

A SELF-ACTUALISING LEARNING PROGRAMME –  
AN EDUCATIONAL NEUROPSYCHOLOGICAL PERSPECTIVE

by

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submitted in part fulfillment of the requirements for the degree of

MASTER OF EDUCATION (SPECIALISING IN GUIDANCE AND COUNSELLING)

in the

DEPARTMENT OF PSYCHOLOGY OF EDUCATION

at the

UNIVERSITY OF SOUTH AFRICA

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NOVEMBER 2001

**DECLARATION**

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I declare that

**“A SELF-ACTUALISING LEARNING PROGRAMME –  
AN EDUCATIONAL NEUROPSYCHOLOGICAL PERSPECTIVE”**

is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

.....  
**MRS R FERRARO**

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**DATE**

A SELF-ACTUALISING LEARNING PROGRAMME –  
AN EDUCATIONAL NEUROPSYCHOLOGICAL PERSPECTIVE

**SUMMARY**

This study has examined the effectiveness of a neuropsychologically based learning programme aimed at enhancing the self-actualisation of learners. The aim of the programme is to create awareness of one's unique purpose in life. The need for motivation, commitment and determination must be realised. Holistic thinking is an important concept throughout the programme, in that it is aimed at unlocking latent potential through the encouragement of lateral thinking. The awareness of underlying potential enhances the realisation of each learner's uniqueness and individual contributions to society, and facilitates awareness of the need to accept responsibility for one's own future. This failure to fully utilise the potential of the brain has implications for education. A teacher who is made aware of the huge untapped storage of human brain potential could be trained to disclose a learner's unused abilities, through adjusted education, thus informing learners of the intrinsic abilities of their brains.

**Key Terms:** self-awareness, self-actualisation, neuropsychology, neuropsychological functioning, potential, latent potential, an educational perspective, a learning programme, lateral thinking.

## **DEDICATION**

This dissertation is dedicated to my husband, Don.



## ACKNOWLEDGEMENTS

I wish to express my sincere appreciation and gratitude to all who have assisted me in the completion of this study. I am particularly indebted to:

- ◆ My husband, Don, who has supported me throughout my years of studying.
- ◆ My dear friend Linda Maritz, who provided continued moral support, prayers and statistical expertise.
- ◆ My children for their patience.
- ◆ My mother, sister and brother for their constant encouragement.
- ◆ Doctor Kruger, my supervisor, for her guidance.
- ◆ Karlien de Beer from the UNISA library for her contribution to my literature survey.
- ◆ All participants in this study.

In memory of my father who died on 18 May 2001

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# CHAPTER 1

## ORIENTATION

### 1.1 INTRODUCTION

The dramatic increase in information and technology in the 20<sup>th</sup> Century was accompanied by a need to know more about the physical structure and functioning of the brain. This was the point of departure for neuropsychology, which studies the connection between the physical brain and the mental mind, a science of which Luria is an important preceptor. Neuropsychology studies the working human brain and the human mind (Luria 1973:341-344), connecting human behaviour to the functioning of the brain. In this field of study, the neuropsychological study of brain lesions has been the most important source of knowledge regarding the organisational functioning of the brain (Luria 1973: 341-344).

The human brain is far superior to the brains of other living organisms and is certainly the most amazing mechanism on earth. It has the ability to collect, store and manipulate a vast mass of information, both from the outside and inside. However, it appears that the majority of people are quite content to limit their brains, and thus themselves, to superficial challenges and modest achievements (Johnson & Daumer 1993:267). The lack of comprehension of the incredible potential of the human brain can be attributed to the untapped potential of most human beings (Buzan 1989:10).

This failure to fully utilise the potential of the brain has implications for education. A teacher who is made aware of the huge untapped storage of human brain potential could be trained to disclose a learner's unused abilities, through adjusted education, thus informing learners of the intrinsic abilities of their brains. Buzan (1989:10-21) describes the magnitude of the brain in the following way: "If we need a 1000 page manual to instruct us on how to use a one megabyte computer, what kind of manual do we need for our brain, with its million, million cells, of which even one cell is more intelligent than a computer?" In accordance with this knowledge of the brain's potential, it may therefore be assumed that if learners had knowledge about their brains' potential, this could lead to

improved perception of their abilities, thus enhancing motivation and resulting in greater achievement.

The society in which we live places much value on achievement. Hamachek (1995: 324) reports how research has shown that our achievements as individuals are more or less consistent with how we view ourselves. In modern society, learners are finding it more difficult to achieve, because of the increasing workload and advanced technology. This in turn has a negative effect on learners' self-esteem, which in turn affects their ability to self-actualise, and thus learn and grow towards the goal of becoming responsible, independent adults.

## **1.2 INITIAL AWARENESS OF PROBLEM**

During teaching experience, the researcher became aware of the lack of motivation, low general and academic self-esteem and lack of self-awareness of learners as well as the inability to study on the one hand, while on the other, the increasing work and study load due to the increasing amount of information and technology available. In addition, classroom situations reveal reports from teachers regarding their own feelings about teaching and their own lack of motivation as well as lack of motivation on behalf of learners.

Questions such as "Why are children not motivated?" and "What is lacking in the education system?" were prominent in the researcher's mind during this time. The researcher had just finished a neuro-anatomy and neuropsychology course as well as a study method course. The knowledge of the brain structure and functioning added more insight to the application of study methods and the researcher decided to implement certain techniques to enhance personal achievements. This proved to be successful. Therefore the question "Can this be applied to school learners with the same effect?" arose in the researcher's mind. Although the researcher does not claim to be able to address the above-mentioned issues, for which there may be various reasons, the research study was an attempt to provide a possible solution to the problem. One problem that seemed

apparent was generally most teachers' resistance to embrace the new Outcomes Based Education (OBE), which provided the perfect setting for the implementation of the learning programme that the researcher had in mind.

