd*).

The Options-Field: This field is a menu which can display up to 4 symbols at a time: (a) When the retrieval mechanism has symbols to offer (b) After the syntactically-based option generator had been activated (c) After the symbol-synonyms of a particular selection had been retrieved (d) When a *FollowUp-Set* is displayed.

Number of Options Left: The field which is conveniently placed under the Options Arrow, indicates the number ofinvisible options still left to be scrolled.

Data Buttons

Fwd (Forward): This button scrolls the Text-Field linearly five symbols at a time.

Options Arrow (Scrolling the Options-Field): Anytime the Options-Field contains series of more then four symbols the number of remaining invisible items is conveniently displayed under the Options-Arrow. The scrolling motion is one way only. You may scroll the Options-Field until the entire series is exhausted.

Response Buttons

Yes: Produces a vocal "Yes" response.
No: Produces a vocal "No" response.

Function Buttons (Special)

The following two function buttons are NOT accessible when the *Scanning* is ON. The interface which they activate is designed for users who can type and move the mouse freely. Therefore they are NOT accessible when the *scanning* is ON.

Import: This button allows you to import to the Board symbols from the Lexicon Stack by typing their glosses (see *Import Function* below).

Macros: This button reveals the two-component codes of "lost" Macros (see *Macros Function* below).

The Cursor

The currently active symbol in your Bliss-Text is the one placed left to the cursor. There are two ways to move the cursor in the *Text-Field* (even if the scanning is ON):
1. By clicking anywhere in the *Text-Field*.
2. By clicking button *Fwd*.

The Bliss Keyboard of Components

The keyboard onsists of **132** key-components. This keyboard is identical to the one which used for coding the symbols in the Lexicon Stack, or teaching them in the School Utility.

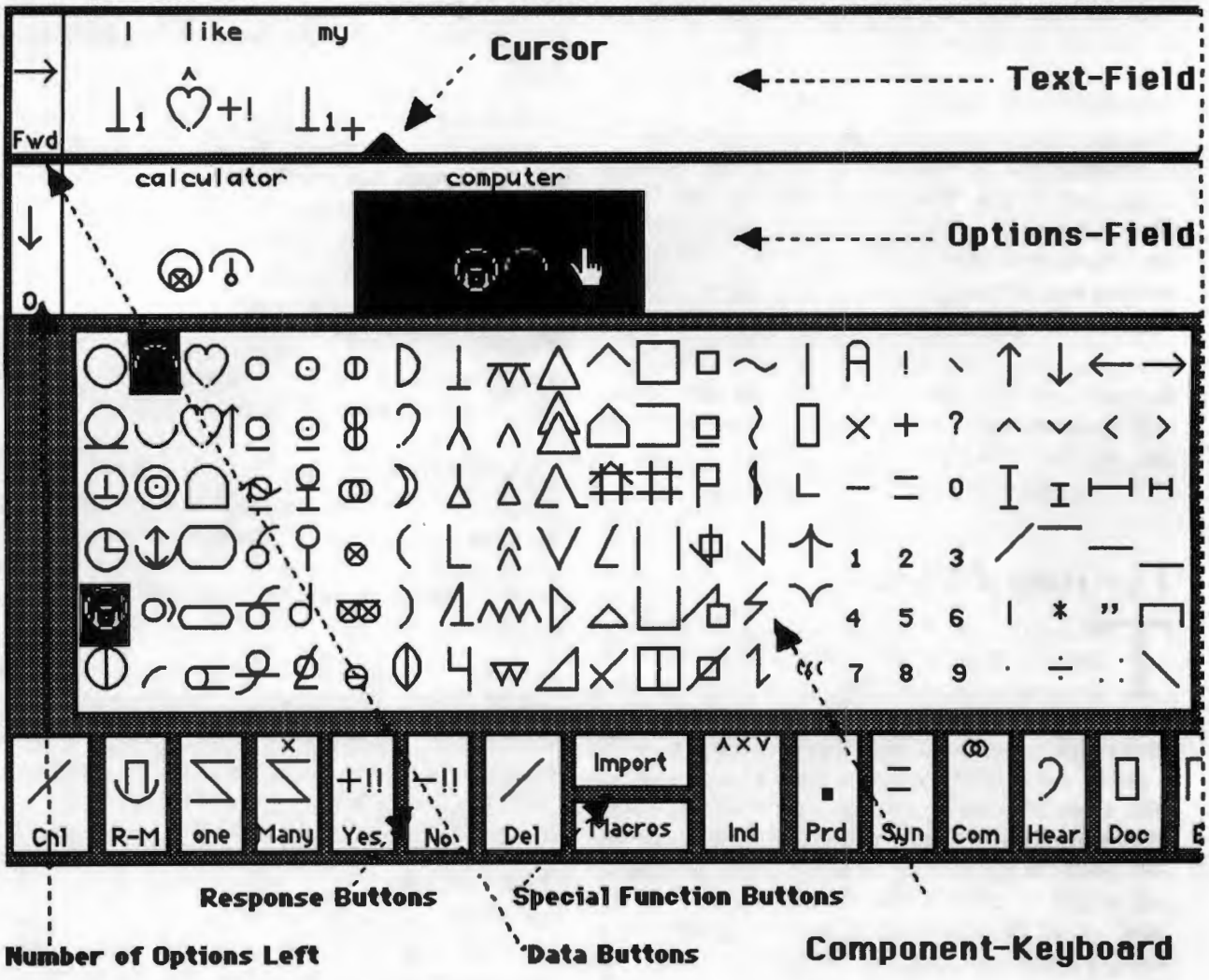
Function Buttons

Cnl (Cancel): Cancels (Deactivates) the current mode (e.g. Retrieve, Macro-Retrieve, Macro-Store, Macros, Import, etc.). In addition it wipes out all the data from the Options-Field and turns-off all the keys on the Bliss Keyboard.

M-R (Macro-Retrieve): Activates the Macro-Retrieve Mode (see the relevant section below).

One: Activates the Macro-Store Mode in order to store the symbol which is displayed immediately to the left of the cursor in the Text-Field as a Macro (see the relevant section below).

Many: Activates the Macro-Store Mode in order to store a phrase (i.e. the current portion of the text, namely, what ever is displayed in the Text-Field) as a Macro. It is also



used in conjunction with the R-M button to retrieve phrases stored as macros (see the relevant section below).

Del (Delete)**:** Deletes the symbol which is immediately to the left of the cursor.

Ind (Indicators): Activates the syntactically-based option generator (see the relevant section below).

Prd (Period): Inserts a period (.) immediately to the left of the cursor. The period is also the end of the current paragraph in the text. (The division to paragraphs is shown only in the Document Utility).

Syn (Symbol-Synonyms): Retrieves the Symbol-Synonyms of a the symbol which is immediately to the left of the cursor (see the relevant section below).

Com (Combine): If you want to enclose a sequence of symbols with a pair of Combine Indicators, all you have to do is to place the cursor where you want a Combine indicator to be inserted and then click this button.

Hear: Lets you listen to the current portion of the Bliss-Text which is displayed in the Text-Field.

Doc (Document)**:** Click this button to transfer your Bliss-text from the Board Card to the Document Card where you may save, print, listen or view the entire file.

Exit: Quits the Board and opens the Main Menu.

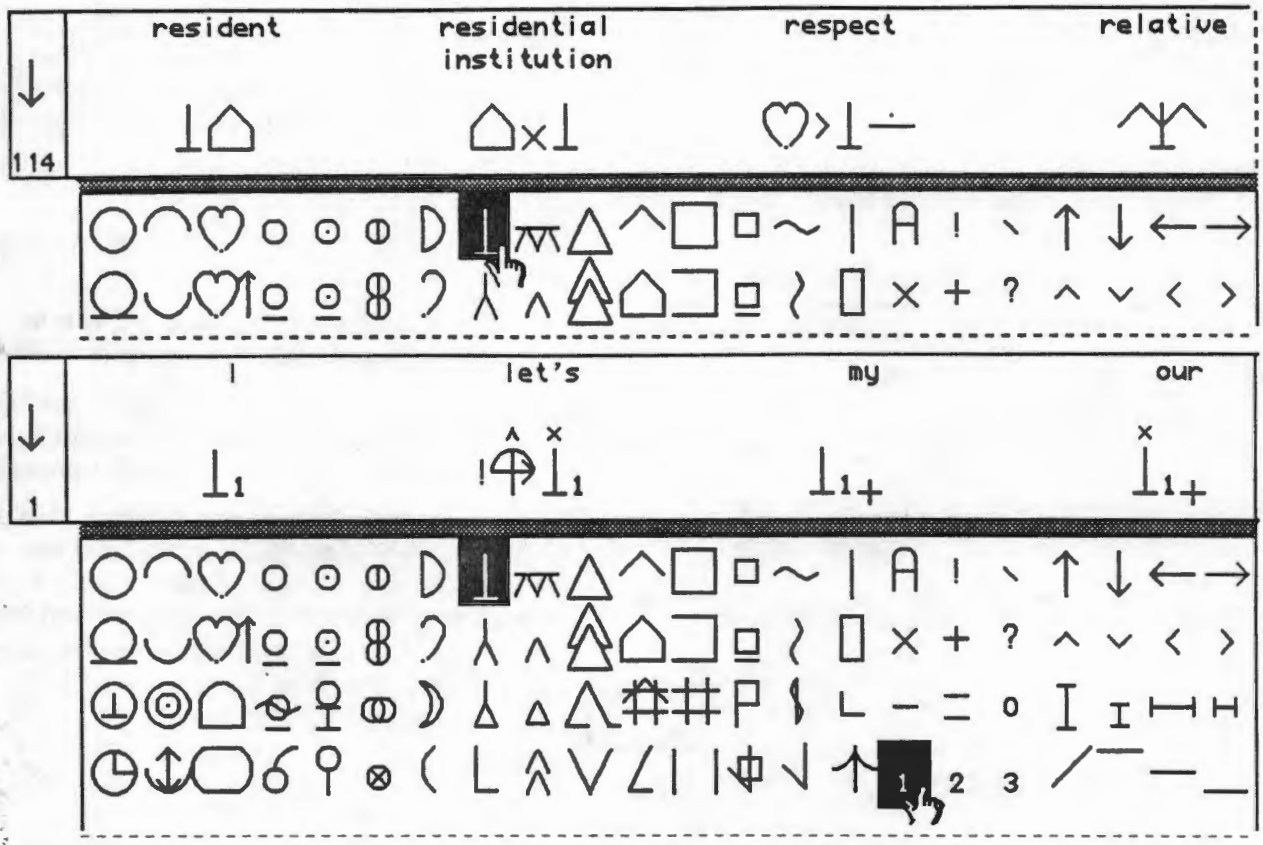
When the Scanning is Active: Do exactly what you would do if it were not active. Remember to click the mouse only when the relevant button or text is highlighted. To get out of nested scanning routines wait until the entire screen is highlighted and click OK.

Retrieving Symbols Semantographically

Let us now write the message: *"I want my apple computer."*..."apple computer" is, of course, the user's own combined symbol. Note: The illustration is done with a "fresh" system (i.e. all recency and frequency parameters were nil].

1. Click the component ⊥ on the Bliss Keyboard.
2. Clicked the component **1** on the BlissKeyboard.

As you have noticed, after clicking the first component, HyperBliss displayed the first **4** out of a total of **118** symbols which have this component in their Component-Code (see the relevant section in: Lexicon). The number of the remaining potential symbols (in this case, **114**) is displayed. Needless to mention that it would have taken a long time to try and find the symbol "**I**" by scrolling the Options-Field down again and again... Instead of wasting time and



energy on scrolling, we did it the HyperBliss way, namely, we clicked another component [see Figure 5]. This action shortened the list of potential symbols from **118** to **5**, and the symbol we looked for was among the first **4** which were displayed in the Options-Field.

To add any of the symbols displayed in the Options-Field to your Bliss-Text select the symbol you want by clicking on it. HyperBliss will highlight the selected symbol and transfer it to the Left of the cursor in the Text-Field. It will also repeat the gloss vocally. Consequently, the Frequency &Recency parameters of selected symbol will be updated, and the FollowUp-Set which is associated with the symbol will appear in the Options-Field.

3. Select (i.e. click) the symbol $\perp_1$ on the *Options-Field* and display it in the *Text-Field:*

4. To retrieve $\heartsuit\rangle$ you may click either of the following components: $\heartsuit$ or $\rangle$. Please click: $\heartsuit$.

Here too, the list of potential symbols is very large. Obviously, you should decide against scrolling the *Options-Field* down and down in order to find the symbol "**want**".

5. Click the component: $\rangle$.

Again, the number of potential symbols is reduced to **3**, and they are all displayed in the *Options-Field.*

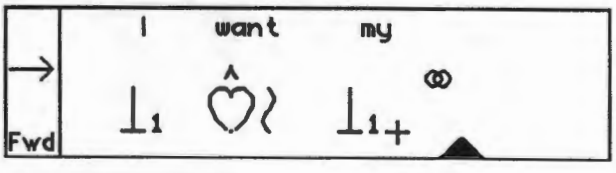
6. Select the symbol "want".

7. To retrieve the symbol "my", click the component: $\perp$.

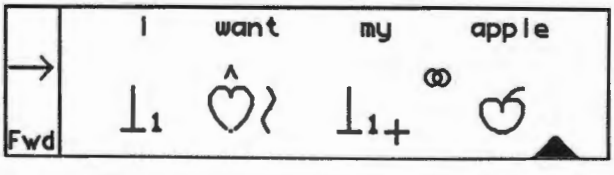
Please notice that the symbol $\perp_1$ is now heading the list of symbols associated with the component $\perp$. It is so because HyperBliss has already updated the Recency and Frequency parameters of this symbol.

8. Again, instead of scrolling the *Options-Field*, we clicked on the component **1.**

9. Select the symbol "**my**" which is displayed in the *Options Field*, and click button *Com* in order to insert the first *Combine Indicator.*

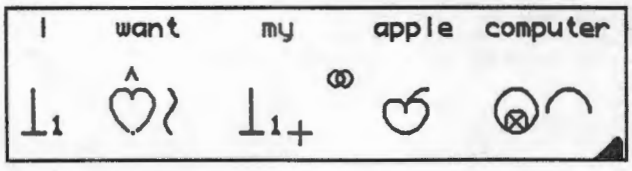


10. Try to retrieve the symbol "**apple**". This type of symbol poses a little coding problem because it is a *pictograph.*

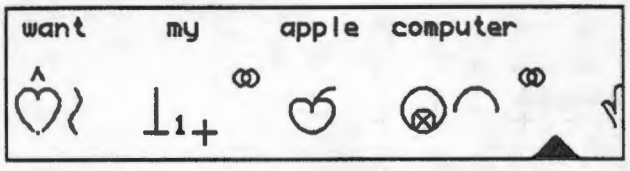


It is suggested to solve such a problem by coding pictographs with a sequence of at least two components that describe the symbol in a meaningful way that will be easy for the user to understand, relate to, and remember! For the pictograph "**apple**" we propose the sequence "**fruit**" and "**heart**" If you disagree, then code it differently. (See the relevant section in Lexicon).

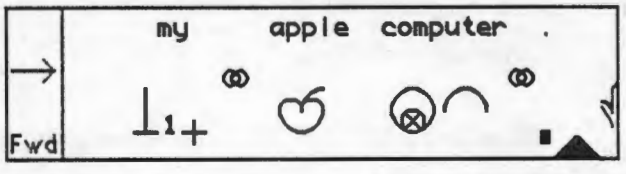
11. Retrieved and Select the symbol *Computer:*



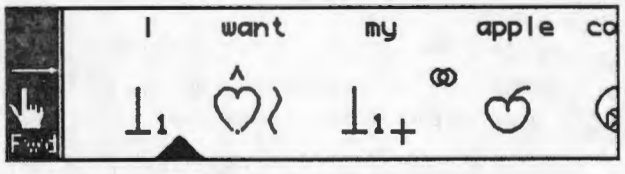
12. Clicked button *Com* to add the second *Combine Indicator.* Notice: Our message has moved one symbol to the left:



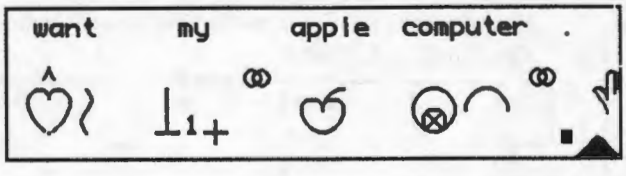
13. Clicked button *Prd* in order to put a *period* at the end of the sentence. Notice: Our message has moved, once again, one more symbol to the left:



14. Reveal the the entire message by clickin button *Fwd:*



15. Position the cursor at the end of the message by clicking on the *Text-Field* left to the the period:



Summary of The Semantographic Retrieval Procedure

Chart 2 and the paragraphs which follow thereafter summarize the semantographic retrieval mechanism.

e.g. the retrieval of the symbol "teacher"  .

Route A

(a) The component  is highlighted on the Bliss-Key board.

(b) The Reference-List on the  Reference-Car d is examined.

(c) The Reference-List is reordered according to the current Frequency and Recency values of its members.

(d) The top four referenced-symbols of the list are found in the Lexicon Stack, sent to the BoardCard and displayed (in their frequency/recency order) in the Options-Field.

If the required symbol appears in the Options-Field then it can be *selected* and transferred to the the Text-Field. Otherwise, the user has two options: either to scroll the remaining portion of the Reference-List, or, to proceed with the semantographic retrieval by highlighting another key-component on the Bliss-keyboard.

Route B

(a) The Options Button is clicked.

(b) The remaining portion of the Reference-List of symbols which include  in their Component Code is examined.

(c) The top four referenced-symbols of thecombined list are found in the Lexicon Stack,sent to the Board Card and displayed (in theirfrequency/recency order) in the Options-Field.

If the required symbol appears in the Options-Field then it can be **selected** and transferred to the the Text-Field. Otherwise, the user has two options: either to scroll the remaining portion of the Reference-List, or, to proceed with the semantographic retrieval by highlighting another key-component on the Bliss-keyboard.

Route C

(a) Another component (e.g. ), is highlighted.

(b) The Reference-List on the  Reference-Card is examined checks the *Reference-List* of all the symbols in the *Retrieval-Index* which have this component in their component-code.

(c) The top four referenced-symbols of thecombined list are found in the Lexicon Stack,sent to the Board Card and displayed (in theirfrequency/recency order) in the Options-Field.

Route D

(a) The Options Button is clicked.

(b) The remaining portion of the combined Reference-List (i.e. of symbols which their Component-Code includes both components: ⊥ and ∩ is examined.

(c) The top four referenced-symbols of the remaining portion of the list are found in the Lexicon Stack, sent to the Board Card an displayed (in their frequency/ recency order) in the Options-Field.

By now, it is most likely that the required symbol is displayed in the Options-Field. therefore it can be selected and transfered to the Text-Field. If not, the user may either continue to **scroll** down the Reference-List, or highlight another key-component on the Bliss-keyboard.

The FollowUp-Set

HyperBliss keeps a record of up to the last 8 symbols you ever select immediately after any symbol. This function offers you a list of previous preferences ordered by recency of selection (i.e. the most recent one is offered first). The example below illustrates a Follow-Up Set for the symbol "to drink" that was retrieved by a system which had been used for a while:

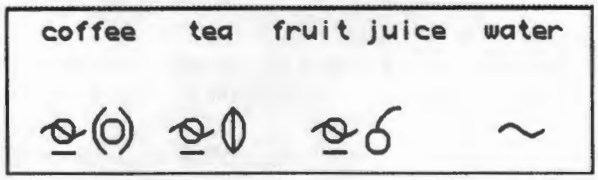


Chart 2 - Retrieving a Symbol Semantographically (Routes A,B,C & D).

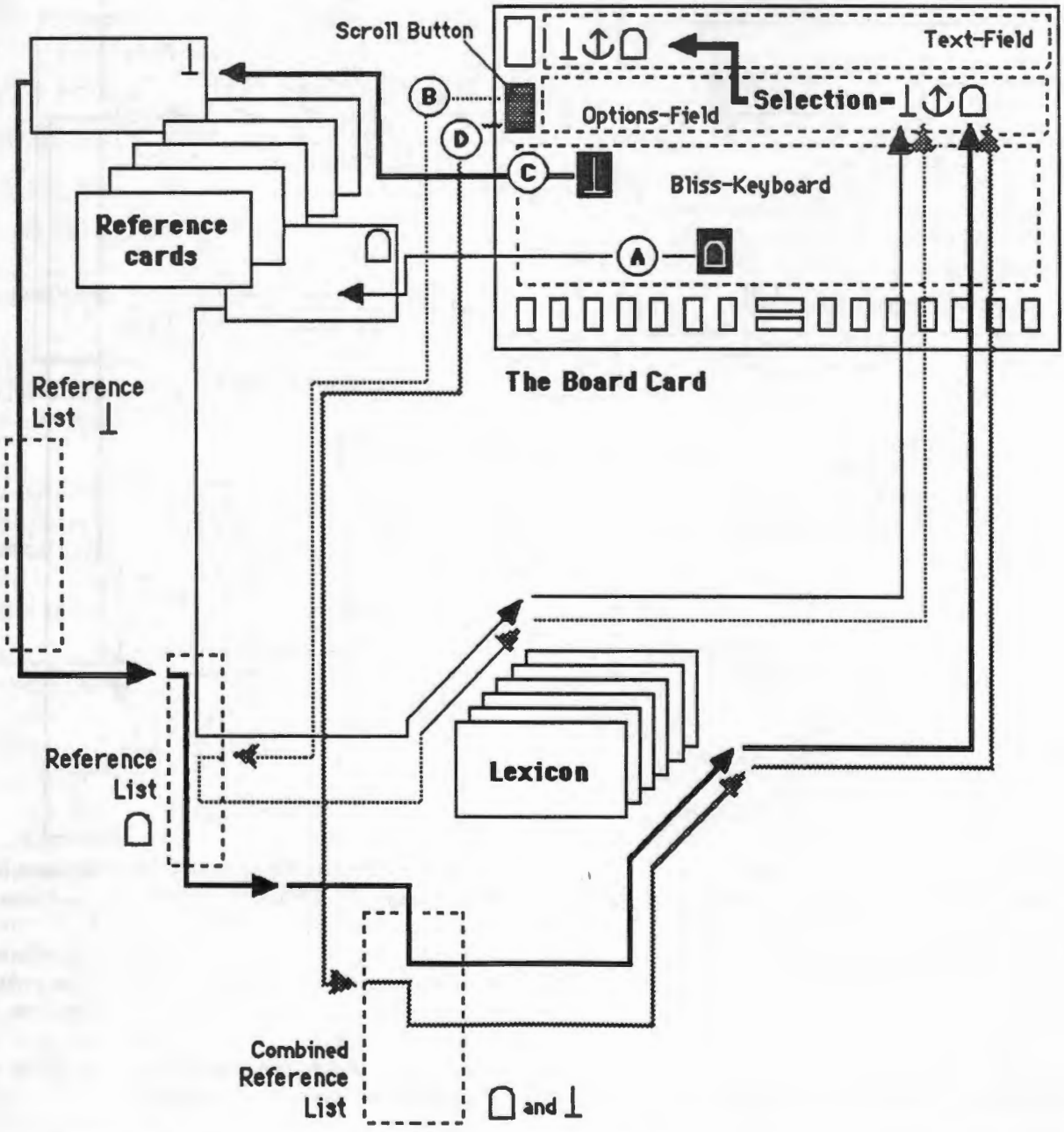


Chart 3 illustrates what happens immediately following a selection of symbol (i.e after a transfer of a symbol to the Text-Field):

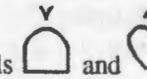
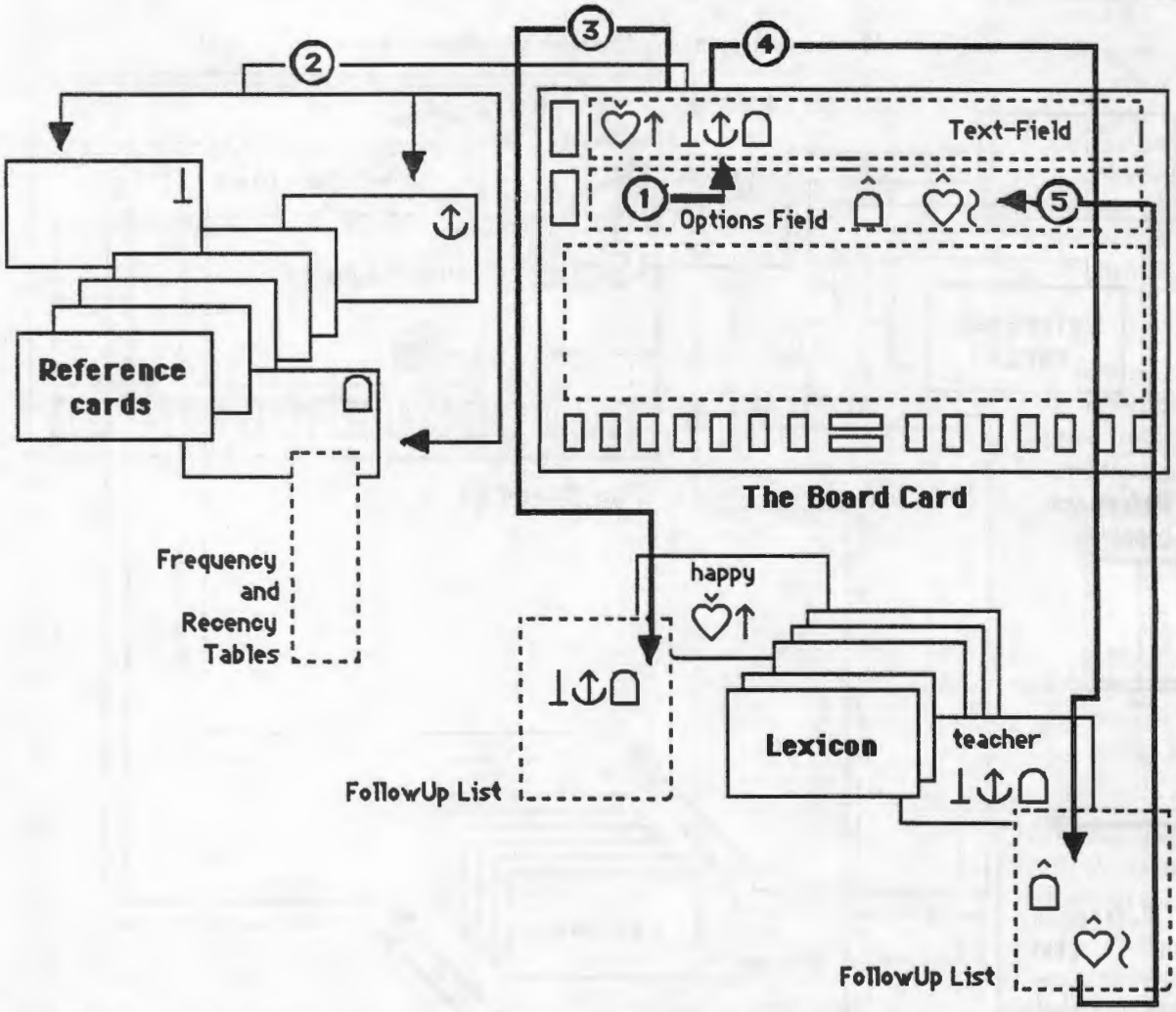
1. The symbol  "teacher" is selected.
2. HyperBliss refers to all three reference-cards  which represent the elements in the component-code of the symbol "teacher"and adds the value "1" to the frequency and recency values which are associated with it.
3. Since the selected symbol (i.e. "teacher") is not the first in the file, HyperBliss finds in the Lexicon Stack the card which is associatedwith the previously selected symbol (i.e.  "happy") and adds to its FollowUp-Set the reference of the current symbol (i.e. "teacher").
4. Still in the Lexicon Stack, HyperBliss finds the card associated with the selected symbol and checks its FollowUp-Set.
5. HyperBliss retrieves the symbols  for which references are found and displays the first four of these symbols in the Options-Field.