### **1.3 EXPLORATION OF AWARENESS OF PROBLEM**

While teaching "Life Orientation" at a particular school where the new education system, "Outcomes Based Education" (OBE) has been implemented, the researcher was fortunate enough to be able to conduct a pilot study, with the assistance of the school principal and guidance from a neuropsychology lecturer. Life Orientation enhances the practice of positive values, attitudes, behaviour and skills in the individual and the community. It also aims at promoting the achievement of individual learners' potential by strengthening and integrating their self-concept, their capacity to develop healthy relationships, their ability to make informed and responsible decisions, independency, critical and creative thinking, survival and coping skills, commitment to life long learning and pleasure in the expression and co-ordination of their intellectual, physical, spiritual, emotional and moral powers (Department of Education 1997).

This pilot study was directed towards determining the effectiveness of knowledge of basic brain structure and functions on learners, while enhancing their self-awareness and encouraging lateral thinking (as described in chapter 3), for learning and study purposes. During the lessons the following topics were discussed with learners:

- the importance of knowledge about themselves or self-awareness
- ways in which they would be able to unlock their potential, by encouraging lateral thinking, motivation, determination
- awareness of brain structure and functioning, in terms of learning, memory, retrieval of information and the impact that anxiety and other emotions have on brain functioning

The pilot study revealed that in terms of the afore-mentioned topics, learners were unaware of the importance that these impacted on their learning ability. In addition, the



researcher had the opportunity to expose learners to the marvels of the workings of the brain. This exposure was very effective in that when learners were made aware of brain structures and functions, they were better able to use their brains to their maximal potential. This intrigued them and, surprisingly, they were able to grasp rather difficult concepts.

From the above, the researcher established that a neuropsychological approach might prove useful in researching the following problems:

- whether learners could be made aware of their potential through this approach
- whether the provision of positive experiences for learners could enhance self-concept
- whether increased self-awareness could enhance self-motivation and determination
- whether awareness of brain structure and functioning will have an effect on self-concept, values, study habits and attitudes towards learning
- whether the encouragement of lateral thinking, as part of the learning approach, could result in positive changes in attitudes to study

#### **1.4 LITERATURE SURVEY**

This study is concerned with the impact that knowledge of the physical structure and functions of the human brain may have on the psychological lives of the learners in education, on their journey towards self-actualisation. According to Du Plessis (1994:22), the psychological functioning of the learner in education is the central construct in educational psychology, and is operationalised in terms of self-actualisation.

Research has shown that the self-concept is an integral part of self-actualisation. Self-concept indicates an understanding of oneself. Three interdependent components (identity, action and self-esteem) are used to evaluate the self. Self-knowledge enables a learner to know who s/he is (identity). The learner's evaluation of personal identity, action and self-esteem gives rise to the self-concept.

Self-concept formation is determined by the extent to which children are guided and supported towards significance attribution, purposeful involvement and positive experience of the self as a unique being with a unique purpose. In addition, self-concept consists of self-understanding, which is one's definition of who one is, and self-esteem, which is one's sense of self-worth. According to Harter (Sternberg 1995), self-esteem is based on one's judgment about one's own worth in various domains of differing importance; older children see themselves as functioning in more domains than do younger children. People also base their self-esteem on other people's judgments of them.

Children who underestimate their abilities tend to have more problems in school and social life than children who do not. Various studies have shown a positive correlation between the self-concept and intellectual development (Raath & Jacobs 1993:3). On the other hand, these studies also indicate that there is a strong link between a negative self-concept and underachievement. It appears that a negative self-concept can cause the learner to underachieve, which in turn creates a feeling of inferiority in the child.

Whereas self-concept is the cognitive part of self-perception, self-esteem is the affective dimension of self-perception. That is, not only do we have ideas about what or who we are, but we also have feelings about what or who we are. Self-concept is the purely descriptive aspect of our self-perceptions. Self-esteem, however, is the evaluative component of our self-perceptions. Self-esteem, then, is constructed by means of self-evaluation of the things we do, of who we are and what we achieve in terms of our private assessment of the goodness, worthiness and/or significance of these things. Out of all of this emerges what is commonly referred to as personality --- the part of us involved in our journey towards self-actualisation (Hamachek 1995: 326).

Vrey (1979:25), writer and author of "The self-actualising educand" and leading authority in the fields of 'self-concept' and 'self-actualisation', emphasises the role that education and educators play in the actualisation of children's potential – accordingly, he sees the goal of education as assisting children in becoming mature and growing to their full potential. Both Vrey (1979:39), and Rogers (Meyer, Moore & Viljoen 1997: 442), would emphasize the role that education and educators play in building children's self-esteem,



thereby contributing to the formation of their positive self-concepts and the actualisation of their potential (Du Toit & Kruger 1993:144). Self-actualisation in children is understood as enhanced self-awareness, increased positive self-concept, creative thinking, effective learning and the ability to manage emotions and behaviour and ultimately unlock and actualise their potential. Children, according to Vrey (1979:39), are capable of actualising their potential. The actualisation of potential in children is thus identified when children attribute positive meaning to their relationships with themselves and their peers, to their relationships with objects and ideas in the world around them as well as to their relationship with God. When they are intensely involved in these relationships and experience them positively, this contributes to the formation of a positive self-concept, which in turn enables these children to achieve self-actualisation.

The relationship between body and mind and between the physical brain and its neuropsychological functioning has interested many researchers. Neuropsychology, according to leading neuropsychologist, Luria (1973:334), affirms the link between body and mind in its use of the occurrence of brain lesions and analyses of psychological changes resulting from these lesions, which indicate neurological structures linked to specific functions. Neuropsychology has provided greater insight into processes of perception, memory, learning, problem solving and adaptation (Walsh 1994:21).

Vrey's (1979:39) description of self-actualisation emphasizes the association between body and mind, in which self-actualisation is defined as a synthesis of the physical, psychological and educational aspects. Therefore, learning methods can be implemented according to a specific desired neuro-psychological function, based on the physical structure and function of the brain, with the intention of achieving specific educational objectives in the form of specific educational outcomes (Du Plessis 1994:33).

In this study, the focus will fall on the neuropsychological functioning of the human brain and its relation to self-actualisation, using a directed learning approach in an attempt to unlock latent potential. The researcher aims to encourage the unlocking of learners' latent potential by creating insight through knowledge of themselves and their capabilities. A

neuropsychological approach will be adopted during the learning process, which focuses on the learners' self-concept, values, study habits and attitudes with the ultimate goal being the enhancement of the self-actualisation of the learner.

## **1.5 STATEMENT OF THE PROBLEM**

Asking questions should elucidate the problem to be studied further:

1. Are learners able to be made aware of their potential by employing a neuropsychological learning approach?
2. Will the provision of positive experiences for learners, enhance the self-concept of learners?
3. Will increased self-awareness enhance self-motivation and determination?
4. Will knowledge/awareness of brain structure and functioning have a positive effect on self-concept, values, study habits and attitudes towards learning?
5. Will the encouragement of lateral thinking as part of the learning approach, result in positive changes in attitudes to study?

## **1.6 AIM OF THE STUDY**

### **1.6.1 General Aim**

The general aim would be to determine the effectiveness of an educational neuropsychological learning programme in the assistance of learners in their development towards self-actualisation.

### **1.6.2 Specific Aims**

Specific aims include:

1. Conducting a literature study of self-concept, self-actualisation, educational conditions relating to self-actualisation, general learning theories, existing learning programmes with a neuropsychological perspective and neuropsychology

2. Developing a learning programme aimed at unlocking the potential of learners through neuropsychological educational methods.
3. Testing the validity of such a programme through various pre-tests and post-tests measuring study habits and attitude, values, and self-concept as constructs of self-actualisation.

### **1.7 HYPOTHESIS**

By implementing a learning programme aimed at unlocking learners' potential, through self-knowledge enhancement and neuropsychological awareness, not only will learners' attitudes to learning, values and study habits be positively affected but also their self-concepts as a construct of self-actualisation will be enhanced.

### **1.8 DELIMITATION OF FIELD OF STUDY**

This research is aimed at investigating whether a learning programme aimed at unlocking the potential of learners through neuropsychological educational methods, will result in enhanced self-concept, values and greater awareness in terms of study habits and attitudes. Le Francois (1997:239) suggests that learning involves different cognitive processes as well as the manifestation of competencies in various areas of human functioning. Therefore multiple learning criteria underlie the need to encourage the development of competencies in these areas and are essential in enabling the teacher to assess the value of the learning that has taken place during the intervention (learning programme). The aim of these criteria is to measure the efficacy of an intervention in terms of its contribution to educational goals. However, it is not possible in this investigation to measure the total contribution of the learning programme because of the enormous diversity of activities within the school curriculum. Therefore, these aspects of self-growth and independence will be measured in the form of the instruments, a) adolescent self-concept scale (ASCS), b) values scale (VS) and c) survey of study habits and attitudes (SSHA).

Pre-tests and post-tests will be administered to one hundred and twenty three English-speaking and second-language English Grade 7 learners, from Freeway Park Primary



School, a mixed cultural and gender school. This is a large, middle socio-economic status school with 840 learners. The neuropsychological programme is thus limited to Grade 7 learners.

## **1.9 METHOD OF RESEARCH**

The research method will be aimed at conducting standardized pre-tests to gauge the values, study habits and attitudes as well as self-concept of five classes of Grade 7 learners. The learning programme will then be implemented in three of those classes (three treatment/experimental groups). This will take place once a week over a six-month period of the academic year. Two comparison/control groups will not be exposed to the programme. Post-tests will then be administered to all five groups, at the end of the six months. A quantitative analysis procedure will be used to determine the effectiveness of the programme, in terms of values, study habits and attitudes, and self-concept. The implementation of O.B.E. to the Grade 7's prevents the acquisition of subject marks, as a form of measuring academic achievement, for the researcher to use as an assessment tool.

## **1.10 CLARIFICATION OF CONCEPTS**

### **➤ *Self Awareness***

This is "the condition of being aware or conscious of oneself – in the sense of a relatively objective but open and accepting appraisal of one's true personal nature" (Reber 1995:701).

### **➤ *Self-actualisation***

This is defined as "the continual striving towards fulfillment of one's purpose in life, towards unlocking one's optimal potential in the process of making one's life meaningful to oneself and significant others. This includes a healthy image of self (positive self-concept) and the ability to empathetically reach out to and serve others during life" (Vrey 1979:40).

➤ ***Neuropsychology***

This is defined as “the branch of Psychology concerned with the effects of disorders of neurological function or structure. Increasingly, the correlation is being drawn between demonstrable brain changes and the resulting effects on the mind” (Oxford Medical Dictionary 1996:444).

➤ ***Neuropsychological Functioning***

The neuropsychological functioning of the brain include all our plans and goals, all feelings, fears, joys and pains, all perceptions, imagery, fantasies, memories and thoughts and all expressions, activities and actions (Oxford Medical Dictionary 1996:444).