Chart 3 - System update following a selection of a symbol

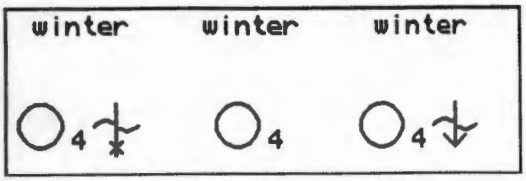


Retrieving Symbol-Synonyms

HyperBliss always retrieves and displays the default Symbol-Synonyms of its Lexicon entries. Providing a particular symbol has synonyms stored on its Lexicon card, you may retrieve and review them, and, if necessary, even replace one by another:

1. Place the cursor to the right of the symbol you wish to change and click button *Syn* (Synonyms).

HyperBliss will delete the symbol from the Message-Field and displays in the Options-Field a series of all the Symbol-Synonyms (including, of course, the default). If there are more then 4 items in the series, the number of the remaining (invisible) items will be displayed under the Option-Arrow and you may scroll the field to view them. Once you find the Symbol-Synonym you want, simply click on it. The example below illustrates 3 Symbol-Synonyms for the concept "Winter" retrieved in this manner:



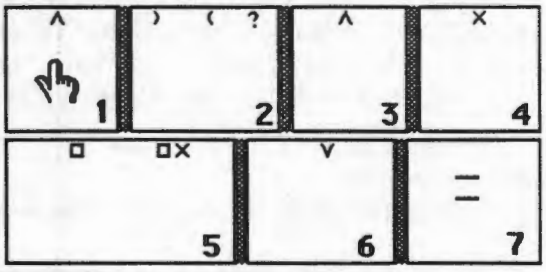
Syntactically-Based Option Generator [The Indicators] Button

HyperBliss always displays the default Gloss of its Lexicon entries. However, you may replace the gloss with any of its synonyms which are stored in the Related Concepts & Synonyms Field [RCSF] of the entry in the Lexicon Stack. Below is the [RCSF] of the entry "**feeling**" as it appears in the Lexicon Stack:

Related Concepts & Synonyms	
1. Unmarked -	feeling
2. Verb -	feel
3. Thing -	heart
4. Adjective -	
5. Adverb -	
6. Synonym1 -	emotion
7. Synonym2 -	
8. Synonym3 -	

Changing the gloss (i.e from singular to plural, from noun to verb, from one tense to another, from noun or verb to adjective or adverb etc.) very often means changing the indicator as well. But you need not worry about that because HyperBliss does it automatically:

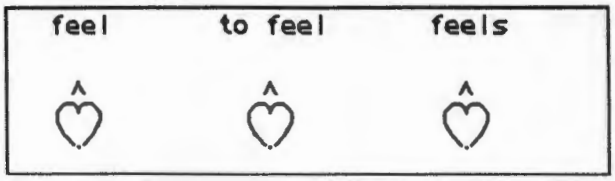
1. Place the cursor to the right of the relevant symbol.
2. Click button *Ind* (Indicators).



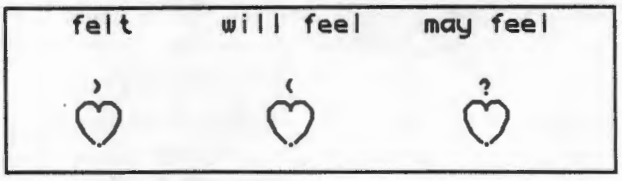
HyperBliss immediately will display seven Transformation Buttons. Regardless of the default gloss, each of these buttons is responsible for a particular transformation.

Suppose you have selected the symbol "feeling" and added it to your Bliss-Text in it original form [noun - singular]. Let us now see what are the options HyperBliss can generate if you click six of the seven Transformation Buttons in turn.

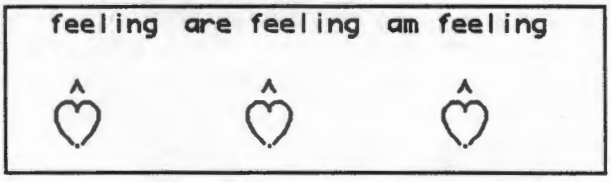
If the [RDSF] of *feeling* contains a verb then button **# 1** generates:
(a) the present tense (1st and 2nd person).
(b) the infinitive
(c) the present tense (3rd person).



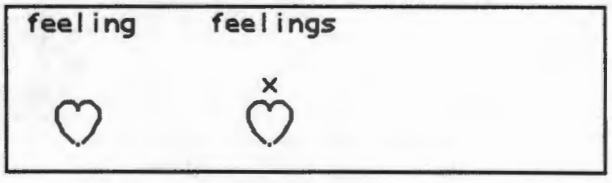
If the [RDSF] of *feeling* contains a verb then button **# 2** generates:
(a) the past tense
(b) the future tense
(c) the conditional



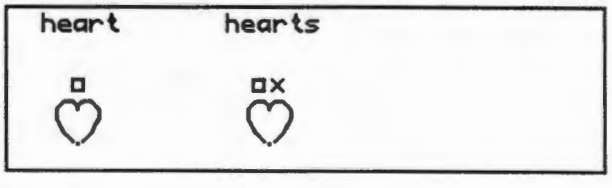
If the [RDSF] of *feeling* contains a verb then button **# 3** generates:
(a) "is" + the present participle
(b) "are" + the present participle
(c) "am" + the present participle



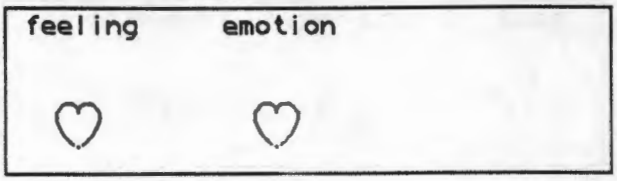
If the [RDSF] of *feeling* contains an unmarked noun then button **# 4** generates:
(a) the singular form of the noun
(b) the plural form of the noun



If the [RDSF] of *feeling* contains a noun marked as a "thing" then button **# 5** generates:
(a) the singular form of the noun
(b) the plural form of the noun



If the [RDSF] of *feeling* contains an adjective or an adverb then button **# 6** offers:
(a) the adjectival form
(b) the adverbial form



If the [RDSF] of *feeling* contains any synonyms of the default gloss then button # 7 displays the default gloss followed by its synonyms.

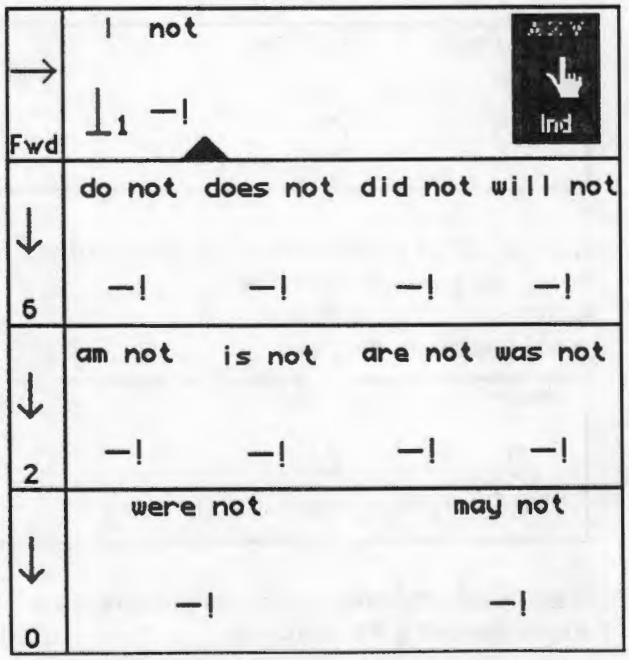
As part of this operation HyperBliss deletes the symbol and its gloss from the Text-Field and displays in the Options-Field the newly generated symbols. If the symbol that you need is displayed, then click on the symbol. It will be added to the Bliss-Text in place of the old version that HyperBliss

Caution! The syntactically -based options generator is programmed to generate English forms. Please keep in mind that it is NOT -at least for the time being- 100% error-free! Although every effort was made to refine the governing rule-base, it may still produce, from time to time, the occasional ungrammatical forms.

Negative

In order to negate a verb in Bliss you ought to place in front of the verb the symbol: *"Not"*. The problem is that one needs to keep the English version of the phrase as grammatical as possible. HyperBliss is programmed to assist you in maintaining the English output grammatical.

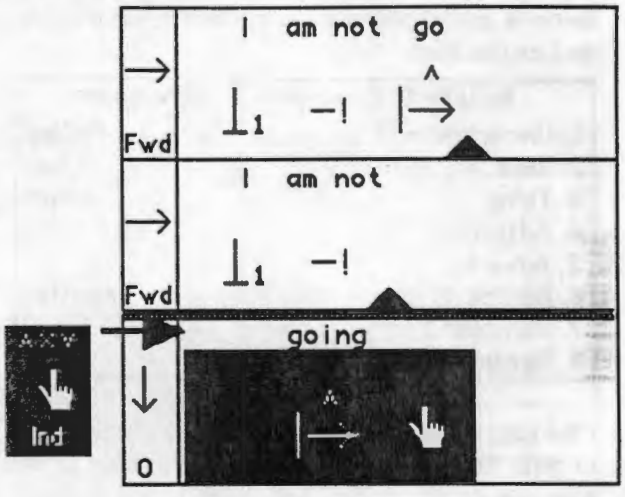
Example: Consider the following Bliss phrase:



1. Retrieve and select the symbol *"I"*
2. Retrieve and select the symbol *"Not"*.
3. Click button *"Ind"* [Indicators].
4. Select the *5th* option (i.e. *"am not"*)
5. Retrieve and select the symbol *"go"*.
6. Click button *"Ind"*. - - - HyperBliss will offer you only one optional form of the verb "go": *"Going"*

If you were to choose the 4th option (i.e. *"will not"*) then after clicking button *"Ind"*, HyperBliss would have offered you again, only one optional form of this verb: *"go"*.

Remember: If you want to negate a verb then first retrieve, select and modify **"not"**, and only then retrieve, select and modify the verb itself!!!

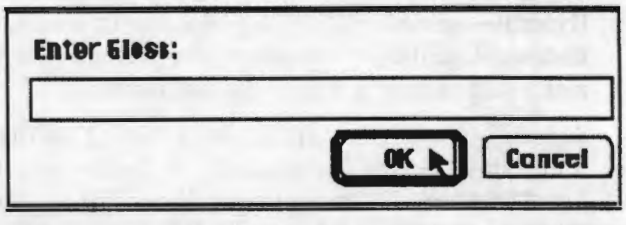


Importing a Symbol from the Lexicon Stack by its Gloss (Function Import)

This is a very useful function especially when teachers want to type a long Bliss-Text and save precious time. The function makes it possible to import to the Board "active" Lexicon entries (i.e. entries which have their **Mode** set to [+]).

To import a symbol:

1. Click the *Import* button.
2. Type in the gloss of the symbol you wish to retrieve and click "OK".



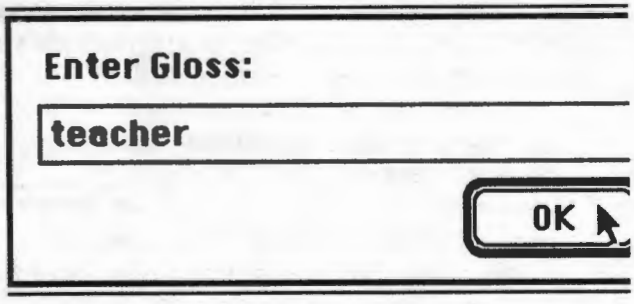
If HyperBliss fails to find the symbol, or, if the Mode of the symbol is not set to [+], or, if some data (e.g. the code) is missing; HyperBliss does not import the symbol. Instead, it sends an explanatory message.

Please note that HyperBliss usually finds the first occurrence of the gloss you wish to import. If the imported symbol is not the one you want to include in your text, then all

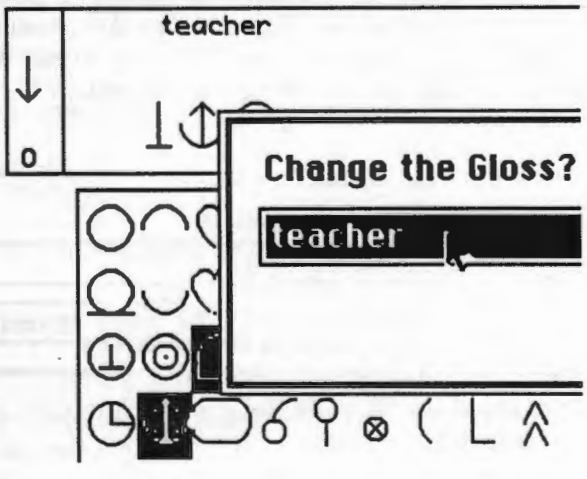
you have to do is repeat the importation process until HyperBliss finds the desired symbol (if it indeed exists in the Lexicon). The imported symbol is always displayed in the right-hand corner of the Option-Field and its Component-Code highlighted on the Bliss-Keyboard. This feature serves to remind you how the symbol is actually coded... Upon importing a symbol HyperBliss allows you to change both the *gloss* and the *indicator* of the symbol in order to suit your particular needs. Now, If the symbol (including gloss and indicator) is indeed the one you want to add to your Bliss-Text then click on the symbol. HyperBliss will add it to the *Text-Field* and update its Frequency & Recency Tables and the FollowUp Set of the previous symbol. However, should you change your mind you may clean the Options-Field and turn-off the highlighted components on the Bliss-Keyboard by clicking button *"Cnl"* (Cancel).

Suppose you wish to import the symbol for "teacher", and then use it with another gloss, say, "instructors":

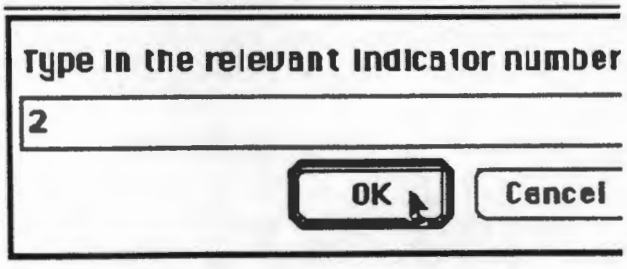
1. Click button *Import*
2. Type in "teacher" in the subsequent dialog-box and click OK.

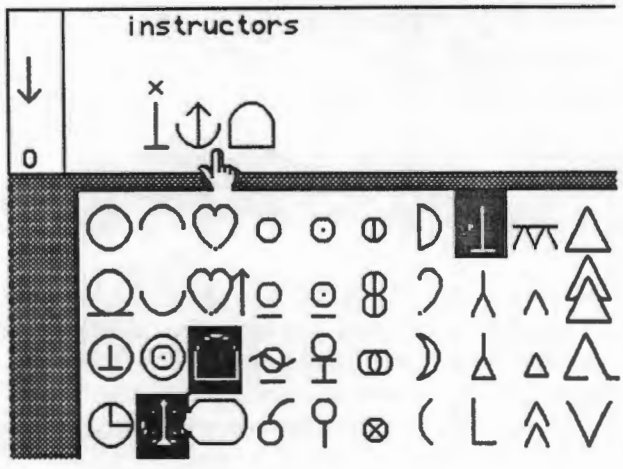


3. The imported symbol should appear in the right-han corner of the Options-Field and the 3 relevant components should be highlighted. Type *"instructors"* instead of "teacher" and click "OK"



4. Next, another dialogue-box and a menu apear. Type "2" and click "OK".
5. What you get is the symbol "**teacher**" but with another gloss ("**instructors**") and the Plural Indicator. Click on the symbol and add it to your Bliss-Text.





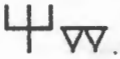
HyperBliss-Macros &The Minspeak™ Concept

Once a symbol appears in the Message-Box, HyperBliss allows the user to store the symbol in a reserved location on one of the *Reference Cards* of the Board Stack. Once a Macro is stored it can be retrieved and automatically selected by a fixed sequence of 3 actuations which cuts some of the time and effort otherwise required for the retrieval and selection of the symbol. Although each sequenced combination of two components can be assigned to only one symbol, the total number of symbols which could be stored as Macros is relatively high:
132 x132 = **1742**.