➤ ***Potential***

This is defined as “a present set of circumstances that suggests a latent ability; characteristics that are used to infer that some property or talent not currently manifested will develop or be learned” (Reber 1995:584).

➤ ***An educational perspective***

This is described by Vrey (1979:25) who emphasizes the role that education and educators play in the actualization of children's potential – accordingly he sees the goal of education as “assisting children in becoming mature and growing to their full potential”.

➤ ***A learning programme***

This is a programme adapted to assist learners during learning and studying (researcher).

➤ ***Lateral Thinking***

This is a way in which an individual attempts to look at a problem from many angles rather than search for a direct head-on solution (Reber 1995:410).

## 1.11 EXPOSITION OF STUDY: OUTLINE OF CHAPTERS

### ➤ *Chapter 1: Orientation*

This chapter provided an orientation of the title of this dissertation, “A self-actualising learning programme --- an educational neuropsychological perspective”.

### ➤ *Chapter 2: Literature Study*

Literature on the relevant topics, such as self-concept, self-actualisation, learning theories and learning programmes with a neuropsychological perspective will be explored.

### ➤ *Chapter 3: Literature Study – a neuropsychological approach*

A theoretical foundation in terms of brain structure and functions as well as neuropsychology is provided to support the proposed foundation for the self-actualisation of the learner through a learning programme as an educational intervention

### ➤ *Chapter 4: Development of a Neuropsychological Learning Programme*

The programme is based on a neuropsychological framework of self-knowledge and awareness, brain awareness, self-management and emotional control, note making, reading, listening and examination preparation.

### ➤ *Chapter 5: Research Design*

This chapter will focus on the research design and methodology in the investigation.

### ➤ *Chapter 6: Results and Findings*

This chapter is concerned with the statistical analysis of the data, and interpretation of the research results.

### ➤ *Chapter 7: Conclusion*

The implications of the outcomes of the programme as well as recommendations will be discussed in this chapter.



## 1.12 IN CONCLUSION

With neuropsychology as a rapidly expanding and relevant discipline, there appears to be an increasing need to incorporate this discipline into the education system as part of the self-actualising process.

While there is a need to improve the quality of education, and self-actualisation has been the target, Riffel (1987:1-5) notes that an important measure in doing this, is to enhance motivation of teachers as well as learners, as well as provide support of teachers, in terms of access to valid information, expert advice and experiences relevant to their settings. Unfortunately, as Meier (Reader for ODI411-E 1995:145) accurately notes, "The habits of schooling are deep, powerful and hard to budge". The implementation of new facilitating and active learning processes is not going to happen overnight, and the change requires more than the effort of any one educationalist.

Furthermore, Meier (Reader for ODI411-E 1995:145) says that change will depend on the seriousness of our need to change and to have the public backing. She further explains that, for change to occur and true active learning and facilitation to take place, the daily experiences of teachers will need to change. "Education should be viewed as not only a means to an end, but also as a process that enhances social development and self-actualisation" (Pardeck, Murphy & Callaghan 1994:67).

Life Orientation is one of the new system's seven learning areas. The focus of Life Orientation is on the capacity for growth and the processes used to cope with the environment, in terms of a learner's attitude and adjustments to political, cultural, social, physiological, psychological and economic circumstances. It incorporates the spiritual and psychological, values and beliefs, morals, health, attitudes and physical dimensions of the individual (Department of Education 1997:32).

The development of the learning programme, incorporating related fields of neuropsychology within an educational field, aims to ensure that the learner is focused on and enhanced with the ultimate aim of enhancing self-actualisation.

## CHAPTER 2

### LITERATURE STUDY

#### 2.1 INTRODUCTION

On their way to adulthood, children orientate themselves to their world through the attribution of meaning as well as involvement and experience as they constitute their own life world. This involves mutual relationships that are dynamic and influence each other as they are integrated into the child's world. This chapter will explore the literature on these dynamics, including aspects of self-concept and self-actualisation, and their psycho-educational implications. General learning theories, integrative approaches to learning, and learning programmes with a neuropsychological perspective will also be discussed.

#### 2.2 SELF-CONCEPT

Van den Aardweg and Van den Aardweg (Du Toit & Kruger 1993:144) define self-concept as the configuration of attitudes toward and convictions concerning oneself, which are dynamic and of which one is conscious or can become conscious. According to Vrey (Du Toit & Kruger 1993:21), self-concept is comprised of the three mutually dependent components, namely identity, action and self-esteem. Children's evaluations of their identity, action and self-esteem give rise to their self-concept.

Self-concept, or the concept that individuals have of themselves, is the descriptive aspect of their self-perceptions. Whereas self-concept is the cognitive part of self-perception, self-esteem is the affective dimension and the evaluative component of self-perception, as already mentioned in chapter 1. An individual's self-concept, which forms the core of their personality, influences the way they think about themselves and the way they behave. According to Vrey (1979:45), self-concept is the criterion whereby the individual differentiates, attributes meaning, evaluates, anticipates and behaves. Self-concept, which develops as awareness of themselves increases, is therefore an expression of the way they have come to think about themselves, an expression of the type of person they perceive

themselves to be.

Children do not have an innate self-concept, but come to know themselves in a particular way through lived experience, thus forming a concept of themselves. The formation of self-concept therefore is dynamic and not static (Oosthuizen & Petrick 1990:9). Self – concept moves between two poles, the negative and the positive. When learners receive high scores for a task, their self-concept will be close to the positive pole. Obtaining low scores will result in a negative self-concept, tending towards the negative pole. The way in which children experience, attribute meaning and become involved, activates and influences self-talk, which in turn activates the self-concept motion between the negative and positive poles. This is demonstrated as follows:

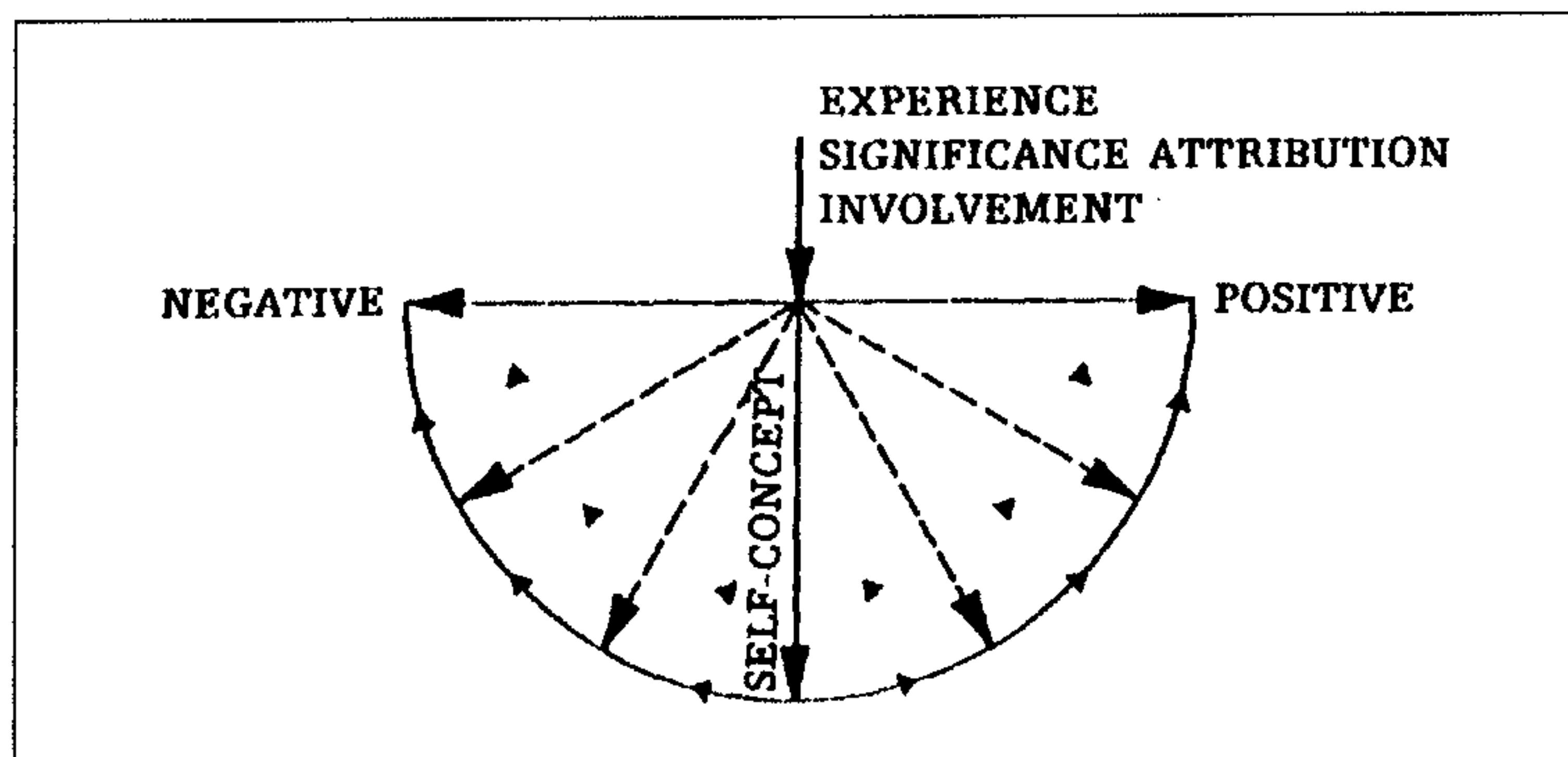


FIGURE 2.1 *The dynamics of the self-concept*

Source: Oosthuizen & Petrick (1990:17)

A realistic self-concept means that learners accept and come to terms with both positive and negative characteristics of themselves. This self-concept does not depend on whether test scores on the different dimensions are high or low, but on whether the learner is able to accept and assimilate both negative and positive characteristics.

A realistic positive self-concept means “positive characteristics are strong enough to balance the negative ones and prevent them from having a detrimental effect on self-concept” thus supporting the process of becoming which leads to self-actualisation



(Oosthuizen & Petrick 1990:11). Becoming refers to the total involvement of the person. The person-in-totality is involved in, directed at and concerned with the goal as well as with the action necessary to achieve that goal (Vrey 1979:10). Becoming refers to a purposeful, deliberate and progressive transition, which requires great effort in order to move from one condition to the next (Du Toit & Kruger 1993:6).

A learner with an unrealistic positive self-concept does not accept his weak characteristics and creates an ideal self-image, which is false. "This type of self-concept may severely impair his becoming, since he is escaping from reality and not realistically accepting his weak characteristics" (Oosthuizen & Petrick 1990:13).

A realistic negative self-concept occurs when a few negative aspects of a dimension of the self is so powerful that a learner's self-concept tends towards the negative pole. "This type of negative experience of the self is usually of a passing nature." (Oosthuizen & Petrick 1990:12). According to these authors, if a negative self-concept persists, it is unrealistic, will result in low self-esteem and may impair the child's becoming.