(Not 132x131, because repeats of the same component are allowed: the first instance indicates the particular reference card and the second points to the exact storage location of the symbol on the card [see Chart 4]).

The fact that the number of elements in a Macro-Code is limited to two, and that each sequence of two elements can be assigned to only one symbol, makes it impossible to encode Macros in Semantographic combinations (i.e. in sequences which resemble the *Component-Codes* of the symbols). A good solution for HyperBliss users is to adapt **Bruce Baker's Minspeak™** concept . In other words, when a particular sequence which resembles the *Component-Code* of a symbol is already assigned to another Macro, users are encouraged to find among the 132 key

symbols on the Bliss-Keyboard sequenced combinations of elements which create certain associations (especially *semantic* associations) which remind them of the symbols they wish to store and recall as Macros. Incidentally, it is recommended to HyperBliss users to take this approach when needing to come up with suitable Component-Codes for *pictographs.*

For instance, consider the pictographs *"comb"*  and *"toothbrush"*  . Obviously, their pictorial nature makes it very difficult to code them with pure semantographic codes. However, it is quite logical to assign these two symbols with the following macro-codes respectively:

Example:

"comb" =  *"instrument"* and *"hair".*

"tootbrush" =  *"instrument"* and  *teeth".*

Storing Single Symbols

This option enables you to store 132x132 symbols, each under a sequence of *two* components:

1. Retrieve the symbol that you want to store.
2. Ensure that the gloss and indicator are indeed the ones you wish to store with it.
3. Place the cursor immediately to the right of the symbol.
4. Click the *"one"* button. HyperBliss will respond vocally: *"Click two components on the keyboard."*
5. Click the *two* components in the sequence you think it's best to store (and later retrieve) the symbol.

* Remember that any other symbol that you might have stored in the past as a Macro under the same sequence of components will be replaced by the new symbol.

* Note that until you click the second component on the Bliss-Keyboard you may still quit the storing mode by clicking button *"Cnl".*

Storing Short Phrases

This option lets you store up to 132 short phrases:

1. Build up the phrase that you wish to store.
2. Ensure that the whole phrase is *visible* in the Text-Field.
3. Click the *"Many"* button. HyperBliss will respond vocally: *"Click one component on the keyboard."*
4. Click the component under which you think it's best to store (and later retrieve) this phrase.

* See the respective comments above.

Retrieving Single Symbols

1. Place the cursor at the end of your text, **or,** where you want the symbol to be inserted.
2. Click button **R-M** (Retrieve Macros). HyperBliss will respond vocally: *"Retrieving."*
3. Click on the Bliss-Keyboard the two-component code under which you have stored the symbol.

* The retrieved symbol will be added to the text, and HyperBliss will read it vocally. The Frequency and Recency parameters of the symbol will be updated, and the FollowUp-Set of the symbol (if it is not empty) will be displayed in the *Options-Field.*

Retrieving a Phrase

1. Place the cursor at the end of your text, **or,** where you want the phrase to be inserted.
2. Click button **R-M** (Retrieve-Macros). HyperBliss will respond vocally saying: "Retrieve".
3. Click on the Bliss-Keyboard the component under which you have stored the phrase.
4. Click the *"Many"* button.

* The phrase will be retrieved and added to the text while being "vocally" read. Please note that when you retrieve a phrase, the cursor is placed before the newly added phrase.

How to find a "lost" Macro

The Macros Button can not be accessed when the scanning is "on". Its purpose is to remind the teacher or the user what is the two-component code under which the particular symbol was stored as a Macro:

1. Click button "Macros"
2. Type in the exact gloss with which the symbol was stored and click **OK.**

* If HyperBliss finds your Macro it highlights the two components under which the symbol is stored.

The Document Card

The Document Card displays up to 5 lines of the current Bliss document and enables the user to save the file in a similar way that one would save an ordinary orthographic text-file on any commercially available 'Word Processor'. The card features 12 Function Buttons.

The Function Buttons

Save: Saves the File.
Board: Quits the Document / opens the Board
Hear: "Reads" the file phonetically
Dir: Quits the Document / opens the Directory
Print: Prints the file including the hidden parts
Start: Shows the beginning of the file.
End: Shows the end of the file.
1 Line: Scrolls one line up.
1 Line: Scrolls one line down.
Pg Up: Scrolls 5 lines up.
Pg Down: Scrolls 5 lines Down.

Saving a File

* Click the Save button. If the current file hasn't been

saved yet, then HyperBliss will vocally tell you: *"Select a name for the file"*.

To select a name for the file: Click on one of the symbols which appear in the file. You may not select a name which is already assigned to another file. If you do, HyperBliss will vocally tell you: "There is already a file with this name please select another name..." If the current file is already stored in the Directory then HyperBliss will save the changes under the current name. In fact, there will be a vocalized message stating that "Your file has been saved under the current name!" Note: Only 10 files can be stored simultaneously in the directory).

Printing a File

* Click the Print button. HyperBliss will hide the Function Buttons and print the entire file (i.e. All lines-even those which you can not see) on a white background.

Speech/Audio Output

* Click on the Hear button. HyperBliss will vocally "read" your file.

When the Scanning is active: Do exactly what you would do if it were not active. Remember to click the mouse only when the relevant button or text is highlighted. If you wish-to escape nested scanning routines wait until the entire screen is highlighted and then click.

The Directory Card

The Directory Card allows the user to access up to 10 Bliss files he/she created on the Board Card and saved through the Page-Document Card. The Card features 5 Function Buttons and 10 "FileName" fields.

The Function Buttons

Exit: Quits the Directory
Board: Quits the Directory / opens the Board
Delete: Activates the Delete Mode.
Copy: Activates the Copy Mode.
Rename: Activates the Rename Mode.

Opening a File

* Click the "FileName" field of your choice. HyperBliss should open your file in the Document Card. If you wish, you may then transfer the file from the Document Card to the Board Card.

Deleting a File

* Click the Delete button. It will remain highlighted to indicate that the Delete Mode is "on". At this point you may cancel the Delete Mode by clicking this button again.

* Click the relevant "FileName" field (i.e. the one which you wish to delete).

Copying a File

* Click the Copy button. It will remain highlighted to indicate that the Copy Mode is "on". At this point you may cancel the Copy Mode by clicking this button again.

* Click the relevant "FileName" field (i.e. the one which wish to copy).

HyperBliss opens your file in the Document Card and asks you to select a name for the copy by clicking one of the symbols present there. Don't select a symbol which is already assigned to another file in the directory. If you do, HyperBliss is forced to abort the operation! After copying your file, HyperBliss displays the name of the copied file in one of the "FileName" fields.

Renaming a File

* Click button- "Copy". The button will remain highlighted to indicate that the Rename Mode is "on". At this point you may cancel the Rename Mode by clicking this button again.

* Click the relevant "FileName" field (i.e. the one which wish to rename).

HyperBliss opens your file in the Document Card and asks you to select a new name for your file by clicking on one of the symbols present there. Don't select a symbol which is already assigned to another file in the directory. If you do, HyperBliss is forced to abort the operation! After renaming your file, HyperBliss displays the new name of the file in one of the "FileName" fields.

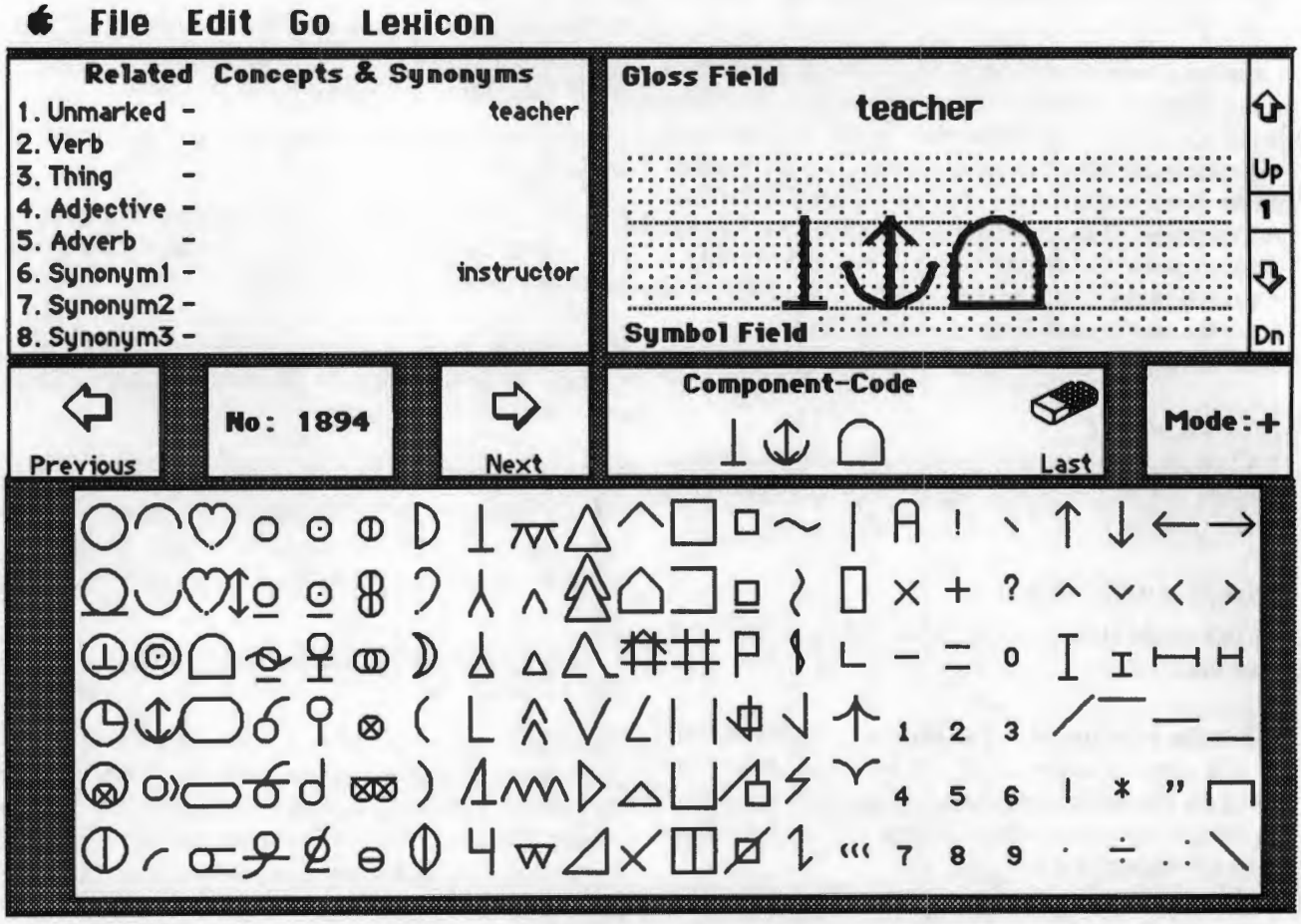
When the Scanning is active: Do exactly what you would do if it were not active. Remember to click the mouse only when the relevant button or text is highlighted. If you wish to escape nested scanning routines wait until the entire screen is highlighted and then click.

The Lexicon Stack

The Lexicon Stack is your Blissymbol-Library. It is a vital resource for all HyperBliss stacks and utilities. In fact, without a well-maintained Lexicon Stack, HyperBliss cannot function properly. The stack comes with a special menu called "Lexicon", function buttons and data fields .

The Lexicon Commands

Find: Find and open an entry by gloss.
Delete: Deletes the current entry.
Export: Exports the symbol to another utility
Sort: Sorts the Lexicon Stack.
Load: Loads the Index.
FollowUp: Deletes the Follow-Up Set
Quit: Quits the Lexicon Stack



Data Fields

Default Gloss: This field contains the gloss which is selected to accompany the symbol of the current entry.

Default Symbol: This field contains the symbol synonym of the current entry.

Component-Code: This field shows the "Component Code" of the current entry [see Coding below].

The Mode Field: The Mode (either [+] or [-]) plays a significant role in many HyperBliss operations. You must set the Mode of an entry to [+] if you want the entry to be active (i.e. to be loaded and thus retrieved in the Board Stack, and included in the StampBook dictionary etc.). The Mode Field indicates the "Mode" of the current entry. then If you wish to reverse the current status click thefield.

Number of Symbol Synonyms: This field Indicates the number of symbol synonyms that the current entry has.

No (Entry Number): This field Indicates the serial number of the current entry. Note: Serial numbers changed each time an entry is deleted or added and after the Lexicon Stack is sorted:

1. Click the Entry Number Field
2. Type in the number of the entry which you want to open and click OK.

If your input is illegal, HyperBliss sends you a message saying that *"There is no such card..."*

Function Buttons

UP:Scroll symbol up: If the current entry has more than one symbol synonym then click this button to scroll the options upward.

DN: Scroll symbol down: If the current entry has more than one symbol synonym then click this button to scroll the options downward.

Next: Click this button to open the Next entry .

Previous: Click this button to open the previous entry .

Last: See "Coding" below.

Updating the "Related Concepts and Synonyms" Field

This field contains concepts and synonyms related to the symbol. You must ensure that the field is indeed well updated. Without the relevant information which should be in this field the user will be unable to retrieve with ease synonyms;or, change indicators and glosses (from singular to plural and vise versa, from one tense to another) etc. [See *The Board*: Button *Indicators*].

Please make sure that when you change the default gloss, the relevant synonyms and other items in this field are also

changed and are compatible with the new default gloss!!! Also, the input of *verbs* must always be in the *present tense form for 1st person*!

1. Click the relevant item on the *"Related Entries"*. If the item is empty then a dialogue-box will appear and ask you to type in the entry .However, if the item already contains an entry then you may either *modify* the entry, *change* its assigned pronunciation, or, *delete* the it altogether from the field by simply erasing the contents of the dialogue-box.
2. Click your preference (i.e. *"Speech"* or *"Gloss"*).
3. Type your corrections in the subsequent dialogue-box.

Changing the Gloss, its Indicator and the way the Gloss Sounds

1. Click and HIGHLIGHT the *Gloss Field* and choose your preference (i.e. *Speech* or *Gloss*).
2. Enter the corrections into the subsequent dialogue-box and click "OK":
3. If you choose to change the Gloss, then consequently, HyperBliss lets you change the indicator too. Type in the relevant indicator number.

If you choose to change the Speech, then enter your corrections into the consequent dialogue-box. However, in order to type meaningful corrections when modifying the transcription of a gloss you must first familiarize yourself with the HyperMacintalk™ Phoneme-Table below.

Although HyperMacintalk™ requires that the phonetic transcription consists of uppercase letters, HyperBliss, nevertheless, lets you type lowercase letters. It will automatically convert them to uppercase.

Macintalk™ Vowel Chart

made	-EY	hide	-AY	soon	-UW
bat	-AE	bird	-ER	border	-OH
about	-AX	bit	-IH	toy	-OY
talk	-AO	low	-OW	use	-UW
beet	-IY	hot	-AA	under	-AH
bet	-EH	power	-AW	urbam	-ER
better	-ER	look	-UH	sold	-IX

Macintalk™ Consonant Chart

but	-B	wax	-W	rat	-R
dog	-D	axe	-KS	soup	-S
fed	-F	yak	-Y	loch	-/C
guest	-G	zipper	-Z	rush	-SH
hole	-/H	check	-CH	pleasure	-ZH
judge	-J	lot	-L	thin	-TH
kitchen	-K	must	-M	then	-DH
table	-T	push	-P	call	-LH
very	-V	quit	-Q	car	-C

If your string of characters is not permissible, HyperMacintalk™ will pretend that the string doesn't exist (i.e. you will hear no vocal output at all). Naturally, you will have to try again... and again... and again... Don't worry. You'll get the hang of it soon enough.

Coding

Every symbol in *HyperBliss* must have a *Component-Code*. This code is vital to the formation of the *Retrieval-Index* which is the heart and soul of the *semantographic* retrieval technique featured here. All Blissymbols in HyperBliss are already coded according to their *component composition*. However, you are free to modify the existing code as you wish. Remember though that it is highly advisable to code symbols as logically close to their component composition as possible. In the case of *pictographs* you are advised to assign a code that represents the semantic category of the concept involved (e.g. Banana can be coded with the symbol for fruit and vegetable...) It is really entirely up to you to decide what the code should be, but whatever you do, you must make sure that each symbol has a code — Otherwise, the retrieval procedure will not work! The current code of each entry is displayed in the Component-Code Field.

Coding a symbol

1. Click and HIGHLIGHT the *Component-Code Field.*
2. Click the components of your choice on the Bliss Keyboard.

Remember: The maximum items per code is **5.** You can not include the same item twice in one code. A new code can be effective (i.e. for retrieval) only after you LOAD the Index (see *Loading* below) .

Deleting the last segment of a Code

You may delete the last segment of the Component-Code which you have assigned to a symbol:

1. If necessary, click and HIGHLIGHT the *Component-Code Field.*
2. Click the *"Last"* button.

Quitting the coding procedure

1. Click the *Component-Code Field*

Handling Symbol-Synonyms

Each entry in the Lexicon Stack can have more than one Symbol-Synonym (e.g. "Winter").

Adding a symbol-synonym to aparticular entry

1. If necessary, use the *Draw* utility to create a new entry featuring the symbol synonym.
2. Make a note of its *card number.*
3. Open the original entry.
4. Click and HIGHLIGHT the *Symbol Field.*
5. Click *"Add: Symbol-Synonym"* on the white cover.
6. Type the card number of the synonym and click OK. The symbol-synonym will be added to the options of the original entry.
7. Click "Quit" on the white cover.

Deleting a symbol-synonym

1. Choose the *Symbol* command from the *Lexicon* menu.
2. Scroll the options which are available, and stop once you see the symbol-synonym you wish to delete.
3. Click *"Delete Symbol Synonym"* on the white cover.
4. Read the warning and click OK if you still agree to delete the symbol-synonym.
5. Click *"Quit"* on the white cover.

Find

1. Choose the *Find* command from the *Lexico menu.*
2. Type in the relevant gloss and click OK.

Remember: *HyperBliss* opens the first entry it finds that is associated with the requested gloss.If for a reason the "Found" entry is not the one you want then simply repeat the operation. HyperBliss will l look for the next occurrence of your request.

Delete

You may delete any entry from your lexicon:

1. Choose the *Delete* command from the *Lexicon* Menu.
2. If indeed you wish to proceed then click **OK.**

Export

you may export entries (i.e the symbol and its default gloss) to two other utilities: Chart and Cargo:

1. Choose the *Export* command the *Lexicon Menu.*
2. Indicate your destination (i.e. *"cargo"* or *"Chart"*) in the subsequent dialogue-box.

FollowUp-Set

The FollowUp-Set is a list of recent symbols which were retrieved and selected (in the Board Stack), by the user, immediately after the current entry. You may delete the FollowUp-Set of the current entry:

1. Choose the *FollowUp* command from the *Lexicon Menu.*

If the FollowUp-Set is empty you get a message telling you that there is nothing to delete. Otherwise you get a warning. If you agree to delete the set then click OK.

Sort

You may find it necessary to add, delete, modify and re-code many symbols. Naturally, you will have to re-sort your Lexicon Stack. The sorting procedure splits the Lexicon into two parts. The first part contains all the [+] entries while the second all the [-] entries. Each part is sorted *alphabetically:*

1. Choose the *Sort* command the *Lexicon Menu* .
2. If indeed you wish to proceed then click OK.

Loading the Retrieval Index

After the actual coding of each symbol, the loading of the codes is the most important procedure a HyperBliss operator is required to do. This procedure creates the very special database that is designed to enable users of the system retrieve their Blissymbols semantographically... Before you Load the Retrieval Index you ought to ensure that all the entries which you wish to load have their MODE set to [+].

Since the loading is lengthy (see below) and it erases all current FollowUp-Sets, as well as Frequency & Recency Tables, it is not recommended to repeat it too often. Do it only when you have the time needed to complete the loading procedure. Stopping it will cause problems (if stopped, the procedure can not be "continued", it must be repeated !). The speed of the loading process depends on many factors: The size of the data (i.e. the number of entries set to [+] , the type of your Mac, its RAM-size etc. The loading time indicated in the dialogue box below [Figure 6.20] is calculated for an SE (2MB RAM), loading a Lexicon of 2000 entries:

1. Choose the *Load* command from the *Lexicon Menu* and click OK.

HyperBliss loads the Retrieval Index in small portions (a maximum of 100 entries each) and lets you follow the progress of the loading procedure by displaying the glosses of the symbols as they are being loaded.

Customizing Your Lexicon

It is suggested that you spend a few hours going over the Lexicon Stack, entry by entry, in order to customize your Lexicon Stack to suit particular preferences within the context of your professional needs:

* **Back-up:** Before you do anything, make a copy of the original Lexicon Stack.
* **Delete Irrelevant Entries:** You will find many entries (usually of concepts taken from foreign cultures) which you or your pupils may never use. Delete them.
* **Add New Symbols:** symbols you need and export them to your Lexicon.
* **Review the Default Glosses:** Make sure the default gloss assigned to each symbol is indeed the one you prefer. If it is not, modify it or choose another.
* **Check the Transcription of Default Glosses:** Check the phonetic representation of the default gloss. If it is inadequate, transcribe it differently
* **Check and Update the Related Entries Field:** Add or delete and check how t sound.
* **Review the Component-Code:** Make sure that the entry has a code. If it does not, then code it.
* **Set the Mod:** If you want an entry to beactive, set its MODE to "+" .
* **Add Entries**
* **Sort the Lexicon.**
* **Load the Retrieval Index.**

The School Utility

The School Utility is a versatile Teaching-Aid. It is designed to prepare the user for proficient utilization of the Board Card. It features teaching and testing routines based on the present cognitive semantographic method. The tutorial "teaches" the symbols to the user in a manner which is believed to facilitate more effective learning of Bliss. The two test routines allow the teacher or the therapist to monitor the user's progress. The utility has a special menu called "School", and scrolling field.

The School Menu Commands

Import: Imports symbols from the Lexicon Stack.
Clear: Deletes entries from the scrolling field
AutoTeach: Sets and activates the auto-tutorial.
Teach: Sets and activates a manua tutorial.
Analysis Test: Starts an Analysis Test.
Synthesis Test: Starts an Synthesis Test.
Stats: Opens the Statistics Card.
Lexicon: Opens the Lexicon Stack.
Quit: Quits the School Utility and opens the Main Menu

Creating a Symbol-Set

1. Decide on the list of symbols you want to teach.
2. Choose the *Import* command from the *School* Menu.
3. Type in the gloss of the symbol you want to import from the Lexicon Stack.

All symbols are imported with their default gloss only. A set can contain a maximum of **50** symbols. If the symbol is present and encoded in the Lexicon Stack, HyperBliss imports and displays the symbol and its component-code. If you think that the coding is inadequate then go to the Lexicon Stack, re-code the symbol, return to the School utility and import the symbol again. If the imported symbol is not the one you meant to add to your set then all you have to do is to repeat the importation process until HyperBliss finds the desired symbol (if indeed it exists in the Lexicon). Once the symbol is found and imported HyperBliss allows you to change the gloss and the indicator of the imported entry (e.g. from "teacher" to "instructors" etc.). See Board: button "Import".

4. Click OK if you wish to add the symbol to the Symbol-Set.

Deleting Entries from the Symbol-Set

1. Choose the *Clear* command the *School* Menu.
2. Click your choic. If it is *"One Entry"* then you are asked to type in the relevant gloss. Else if it is *"The Set"* then you get a warning before the deletion takes place...

Automatic Teaching

1. Choose the *AutoTeach* command the *School* Menu.
2. Type in the gloss of the symbol with which you want to start the tutorial.
3. Specify the length (in seconds) of intervals between items in the list (The default =2 secs).

Manual Teaching

1. Choose the *Teach* command the *School* Menu.
2. Type in the gloss of the symbol with which you want to start the tutorial.
3. Indicate in the subsequent dialogue-box whether or not you wish the *scanning* mechanism to be active.
4. Specify the length (in seconds) of intervals between scanning events. (The default=2 secs).

The Tutorial

The tutorial demonstrates to the user how symbols are synthesized from their component parts. Each symbol is shown with its gloss while a voice output repeats the word twice. The *components* which form the symbol or with which the symbol is coded are then *"highlighted"* one by one on the Bliss *component-keyboard.*

* To bring the next entry to the screen click button *"Next "*
* In order to quit the *Testing Mode* click button *"Exitt"*.

When the Scanning is active: Click the mouse only when the relevant button or text is highlighted. To escape out of nested scanning routines click when the entire screen is highlighted.

The Analysis Test

The first test routine checks if the user is able to analyze symbols that had already been taught to him/her. The user is asked to indicate which "key" components on the Bliss component-Keyboard match the ones that form the particular symbol that appears on the screen. There is instant vocal and visual feedback. If a selection is correct, then the respective "key" component is highlighted and the machine responds with a BEEP Otherwise, the response is 3 BEEPS. However, before the user is tested on the next symbol, the components of the present one are highlighted. This way the user can see how successful he/she was. At the end of each test the teacher can obtain a full report on the user's performance.

1. Choose the *Analysis Test* command from the *School* Menu.
2. Type in the gloss of the symbol with which you want to start the test.
3. Indicate whether or not you wish the *scanning* mechanism to be active.
4. Specify the length (in seconds) of intervals between scanning events (The default =2 secs).

* In order to reveal the correct answer click button *"See"*
* In to bring the next entry to the screen click button *"Next"*
* In order to quit the Testing Mode click button

The Synthesis Test

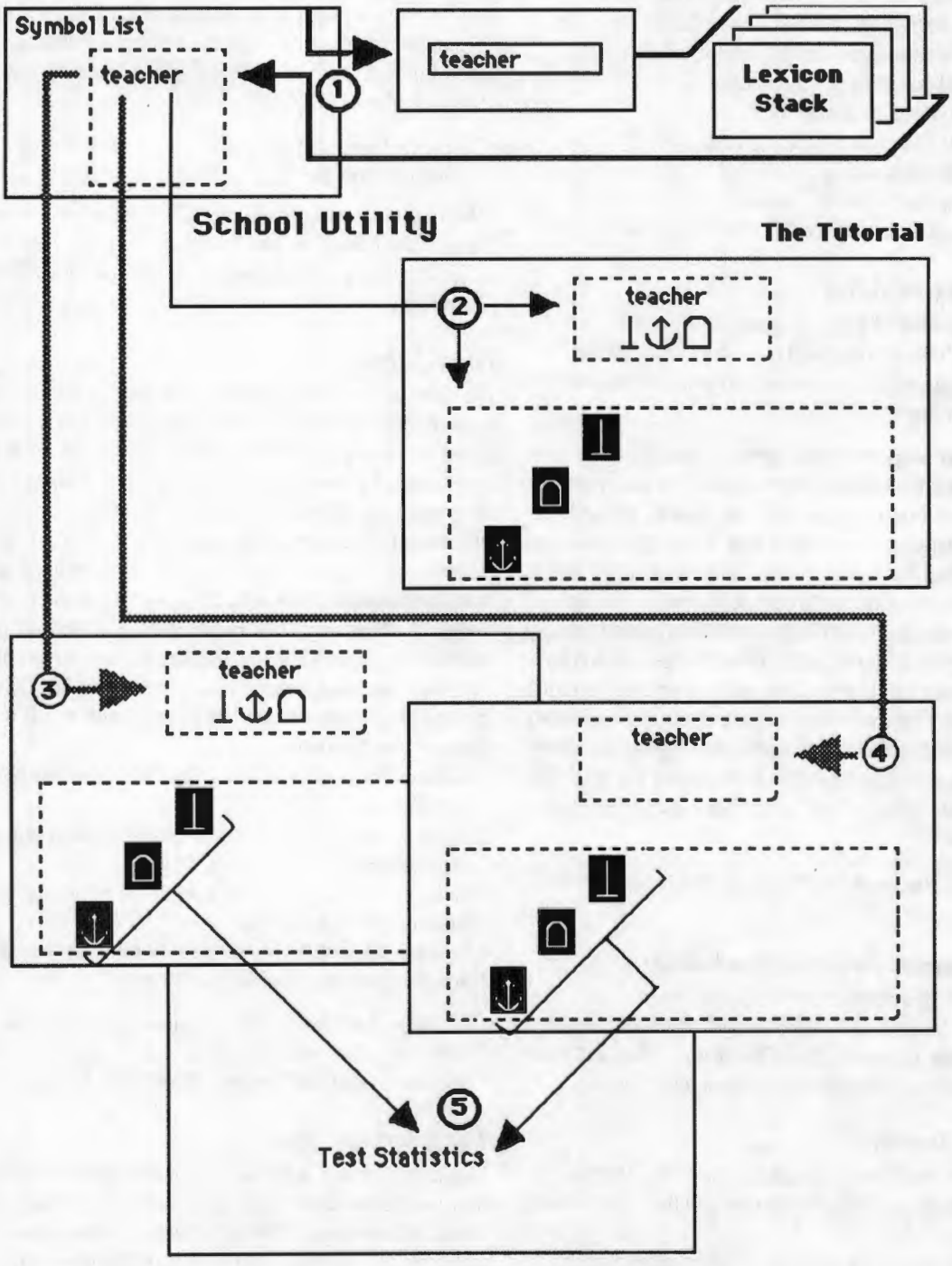
The second test is a simulation of the actual retrieving routine which the user must perform while communicating through HyperBliss. The test checks if the user can synthesize (partially or fully) a given set of familiar symbols. The

test is almost identical to the previous one, except here the user does not see the symbol. In other words, the user is asked to recall Blissymbols by semantographically structuring the them in his/her mind and click, in no particular order, some or all of their component parts which may appear on the Bliss component-keyboard. [About the procedure see: Analysis Test].