Research has shown that one's achievements as individuals are profoundly affected by the view one has of oneself as an individual. Whether conscious of it or not, one has a mental blueprint of the type of person one is. This blueprint consists of a system of interrelated ideas, attitudes and values that are influenced by our past experiences, our history of successes and failures, and the way other people have responded to us, particularly during our formative years. We each develop a consolidated framework of beliefs about ourselves and proceed to live and perform in a manner that is consistent with this framework (Hamachek 1990:317). Knowledge of the role that self-concept plays in influencing a child's performance sensitizes us as educators to the profound influence we can have on children and their ability to self-actualise. This profound influence is confirmed by research, which shows that learners live up to labels assigned to them by teachers, peers and significant others (Field, Hoffman, Peter, & Sawitowsky 1992:934).

Dr Raath (Raath & Jacobs 1993:1), during her research into the dynamics of self-concept, found that an individual's self-concept affected intellectual, social and personal development. In addition, Raath (Raath & Jacobs 1993:3) discovered that a low self-concept can have far-reaching implications on the development of the child, and that learners with negative self-concepts will not realize their full potential, and will therefore not be able to fully self-actualise. While her studies showed how a negative self-concept caused academic underachievement and social development difficulties in terms of conforming to school and peer demands, her research is encouraging in that she found self-concept to be dynamic, and therefore able to change from negative to positive when the learner is given appropriate motivation and support.

The developing child's perception of himself or herself changes, depending on the situation. Consequently, characteristics such as general cultural background, emotional maturity and individuality all affect how children regard themselves. Because a learner's concept of self is developed through messages received from parents, teachers, friends and significant others, changes in self-concept can be appropriated, in particular through effective classroom teaching, guidance and parental and educational support (Hamachek 1995: 303-306). This is confirmed by research, which was conducted at a Cape Town high school, where it was shown that a significant positive relationship existed between perceived teacher support, interest, encouragement and the adolescent's self-concept (Mboya 1995:491).

A sense of competence, self-actualisation and an adequate healthy self-concept can be viewed as a self-sustaining circular process, as seen below (Hamachek 1990:65). A positive experience leads to a positive view of oneself, which in turn results in more openness to experience, thereby attributing positive personal meanings in assessment of oneself. This in turn determines more realistic goals, more intelligent behaviour, a more positive view of oneself and therefore a positive experience of life, in this case, school experience.



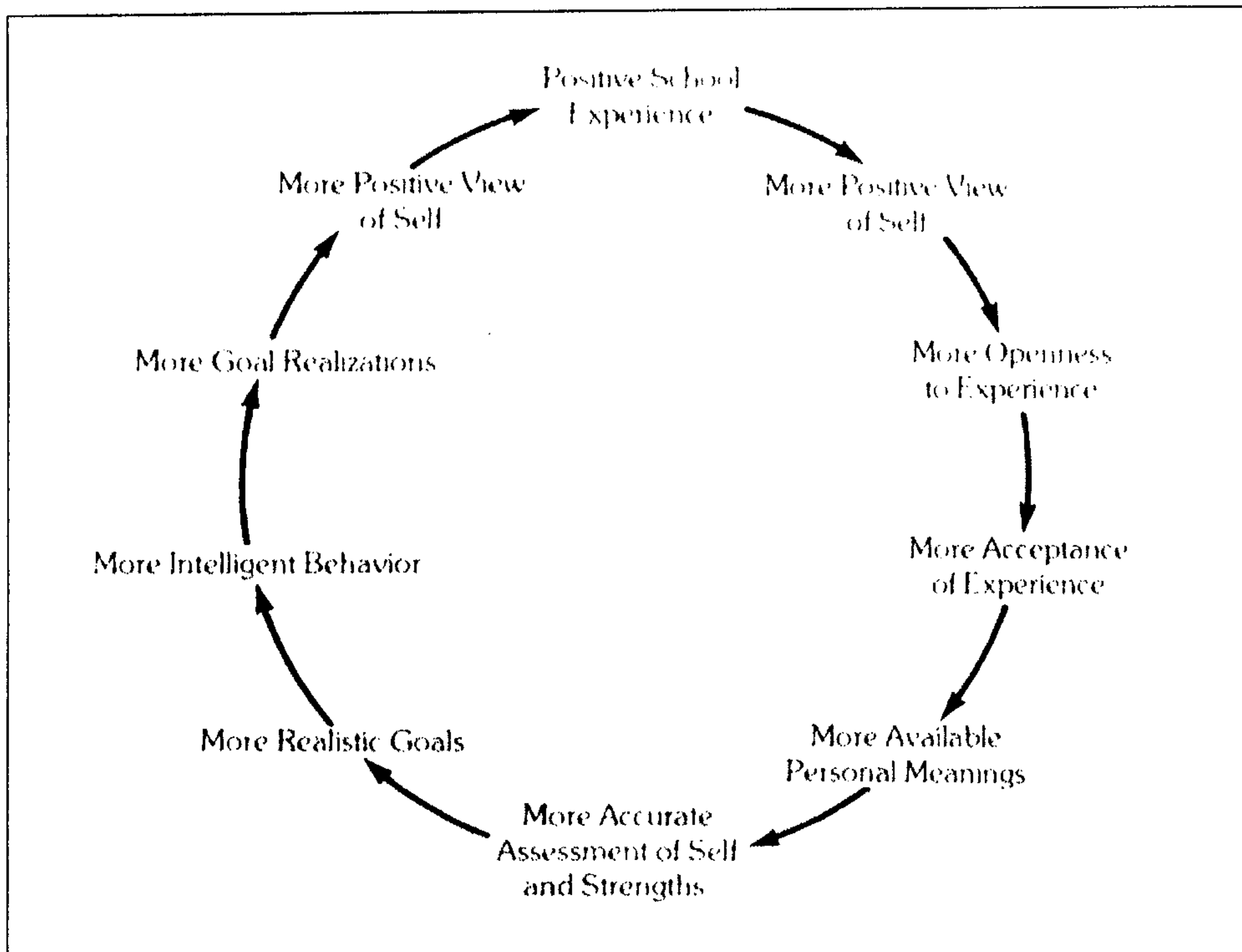


FIGURE 2.2 *The cycle of positive growth*

Source: Hamachek (1990:65)

The psycho-educational theory of Vrey (1979:4) proposes that the learner's maturation is realised through the constant interaction between educational assistance and the individual's self-determination, culminating in self-actualisation when the educational assistance is minimal and the learner's self-determining behaviour (influenced by self-concept) is maximized.