The Analysis Test

The first test routine checks if the user is able to analyze symbols that had already been taught to him/her. The user is asked to indicate which "key" components on the Bliss component-Keyboard match the ones that form the particular symbol that appears on the screen. There is instant vocal and visual feedback. If a selection is correct, then the respective "key" component is highlighted and the machine responds with a BEEP Otherwise, the response is 3 BEEPS. However, before the user is tested on the next symbol, the components of the present one are highlighted. This way the user can see how successful he/she was. At the end of each test the teacher can obtain a full report on the user's performance:

Chart 4 - Flow of data to and within the School Utility



1. Choose the *Analysis Test* command from the *School* Menu.
2. Type in the gloss of the symbol with which you want to start the test.
3. Indicate whether or not you wish the *scanning* mechanism to be active.
4. Specify the length (in seconds) of intervals between scanning events (The default =2 secs).

* In order to reveal the correct answer click button *"See"*
* In to bring the next entry to the screen click button *"Next"*
* In order to quit the Testing Mode click button *"Exit"*

The Synthesis Test

The second test is a simulation of the actual retrieving routine which the user must perform while communicating through HyperBliss. The test checks if the user can synthesize (partially or fully) a given set of familiar symbols. The test is almost identical to the previous one, except here the user does not see the symbol. In other words, the user is asked to recall Blissymbols by semantographically structuring the them in his/her mind and click, in no particular order, some or all of their component parts which may appear on the Bliss component-keyboard. [About the procedure see: Analysis Test].

School Statistics

Choose the *Synthesis Test* command from the *School* Menu. HyperBliss will open your *Scholl Statistics Card* and show the number of correct and wrong component selections which wrere recorded by the user for each of the symbols during the last test. Naturally, you may *scroll, print* or *erase* the data. which appear on the Statistics card.

Teaching Blissymbols (and Testing the User's Progress)

Chart 4 presents the various school parts and activities as well as the flow of data among them:

1 - A symbol is imported from the Lexicon Stack and added to the symbol-list of the School Utility.

2 - The symbol is transferred to the tutorial and the components which form the component code of the symbol are highlighted.

3 - The user is asked to highlight the components which form the component-code of the symbol which is presented before him/her.

4 - The user is asked to highlight the components which form the component-code of a hidden symbol. The user can only see and hear the symbol.

5 - For each test, HyperBliss records the user's responses and presents an analysis of his/her performance in the Test-Statistics card.

The Draw Utility

This is a special utility which facilitates the drawing of Blissymbols. Although there is no guaranty that the present version will enable you to draw 100% of the existing symbols, the majority of those, and probably many plausible ones, can be drawn here and exported elsewhere in HyperBliss with ease.

The Draw Menu Commands

Clear: Clears the field of your choice.
Add 1/4 Space: Adds 1/4 space to the field of your choice.
Add 1/8 Space: Adds 1/8 space.
Add 1/16 Space: Adds 1/16 space.
Delete Last Space: Delete the last space.
The Font: Edits the contents of a field via the BlissFont.
Add Indicator Marker: Adds an indicator marker.
Delete Indicator Marker: Deletes the indicator marker.
Gloss: Adds a gloss to the newly drawn symbol.
Export: Exports a symbol to another utility.
Quit: Quits the Draw Utility.

The Template

Consists of 21 Shape Buttons. Each button stores a considerable number of variants. Once you click one of the shape buttons you may scroll the Option Field and view all the variants.

The Segments

Consists of 7 Shape Buttons. Each button stores all the segments which compose the shape. Once you click one of these buttons you may scroll the Option Field and view all the segments.

The Options Field

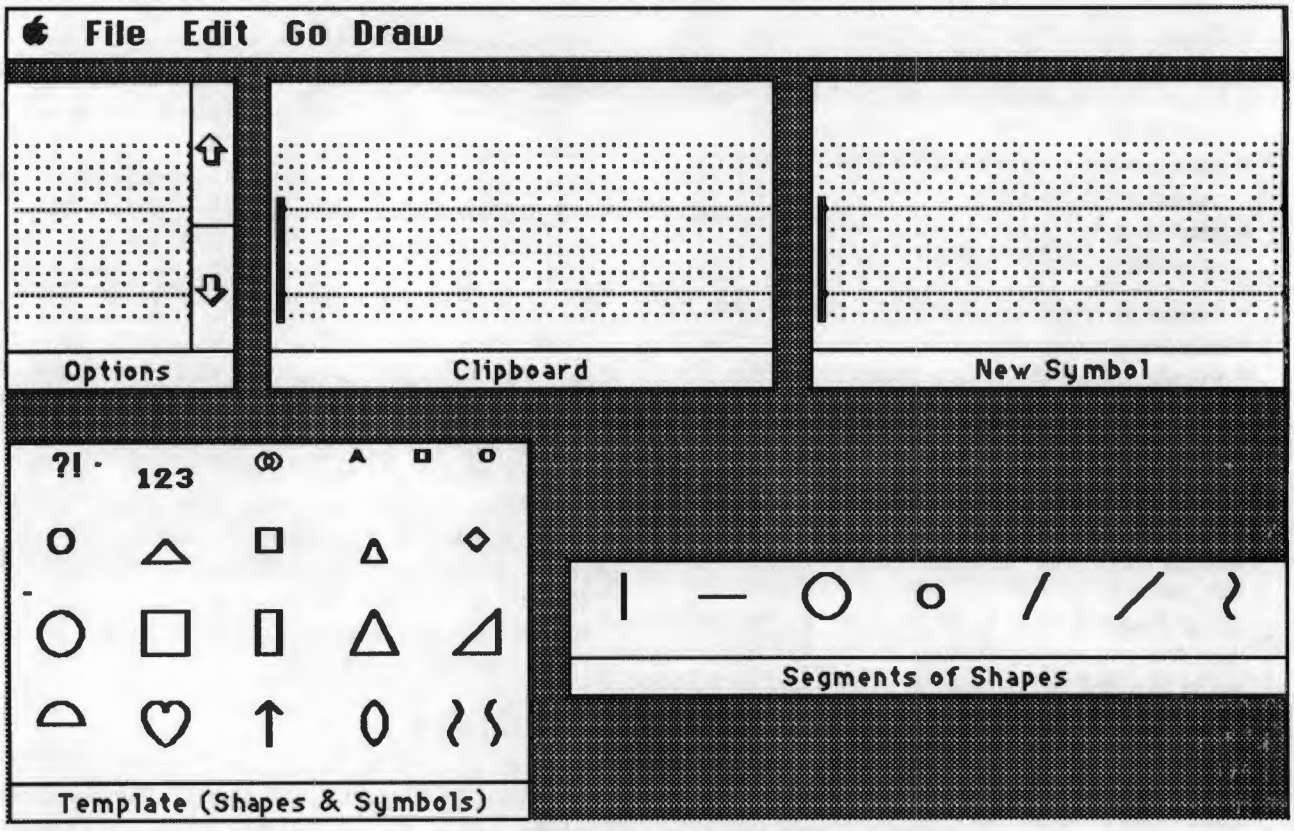
This field contains all the variants (or the segments) of a selected shape. You may scroll it up or down. When you find the shape or the segment you want, simply click on the Options Field. The shape will be copied into the Clipboard. If the Clipboard already contains a certain shape in it then you will be asked if you want the new shape to be superimposed over the other.

Superimposing Components

This is an important feature. It enables you to create complex superimposed components or "glue" primitive segments to one another. You may find out, though, that the drawing of certain symbols requires that one component be superimposed a bit to the left or to the right of the centre of another. These irregular and delicate superimpositions will most likely require temporary addition or deletion of spaces to and from the Clipboard field.

Adding or Deleting Spaces

1. Choose the relevant command from the *Draw* Menu.
2. Indicate you preference (i.e *"Yes"* or *"No"*) in the



The New-Symbol Field

This field receives the finished parts of the symbol from the Clipboard field. When the drawing is done it hosts the symbol and its gloss. If you click this field its contents are transferred back to the Clipboard field.

The Clipboard Field

This is your drawing board. It is where you draw the components, superimpose one over another, add the indicator marker etc. When you finish drawing the current part of the symbol you must click the on the Clipboard in order to transfer its contents to the New-Symbol field. If the *indicator marker* has been added yet to the newly drawn symbol then you will be asked whether or not you wish to add an *indicator marker* to the current component. If you want to add it you must indicate whether it is a tall symbol (i.e. that it exceeds the sky line e.g. Banana) or a normal one.

The Cursors

Both the *Clipboard* field and the *New-Symbol* field have a **cursor** which helps you draw the symbols more accurately (especially where spaces are concerned).

The Indicator Marker

Every symbol in the Lexicon Stack mus have an INVISIBLE Indicator Marker above the centre of its indictor-bearing component. HyperBliss will not let you export a symbol to the Lexicon Stack without an indicator marker being present. Sometimes you will need to add (or delete) an Indicator Marker to (or from) a component while it is still in the Clipboard field. In order to do that you will have to choose the relevant command from the *Draw* Menu.

Clearing the Fields

1. Choose the *Clear* command from the *Draw* Menu.
2. Indicate which field you wish to clear.

Editing with the BlissTemplate Font

If you are familiar with the BlissTemplate Font and you know how to use it well then you may edit the contents of both the Clipboard field and the New-Symbol field by using the BlissTemplate Font:

1. Choose the *Font* command from the *Draw* Menu.
2. Type in your corrections and click OK. Remember: If you click *"Cancel"* the data will be erased!

Adding a Gloss

When your drawing is completed and your new symbol is in the New-Symbol field you may add its gloss:

1. Choose the *Gloss* command from the *Draw* Menu.
2. Type the new gloss in the subsequent dialogue-box.

Exporting a Symbol

You may export your newly drawn symbol to the Lexicon Stack, to Chart Utility or to the Cargo Utility:

1. Choose the *Export* command from the *Draw* Menu.
2. Click your destination in the subsequent dialogue-box.

Exporting to the Lexicon: Data which does not include a symbol (with an Indicator Marker) and a gloss will not be exported to the Lexicon Stack. If any of the above is missing HyperBliss aborts the exportation process. Exporting Data to the Lexicon Stack means creating there a new entry. Therefore, it is vital, after the exportation, to do immediately the following:

1. Set the *Mode* Field to "+" (only if you want the entry to be active).
2. *Code* the entry.
3. Update the *"Related Concepts and Synonyms Field* of the entry.

Examples

Note:

1. The examples below do not describe all the possible combinations and ways in which different symbols may be drawn...
2. You must click in turn all the buttons on the two templates and each time scroll the *Options Field* in order to become familiar with the variants of the respective shape.
3. Be patient. It may not come so easy at first but the more you will practice the more efficient you will become!

Sun (1)

1. Click the "big circle" button on the Template.
2. Click the Options Field.
3. Click the the Clipboard Field.
4. When you see the subsequent dialogue-box (Indicator Marker) click "Normal".
5. Choose the Gloss command from the *Draw* Menu.
6. Type in "sun" and click OK.

Ring

1. Click the "big circle" button on the Template.
2. Click the Options Field.
3. Click the "small circle" button on the Template.
4. Click the Options Field.
5. When you see the subsequent dialogue-box ("Superimpose...") click "Yes".
6. Click the the Clipboard Field.
7. In the subsequent dialogue-box ("...Indicator Marker?") click "Normal".
8. Choose the *Gloss* command from the *Draw* Menu.
9. Type in "ring" and click OK.

Tractor

1. Click the "big circle" button on the Template.
2. Scroll the Options Field until you find ⊗
3. Click the Options Field.
4. Choose the *Add an Indicator Marker* command from the *Draw* Menu.
5. When you see the subsequent dialogue-box ("Symbol:" click "Normal".
6. Choose the Delete Last Space command from the *Draw Menu.*
7. When you see the subsequent dialogue-box ("...Field?") click "Clipboard".
8. Click the "small circle" button on the Template.
9. Scroll the Options Field until you find ⊗
10. Click the Options Field.
11. When you see the subsequent dialogue-box ("Superimpose...") click "No".
12. Click the the Clipboard Field.
13. Choose the *Gloss* command from the *Draw* Menu.
14. Type in "tractor" and click OK.

Sun (2)

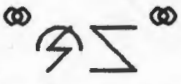
1. Click the "big circle" button on the Segments of Shapes Template.
2. Scroll the Options Field until you find ◜ (the one just under the sky line on the grid).
3. Click the Options Field.
4. Scroll the Options Field until you find ◟ (the one just above the earth line on the grid).
5. Click the Options Field.
6. When you see the subsequent dialogue-box ("superimpose...") click "No".
7. Choose the Add 1/2 Space command from the *Draw* Menu.
8. When you see the subsequent dialogue-box ("...Field?") click "Clipboard".
9. Repeat steps 7 & 8
10. Scroll the Options Field until you find ◝ (the one just under the sky line on the grid).
11. Click the Options Field.
12. When you see the subsequent dialogue-box ("superimpose...") click "No".
13. Scroll the Options Field until you find ◞ (the one just above the earth line on the grid).
14. Click the Options Field.
15. When you see the subsequent dialogue-box ("superimpose...") click "No".
16. Repeat steps 7 & 8 three times.
17. Click the the Clipboard Field.
18. When you see the subsequent dialogue-box (Indicator Marker) click "Normal".
19. Choose the Gloss command from the *Draw* Menu.
20. Type in "sun" and click OK.

How to add the combine indicator

(e.g. HyperBliss):

1. Click the "half circle" button on the Template.
2. Scroll the Options Field until you find the symbol "mind" ◠.
3. Click the Options Field.
4. Click the "triangle" button on the Template.
5. Scroll the Options Field until you find the symbol "electricity" ϟ.
6. Click the Options Field.

7. When you see the subsequent dialogue-box ("Superimpose...") click "Yes".
8. Click the the Clipboard Field.
9. In the subsequent dialogue-box ("...Indicator Marker?") click "Normal".
10. Click the "enclosure" button on the Template.
11. Scroll the Options Field until you find the "sky line".
12. Click the Options Field.
13. Scroll the Options Field until you find the " earth line".
14. Click the Options Field.
15. When you see the subsequent dialogue-box ("Superimpose...") click "Yes".
16. Click the "mountain" button on the Template.
17. Scroll the Options Field until you find the symbol "pencil"
18. Click the Options Field.
19. When you see the subsequent dialogue-box ("Superimpose...") click "Yes".
20. Click the the Clipboard Field.
21. Click the combine button on the template... This should be the result:



22. Choose the *Gloss* command from the *Draw* Menu.
23. Type in "HyperBliss" and click OK.

The Chart Utility

The Chart Utility enables you to design, create and edit your own Symbol-Displays. The utility features a special menu called "Chart" and 16 rectangle chart-fields that can hold one symbol each. The utility can import symbols from the Lexicon Stack, and receive exported ones from the Draw Utility.

The Chart Menu Commands

Import: Imports symbols from the Lexicon Stack.
Delete: Deletes a selected symbol.
Copy: Copies a selected symbol.
Move: Moves a selected symbol from one field to another.
Gloss: Allows you to change the gloss of a symbol.
Indicator: Allows you to change the indicator a symbol.
Reset: Cancels the Editing Mode.
Clear: Deletes ALL the symbols from the chart.
Print: Prints the chart (without the MenuBar).
Lexicon: Quits the Chart Utility and opens the Lexicon.
Draw: Quits the Chart Utility and opens the Draw Utility.
Quit: Quits the Chart Utility and opens the Main Menu.

Note: To enable the*Gloss, Indicator, Copy, Delete* and *Move* options on the *Chart Menu* you first must click and highlight one of the chart-fields which contains a symbol.

Importing a Symbol from the Lexicon Stack

1. Choose the *Import* command from the *Chart* Menu.
2. Type in the gloss of the symbol that you wish to import.

The symbols are imported with their default gloss only! HyperBliss, However, lets you change both the gloss and/or the indicator. (see Board: button "Import" for more details). If HyperBliss finds the requested symbol, it imports it to the chart and displays it in the first available field. However, if the imported symbol is not the one you wish to see on your chart, then all you have to do is to repeat the importation process until HyperBliss finds the desired symbol (if it indeed exists in the Lexicon).

Changing the Gloss of a Symbol

1. Click and highlight the field which contains the symbol that you wish to move.
2. Choose the *Gloss* command from the *Chart* Menu. [See Board: button "Import"].

Changing the Indicator of a Symbol

1. Click and highlight the field which contains the symbol that you wish to move.
2. Choose the *Indicator* command from the *Chart* Menu. [See Board: button "Import"].

Moving a Symbol from one field to another

1. Click and highlight the field which contains the symbol that you wish to move.
2. Choose the *Move* command from the *Chart* Menu and click OK.
3. Click the field to which to wish to move the symbol.

Deleting a Symbol from the chart

1. Click and highlight the field which contains the symbol that you wish to delete.
2. Choose the *Delete* command from the *Chart* Menu and click OK.

Copying a Symbol

1. Click and highlight the field which contains the symbol that you wish to copy.
2. Choose the *Copy* command from the *Chart* Menu and click OK.
3. Click the field to which you wish to paste the copied symbol.

Clearing The Chart

1. Choose the *Clear* command from the *Chart* Menu and click OK.

Printing The Chart

1. Choose the *Print* command from the *Chart* Menu and click OK.

The Cargo Utility

The Cargo Utility enables you to export data (i.e. symbols and their glosses) from the Lexicon Stack to an external ordinary text file (e.g. MacWrite™, MS Word™ etc.). The utility is equipped with a scrolling field and a special menu called "Cargo". Note: It is highly recommended that before exporting data to an external text-file you should familiarize yourself with the particular application and its environment.

The Cargo Menu Commands

Import: Imports data from the Lexicon Stack.
Clear: Clears all data from the scrolling field.
Lexicon: Quits the Utility and opens the Lexicon Stack.
Quit: Quits the Cargo Utility and opens the Main Menu

Importing and Exporting Data

1. Go to the Lexicon Stack.
2. Ensure that the MODE of all the entries which you want to print is set to [+].
3. Make a note of the *card-number* of the symbol that you want to head your data.
4. Make a note of the *card-number* of the symbol that you want to tail your data.
5. Return to the StampBook Stack via the Main menu
6. Choose the *Import* Command from the *Cargo* Menu.
7. If the Cargo Field is not empty then HyperBliss must clear it. Therefore click OK to continue. If you click *Cancel* then HyperBliss aborts the operation.
8. Click the type of data you wish to import:
   - "Symbols" imports Symbols only.
   - "Glosses" imports Glosses only.
   - "Both" imports Symbols and Glosses.
9. Type in the card -number of the symbol which is to head your data.
10. Type in the card-number of the symbol which is to tail your data.
11. Indicate whether or not you want the data to be imported with the background grid installed. Note that the background grid does not show on the screen. It shows only when the document is printed on a Laser printer.
12. When HyperBliss is done you get the message: *"Your Data is Ready"*. Click OK.
13. Select the relevant portion which you wish to import.
14. Copy [COMMAND-C] the selected data to th clipboard.
15. Choose the *Quit* Command from the *Cargo* Menu.
16. Quit HyperBliss.
17. Open the target application (e.g. MS Word™ 4.0).
18. Open the relevant text-file.
19. Paste the data [COMMAND-V].

Showing the imported Blissymbols in their true shape

1. Select the relevant text [i.e. characters which substitute for the Bliss forms].
2. Choose the *Character* command from the *Format Menu.*
3. Set the parameter to eithr BlissTemplate 40 or 80 and click OK.

The StampBook Stack

The StampBook Stack enables you to print your own HyperBliss-dictionary as stamps. You may print the whole, or smaller portions, of your symbol-Library. The stack comes with a special menu called "StampBook".

The StampBook Menu Commands

Titles: Allows you to customize the Title Page.
Import: Allows you to import data from the Lexicon Stack.
Clear: Clears imported data from the stack.
Print: Prints the entire stack as a stamp book.
Quit: Quits the StampBook Stack.

Customizing the Title Page

1. Choose the *Titles* command from the *StampBook* menu.
2. Answer the series of dialogue-boxes concerning *Language, Editor, Institution* and *Date.*

Importing Data from the Lexicon Stack

1. Go to the Lexicon Stack.
2. Ensure that the MODE of all the entries which you want to print is set to [+].
3. Make a note of the *card-number* of the symbol that you want to head your data.
4. Make a note of the *card-number* of the symbol that you want to tail your data.
5. Return to the StampBook Stack via the Main menu.
6. Choose the *Import* command from the *StampBook* menu.
7. If the stack contains some old data then HyperBliss must first dispose of it. Click OK to continue. If you click *Cancel* then HyperBliss aborts the operation.
8. Type in the card -number of the symbol which is to head your data.
9. Type in the card-number of the symbol which is to tail your data.
10. Indicate whether or not you want the data to be imported with the background grid installed. Note that the background grid does not show on the screen. It shows only when the document is printed on a Laser printer.

HyperBliss begins the importation process and lets you watch it as it happens on the screen.

Printing a StampBook Dictionary

1. Choose *Print* from the *StampBook* Menu and indicate in the subsequent dialogue-box whether or not you wish the printout to show the glosses.
2. Set the parameters of the printout in the subsequent dialogue-box shown to: [Full Size Cards; Split-Page Format], and click OK.

Conclusions

Chapter two has shown that if Blissymbols are taught semantographically (i.e. the inner-structure of compound symbols is clearly defined and their components are properly named), the perceived transparency and translucency of the symbols is significantly increased. A direct result of such a process is an increase in the learnability and memorability potential of the respective symbols.

Chapter three has demonstrated the high correlation between the semantic processing of compound Blissymbols and the perception of their inner-structure. In other words, a prior semantographic knowledge of the meaning-bearing components of Blissymbols facilitates the understanding of their total semantic value.

Chapter four, has found the semantographic approach to Blissymbol teaching compatible with a thinking skills model. Therefore, it seems that the implementation of this approach as a pedagogic tool can positively influence the cognitive development of Blissymbolics users because it can stimulate thinking processes and create an appropriate environment for gradual advancement of literacy and open thinking. Also in chapter four, it was proposed that the semantographic principle as the basis for a microcomputer-based retrieval technique could resolve the cognitive problems encountered by users of most present Blissymbol-interfaces. Because enabling users to access stored Blissymbols by referring to their semantic content and retrieve them by logically relating to some or all of their component parts is, in fact, an emulation of the natural way linguistic entities are generated, stored and recalled.

Chapter five presented **HyperBliss**, a microcomputer-based application for Blissymbolics. The interface through which the symbols are retrieved and manipulated operates on the semantographic principle, and it is augmented with additional intelligent capabilities.

The remaining question is what type of users can benefit from this interface. To answer that let us first consider the five Blissymbolics User-Models which have been developed over the years to assist in identifying AAC-dependent individuals who could benefit from this graphic system:

Model 1: Utilizing Blissymbolics as an expressive language augmenting a developed receptive native language.

Model 2: Utilizing Blissymbolics as an expressive language paralleling and contributing to the develop ment of native language.

Model 3: Utilizing Blissymbolics as a surface communication system.

Model 4: Utilizing Blissymbolics as an expressive language system that support the development of language, attentional and cognitive competencies basic to learning to read and that provides semantic, syntactic, graphophonic and strategic learning opportunities critical to the reading process.

Model 5:* Utilizing Blissymbolics as an expressive language system and as a representation system for semantic compaction, with its imagery and structure providing semantic, grammatical, syntactic and strategy associations for Minspeak™ and Words Strategy™.

(McNaughton, 1990)

** The fifth model was develope specifically for the use of Blissymbolics for semantic compaction encoding (i.e. within the Minspeak™ and Word Strategy™ (BMW) environment. McNaughton has developed Blissymbol-Component Minspeak™ Word Strategy ™ (McNaughton, 1990) as a Minspeak™ application programme which allows a cognitive manipulation and retrieval of Blissymols. BMW is a method of encoding using Blissymbols and their componet parts to designate the user's vocabulary. The pre-programmed coding of the symbols in BMW is based primarily on their component parts as well as on their semantic associations. Therefore, a competent use of BMW (i.e. a proficient encoding and retrieval of vocabulary items) depends, to a large extent, on the users' awareness and understanding of the inner-structure of their symbols.*

Since model **5** has been developed to accommodate a particular application, it is incompatible with **HyperBliss**. Neither is model **3**, because the communication component of **HyperBliss** is too powerful and involved to be used as a surface communication only as suggested by that model. Furthermore, an efficient and an effective operation of the present interface requires users to possess an understanding of the principles governing language in general and Blissymbolics in particular. Therefore, **HyperBliss** may not be suitable for use by individuals who haven't yet developed a receptive native language. On the other hand, the semantographic training and retrieving procedures of **HyperBliss** which emulate natural linguistic procedures could benefit model **1** type of users, as well as individuals who are in the process of developing their native language (i.e. model **2**). It has already been mentioned above that the trend in the AAC field, in recent years, has been to ensure that AAC systems are also used as means to help their users establish an adequate level of literacy. Quite clearly, this was the spirit in which model **4** was developed and proposed. In other words, model **4** is based on a recognition in the potential Blissymbolics has in serving as a convenient bridge between itself (i.e. a soundless meaning-based augmentative graphic system) and natural language reading (i.e. conventional orthographic and graphophonic systems). **HyperBliss** too was conceived with a clear intention to provide a supportive and opportune environment for users who need to move towards natural language reading. For instance, each appearance and selection of a symbol in **HyperBliss** is accompanied by its graphophonic representation. Also, any change made by the user to the indicator of a symbol automatically modifies the morphological and, of course, the phonological representation of the gloss.

A New Blissymbolics User Model

Finally, although **HyperBliss** is found to be sufficiently compatible with three of the five existing user-models, there is, nevertheless, a need for a new model which would highlight the immense potential inherent in the semantographic approach to the teaching and retrieving of Blissymbols as implemented in **HyperBliss**.

The proposed model which concludes this dissertation is based on the findings and conclusions included in its earlier chapters. According to the new model, individuals who have sufficient cognitive ability to learn the structure of Blissymbolics and relate to its principles can:

Utilize Blissymbolics as an expressive language system and as a natural environment for the implementation of the semantographic approach; turning the system's own characteristics, principles, imagery and structure into:

1. ***a powerful pedagogic tool to stimulate thinking processes and develop the thinking skills necessary to the acquisition and advancement of literacy.***
2. ***an efficient and cognitively consistent access to the entire Blisssymbol vocabulary - thus exploiting its full communication potential.***

Concluding Remarks

I hope the findings of the present thesis will encourage therapists and educationalists who work with Bliss-users to accept the semantographic approach to the teaching of Blissymbols and initiate further clinical investigations in pursuit of the most practical way to implement in their routine field work the philosophy which is summarized in the "Sixth Blissymbolics User Model". It is also my hope that the relevant AAC professionals along with their clients would learn to extend the use of **HyperBliss** to its full potential, so the work of the former would be less difficult, and the language development, cognitive skills and communication performance of the latter would be enhanced.

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Notes

1 Shirley McNaughton: Executive Director of Blissymbolics Communication International [BCI] until 1989, and recipient of "The Order of Canada" in 1989 for her contribution to the field of Special Education.

2 The Ontario Crippled Children Centre: is presently known as "The Hugh Macmillan Medical Centre".

3 The system of Blissymbolics, its syntax and some useful strategies are described in length and detail in the following sources: Bliss, 1965; Blissymbolics Communication Institute, 1985; McDonald, 1980; McNaughton, 1985.

4 The Key Symbols are listed in Appendix A.

5 See definitions in Verburg, 1982; Luftig, 1983; Musselwhite & Ruscello, 1984; Luftig & Bersani, 1985; Yovetich, 1985; Blackstone, 1986; Fuller, 1987; Yovetich & Young, 1988; Lloyd, Schlosser & Quist, 1990.

6 For a description of the McNemar Test see Conover, 1971, pp. 127-130; See also page 11 herein.

7 Standard 8 in South Africa is the equivalent of grade 10 in North America.

8 See page 10 for the definitions of HRHC and LRLC.

9 The 30 Symbols appear in Table 1 on page 10.

10 This section is based on an interim report submitted to the Department of Biomedical Engineering, Medical School, University of Cape Town (Shalit, Boonzaier, Underhill & Williams-Short, 1988).

11 Students in their final year in high school in South Africa.

12 The stress figures for the present configurations are listed in Table 8 - page 25.

13 For citations see pp. 8, 9.

14 See pp. 16, 21.

15 Robert Gagne's hierarchy of thinking skills, adapted by June Bigge in Curriculum Based Instruction for Special Students. Mayfield Publishing Company,Mountain View, California, 1988, p. 194. The Model was presented by Shirley McNaughton during her lecture at the Blissymbol Affiliate Meeting in Östhammar, Sweden, August 17-19,1990.

16 These principles were presented and discussed by Claudia Wood during the session on Guidelines for New Panel Members, at the meeting of the International Panel in Jerusalem, August 20, 1990.