The following concepts --- meaning attribution, involvement and experience --- provide the basis for Vrey's (1979:24) psycho-educational theory. Meaning attribution, involvement and experience, all influence the child's self-actualisation along with the development of a positive self-concept, as depicted above in the diagrammatic representation of the essences of psycho-educational theory (Vrey 1979:28).

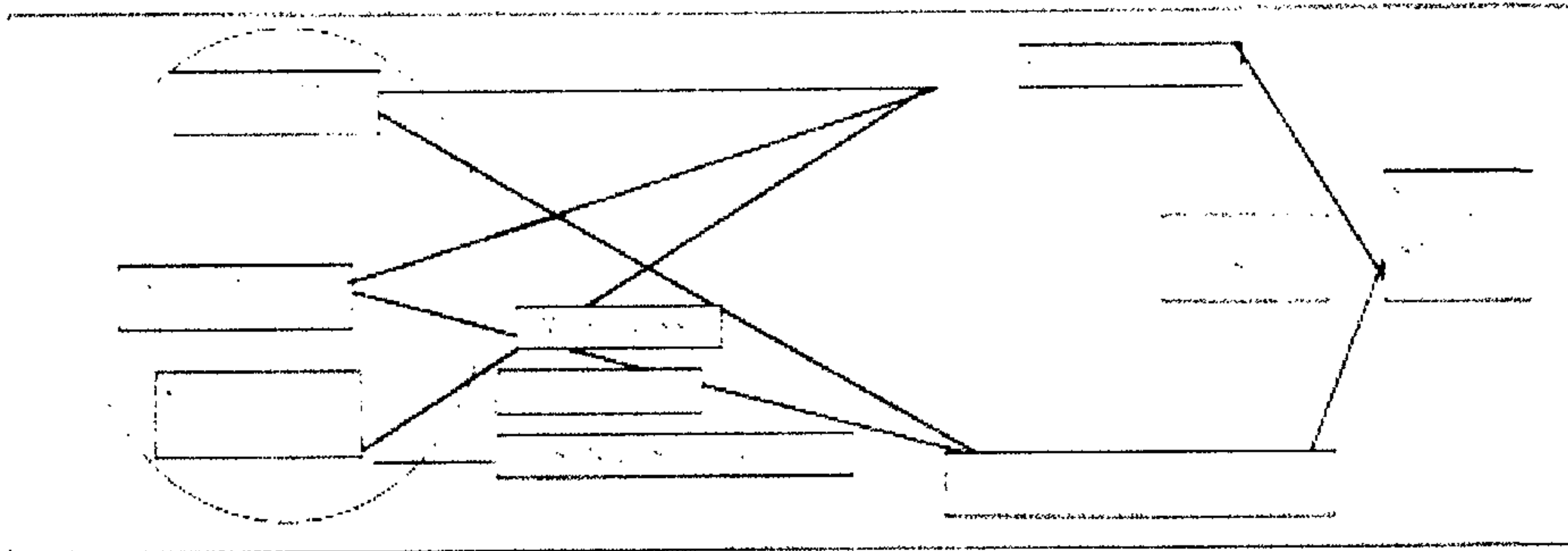


FIGURE 2.3 *A Theoretical Basis of the essences of Psycho-educational Theory*

Source: (Du Toit & Kruger 1993:20)

*Meaning attribution* is identified as an empirical-education essence because children cannot progress towards adulthood unless they are able to recognize, understand and perform actions. Thus, meaning makes orientation to the self and the world possible. By ascertaining and attributing meaning, the children will be able to understand, act and form relationships, thereby constituting to their own life-worlds. In doing so, they direct their behaviour accordingly (Du Toit & Kruger 1993:16).

*Involvement* refers to the human, physical and psychological act of being concerned with, of giving attention to a person or matter, because a person wants to do so (Du Toit & Kruger 1993:17). Involvement may be defined as the psychic vitality or vigour with which a meaningful objective is pursued and achieved (Vrey 1979:37). By observing children's involvement with their transitional objects, one can get an idea of their goals, purposes or intentions and also whether their experiences are positive or negative.

*Experience* is related to the emotional or affective dimension of being human and to a person's situation. Experience influences involvement in every significant action as well as the quality of the relationship formed (Du Toit & Kruger 1993:19). The children's perceptions of themselves in relation to the world, its people and objects, and their experiences are crucial essences of education.

The psycho-educational model of Vrey (1979:28) highlights the possibility of influencing the learner's self-concept in a positive manner and promoting his or her self-actualisation, given the appropriate educational support. In support of this model, Du Toit and Kruger (1993:22) state, "every child should, with the support and guidance of his educators, form a realistically positive self-concept".

### **2.3 SELF-ACTUALISATION**

Humanistic psychology is concerned with the uniqueness, individuality, humanity, worth and dignity of the individual. The major emphases of humanistic approaches include greater attention to thinking and feeling, the development of self and self-concept, communication, the clarification of values, openness, honesty and self-determination. These concepts form the basis of the self-actualisation process, which is advocated in both Rogers's and Maslow's theories (see figure 2.4 below) (Lefrancois 1997:326).