17 See Appendix B - Blissymbolics and Technology.

18 A limited exception to this statement is discussed in Appendix C - "Toulotte's Acceleration Method Using a Dictionary Access in a Blissymbolics Communication". See another example in Appendix D - "Mineo's Blissymbol Communication.

Appendix A

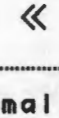
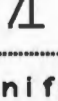
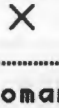
Key Symbols

Appendix A lists the "Key symbols" which represent primary meanings or concepts, and are used repeatedly to generate additional Blissymbol vocabulary. Not only that these symbols demonstrate the genertive capabilities of the system of Blissymboics, but also provide the key needed by users to decipher existing Blissymbols. The list below is by no means definitive. If necessary, new "key symbols" may be added, in the future, to the system in order to accommodate the inclusion of new vocabulary items.

*Aappendix A is adapted from **"Key Symbols Worksheet and Explanations"** (26.10.90), by Ms. Claudia Wood, former System Coordinator, Blissymbolics Communication Interntional [BCI].*

fire	medical	water	feeling
cloth	cloth-ing	house	ear
up	down	forward	back-ward
gather-ing	wheel	vehicle	sun
mach-ine	day	head	life
be	time	money	flower

child	mouth	food	combine
eye	light	colour	fruit
veget-able	veget-able	note	mind
know-ledge	month	conta-iner	fly
bird	past	future	hair
body	bread	leaf	tree
grass	enclo-sure	thing	mater-ial
waste	chemic-al	paper	book
room	public room	open	make

cause 	dot 	part 	protection 
about 	by 	for 	against 
person 	standing 	big 	small 
help 	and 	belongs to 	group 
knife 	creation 	God	woman 
work 	male 	opposite meaning 	electricity 
nose 	taste 	sky 	minus 
electro magnetic radiation 	hand 	tool 	evaluation 
earth 	equal 	long 	short 

animal	insect	legs	action
arm	line	pen	delete
limits	it	pointer	relativizer
intensity !	what ? ?	1	2
3	4	5	6
7	8	9	0
		?	

Appendix B

Blissymbolics & Technology

Appendix B contains a list of currently available commercial and noncommercial products (i.e. programmes and applications) designed to enhance communication and literacy through Blissymbolics. The list includes contact names and addresses from which further information could be obtained.

Canada

Blissymbolics Communication International
250 Ferrand Drive, Suit 200, Don Mills,
Ontario, canada, M3C 3P2
Tel: (16) 421-8377 Fax: (416) 696-1035.

* **AccessBliss** (Macintosh),
  developed by Russel Galvin of Geliefan Enterprises & Fraser Shein of the Hugh MacMillan Medical Centre.
* **BlissTemplate Font** (Macintosh),
  developed by Dr. Peter Reich, University of Toronto.
* **BlissBook** (ICON)
  developed by DADA.
* **Bliss Skills** (Apple II series),
  developed by the vocational and Rehabilitation Research Institute, Calgary, Alberta.
* **Blisspen** (Apple II series)
  developed by BCI and the Augmentative Communication Service of the Hugh MacMillan Medical Centre.
* **Blissymbol Component-Minspeak™ Word Strategy™**
  developed by Shirley McNaughton.
  A Minspeak™ Application Program
  to be distributed by Prentke Romich Company.
* **MECC Bliss Training** (Apple II series)
  developed by Florence Wirtz, Minnesota.
* **Talking Bliss Apple** (Apple II series)
  developed by the Trace Research Centre, University of Wisconsin.
* **StoryBliss** (Macintosh)
  developed by Russel Galvin of Geliefan Enterprises & Shirley McNaughton.
* **Voici** (Macintosh)
  developed by Dr. Peter Reich, University of Toronto & Fraser Shein of the Hugh MacMillan Medical Centre.
* **BlissTel** (Apple IIe)
  developed by IDON Corporation.

Danmark

* **DanBliss II** (Amiga)
  developed by Bliss Kommunikation Danmark.
  Kongeveyen 252, 2830 Virum, Danmak

Finland

* **Personal Bliss** (IBM PC)
  developed by Timo Hassi.. *NormicGraphics Ltd.*
  Heimotie 18, 29600 Noormarkku, Finland
* **BlissMaster** (Macintosh)
  developed by Hanna Usenies & Kaarina Vuoriso of Keski-Souomen Future Oy
  Folkhasans Kommunicationscentrum
  Topeliusg 20, 000250 Helsinki, Finland
* **HandiTalk** (electronic interface)
  developed by Pikosystems Ltd. Finland

Germany

* **Programmable Communication Aid with Bliss**
  developed by Manfred Pischke & W. Rossdeutscher
  Spastikerhilfe Berlin e.v.
  Prethauer Pfad 23, 1000 Berlin 45, Germany

Iceland

* **Isbliss** (IBM PS/2)
  developed by Fridrik Skulsason and Jon Magnusson
  JHM Hnjukasel 9, 109 Reykjavik, Iceland

Italy

* **A.P. Bliss** (IBM PC)
  developed by prof. M. Somalvico and Antonio Thovazzi
  AICA via Aurelio Saffi 8, 2013 Milano, Italy
* **Kiki** (IBM PS/2)
  developed by Sergio Lo Travato
  INFO SUD via Colle del Pino 1/F, 9512 - Catania, Italy

Norway

* **BlissPerfect and NorBliss**
  developed by Frode Rustoy *The Norwegian Datasecretariat, Ministry of Education and Reserach*
  Mollergt. 23-25 P.O. Box8185 Dep., 0034
  Oslo 1, Norway Fax: 47-2-349541

Sweden

* **BlissTalk** (VOCA)
  developed by the *Royal Institute of Technology in Stockholm: Rehabmodul AB*
  Vintervagen 41 s. 171 35 solna, Sweden

United Kingdom

* **SYNREL**(BBC)
  developed by Malcolm Hind, *Edge Hill College St. Helens Rd., Ormskirk, Lancashire, L39 4OP England*

United States

* **Wolf, ScanWolf** (VOCA)
  developed by Greg Turner, ADAMLAB, WCISD
  33500 Van Born Road, Wayne, MI 48184 USA.

*The list was distributed by **BCI** during the Blissymbol Affiliate Meeting in Östhammar, Sweden, August 17-19, 1990.*

Appendix C

*Toulotte's Acceleration Method Using a Dictionary Access in a Blissymbolics Communicator**

Appendix C briefly presentes and discusses Toulotte's Blissymbol-Retrieval Method is in relevance to the semantographic method used in HyperBliss.

A team of researchers, lead by Professor J.M. Toulotte, at the *Université Des Sciences et Techniques, De Lille Flandres-Artois, France*, has developed a dictionary access method permitting acceleration of Blissymbol-retrieval by users of a microcomputer-based Blissymbolics-Communicator. Users of the Toulotte's designed communicator retrieve stored Blissymbols by selecting the relevant components of a desired symbol (not necessarily in their order of appearance) from a classical row-column menu. With each selection the number of the corresponding Blissymbols is evaluated, and when it is suffciently small, a menu of symbols is offered to the user to choose from (Toulotte et al., 1990).

Indeed, the Toulotte's team too arrived at the conclusion that retrieval of Blissymbols through intentional reference to their component-parts is potentially very effective. However, they had based the rationale for their method on the advantageous combination of a computational technique such as the binary search, and an interface environment controlled by an Object Oriented Language. Not withholding, of course, credit from their valuable work, it should, however, be pointed out that their approach is purely mathematical, unlike the relatively similar proposed semantographic method for which the present study has established a sound cognitive and pedagogic theoretical basis!

* *The first time any information concerning the work done by Prof. Toulotte's team was made public was at the morning session on "Graphic and Other Aided Symbols" on the fourth day of the Fourth Biennial International ISAAC Conference on Augmentative and Alternative Communication, August 12-16, Stockholm, Sweden. A member of the Toulotte's team kindly left a copy of the paper he delivered on behalf of the his team with the present author who chaired the aforementioned session.*

Appendix D

Mineo's Blissymbol Communication Device*

Appendix D contains a brief summary of Mineo's manuscript: *"A New Blissymbol Communication Device."* Both the rationale and the mechanism of her proposed device strengthen the argument for the present semantographic technique.

In her manuscript, Mineo proposes a communication device by which users would access a large body of stored Blissymbols through reference to the "key symbols" from which all Blissymbols are constructed. Although the concept is very similar to that of **HyperBliss**, the retrieval procedure itself is somewhat different. With Mineo's device, to retrieve a symbol, the user would have to select the components which comprise it. The components would then appear in their order on the screen, and the user would have to activate an automatic "mixer" which would systematically present (in order of frequency of use) the various possible configurations of the selected components. When the target symbol is finally selected there would be an auditory presentation of all the possible synonymous glosses associated with the symbol (again, in their order of frequency of use). The user, of course, would be required to select the relevant one. Additional keys could be programmed to store and present, on request, personal frequently-used utterances.

HyperBliss users do not have to point at all the components which form the symbol. Pointing at one of them is enough. **HyperBliss** highlights the selected component and automatically offers the user a list of optional symbols which contain that component (naturally, the options are ordered in the user's own recency/frequency of use). The user then can either select a symbol, scroll the options-field, or, point at another component. In doing so the user instructs the system to offer a new list of symbols which contain the new combination of component-parts. Upon selection of the target symbol **HyperBliss** prompts with its default gloss. The user is free to replace the gloss with one of its synonyms, or change the symbol indicator and subsequently the grammatical representation of the gloss. **HyperBliss** too, allows users to store frequently used phrases. However, both the storage and the retrieval of the phrases are done semantographically (very much within the spirit of Bruce Baker's **Minspeak™** concept).

Mineo acknowledges that retrieval through reference to the "key symbols" which compose Blissymbols would necessitate great familiarity with the system. But she sees no particular drawback in this prerequisite. In fact, she argues that this type of retrieval mechanism could help vocabulary building and serve as a *teaching-aid* for presenting the combinatorial rules and possibilities of the Blissymbol system itself.

A great dea of her argument is also applicable to **HyperBliss.** The semantographically-based teaching-aid component of **HyperBliss** is designed to make users become familiar with the inner-structure of the symbols they use and coaches them to "think" in Blissymbolics. Incidentally, this familiarity with the Blissymbol system is, of course, necessary for a proficient operating or handling of the semantographically-based retrieval mechanism which is offered by **HyperBliss.**

* *During the Third Biennial International ISAAC Conference on Augmentative and Alternative Communication which was held in October 1988 at the Disneyland Hotel, Anaheim, California, Dr. Carrie Brown introduced me to Dr. Beth Mineo of the Applied Sciences and Engineering Laboratories, University of Delaware and the A.I. duPont Institute. In a subsequent meeting, on the next day, I presented Dr. Mineo with the results of the Multidimensional Scaling Study and with my ideas concerning a new interface for Blissymbol-Retrieval which is based on a cognitive semantographic technique. Dr. Mineo told me of a manuscript she had prepared a few years back when she was still an undergraduate student. In that manuscript she proposed a stand alone Blissymbol communication device that was suppose to be operating on a similar principle to the one I was proposing. As I was excited to hear that she too thought that the idea of retrieving Blissymbols semantographically had a potential of being effective, I asked her to send me the manuscript which she had never published or discussed at any public meeting. Several months later, Dr. Mineo indeed sent me the requested manuscript. At that point, HyperBliss, the interface which I designed, was already in its Beta form. I, nevertheless, decided to cite and discuss Mineo's manuscript here because the rationale and the principle of her proposed device strengthen my argument for the semantographic technique. In addition I felt it would do a humble justice to a good idea which for some reason did not materialized.*

Appendix E

The contents of this appendix are adapted from the original **HyperBliss User's Guide** - © Ami Shalit, July 1990. HyperBliss and its User's Guide is available from lissymbolics Communication International.

HyperBliss - Credits

HyperBliss: HyperBliss 3.0 © was conceptualized, designed and specified by Ami Shalit, Department of Biomedical Engineering, Medical School, University of Cape Town and Groote Schuur Hospital.

Project Supervisor: Dr. David A. Boonzaier, Department of Biomedical Engineering, Medical School, University of Cape Town and Groote Schuur Hospital.

Programming: Michael Brand, Tony Stein and Marion Baxter, Department of Computer Science, University of Cape Town; and Ami Shalit.

Project Coordinator: Ami Shalit

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* Mr S. Yach, Chairman, The Mauerberger Foundation, Cape Town, RSA.
* The Foundation for Research Development, Pretoria, R.S.A.

Dr. David Boonzaier, Shirley McNaughton, Dr. Peter Reich, Dr. G.C. Vanderheiden, David Kelso, Judy Wine, Claudia Wood, Katherine Seybold and her BCI staff, Jinny Storr, Michael Brand, Tony Stein, Marion Baxter, Dr. M. Linck, G. Rockwell, Annalu Waller, Dr. Patti Wickens, Roger Godwin, Bernice Lambert, Mary-Ann Lloyd, Val Sharkey, Cathy Hole, and Estelle Godden.

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9 Raul Wallenberg St. # 27, Har ha-Carmel, Haifa,
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Blissymbolics Communication International
250 Ferrand Drive Suite 200, Don Mills,
Ontario, M3C 3P2 Canada.
Tel: + (416) 421-8377 Fax: +(416) 696-1035

HyperBliss - Technical Notes

Knowledge Requirements: A basic working knowledge of the Macintosh™ is assumed for the person installing HyperBliss. However, it is suggested that instructors, teachers and therapists who plan to use HyperBliss should become familiar with elementary Macintosh™ terminology and operations (e.g. back-up, copying a file from and to a disk, pull-down menus, etc., etc.).

Hardware Requirements: Apple® Macintosh™ Plus, SE, SE30 or any Mac II (with at least 1MB RAM and a Hard Disk).

Software Requirements:
1. HyperCard™ (version 1.2.5).
2. Fonts: BlissTemplate - 40, 80; Keystroke - 40. Monaco -9,12; Geneva - 9,10, 12, 14,18 & 24.
3. Macintalk™ (Without it HyperBliss will CRASH !!!)

First Steps:
1. Drag the HyperMacintalk™ icon into your System Folder and restart your Macintaosh™.
2. Use a DA-Font Mover™ to open your System File and install the Fonts.
3. Create a new folder for HyperBliss.
4. Copy all HyperBliss Stacks from the 3.5" diskettes into the newly created folder .
5. Back-up your HyperBliss stacks.
6. Read the contents of the manual.
7. Customize your Lexicon Stack.

Problem Shooting: If you run into problems (i.e. strange system messages relating to script etc.):
1. Quit HyperBliss and HyperCard™.
2. Re-Start HyperBliss.
3. Try to execute the same routine again.

If it doesn't help: Trash HyperBliss and copy the stack from your original diskettes. If this fails to redeem the situation then phone, fax or write to us. We will do our best to solve the problem.

Never change the NAMES of the stacks or tamper with the SCRIPTS.

Always start HyperBliss with the MENU STACK.