Maslow's idea of self-actualisation is a person's ability to constantly strive to realize the potential within and to develop inherent talents and capabilities (Hamachek 1990:55). According to Maslow, the primary aim of education and teaching should be the satisfaction of basic needs, without which children cannot reach a stage of self-actualizing, whereas Rogers believes that children, provided with unconditional acceptance in a stimulating environment, will naturally actualize their potential, in spite of other basic needs not being met. Rogers believes that self-actualisation is related to healthy and creative functioning and the development of self, results from interactions with the world and from values attained through experience. This definition forms the basis or core description of unlocking latent potential and subsequently enhancing self-actualisation – both processes that are significant in this study.



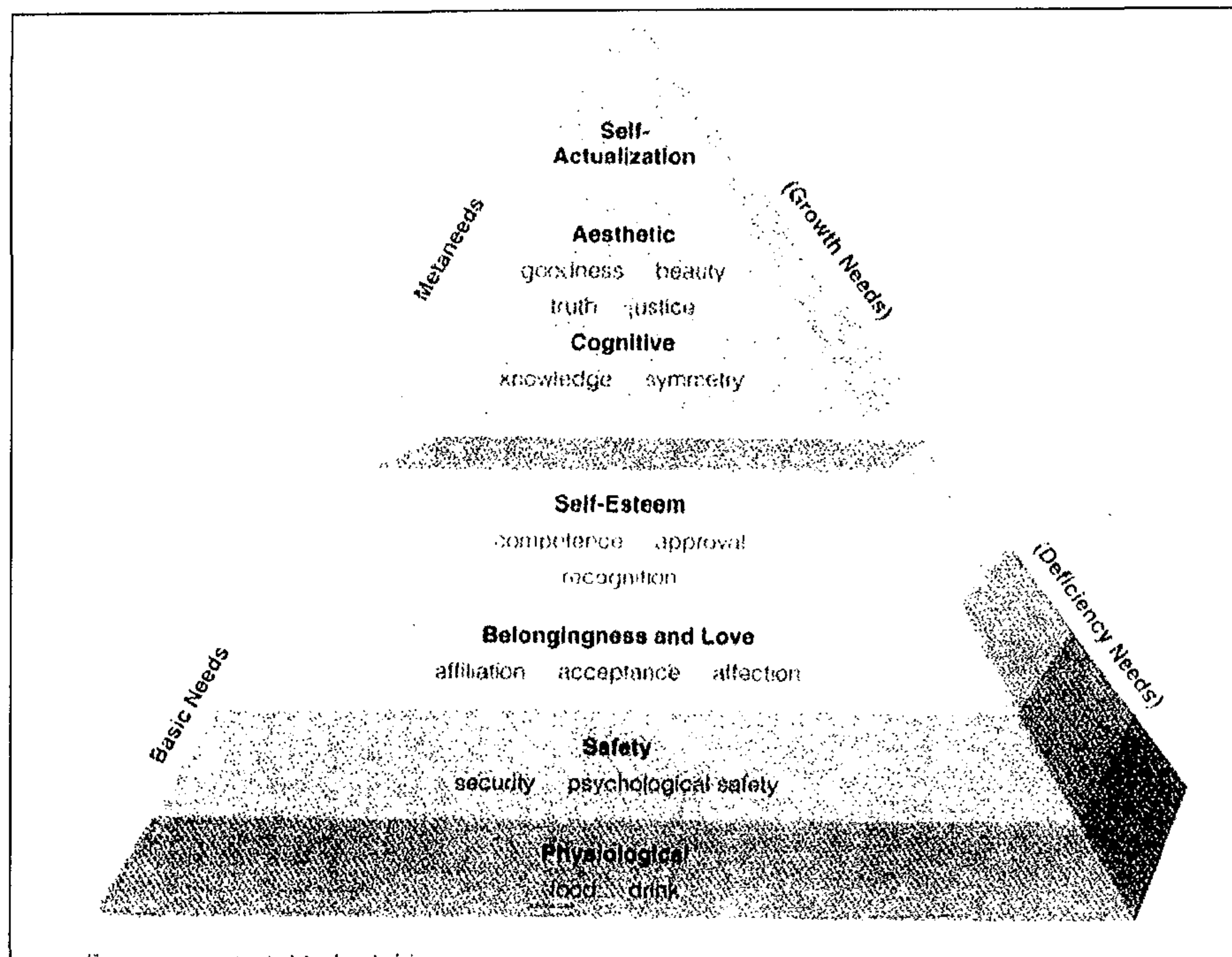


FIGURE 2.4 *Maslow's hierarchy of needs*

Source: Lefrancois (1997:360)

Frankl (Vrey 1979:40) disagrees with Maslow's view that self-actualisation is linked to the satisfaction of basic needs – instead he believes that the core tendency and therefore the inherent motivation that drives human beings, is based on their desire to seek the meaning of life (Meyer, Moore & Viljoen 1997:440). Like Frankl, Vrey believes that self-actualisation is not the sole focus of an individual's life, but rather the by-product of a meaningful life, dedicated to transcending environmental limitations (Vrey 1979:40).

Frame (1996:13-22) reviews Maslow's hierarchy of needs and his characterization of the self-actualizing personality. He suggests that since so few among the general population meet Maslow's own criteria for self-actualisation, teachers tend to lower their sights because the goal appears unreachable for learners. Vrey (1979:43) states that self-actualisation refers to individual's deliberate endeavours to realize the latent potential of

their self-hood. Although self-actualisation begins with genetically determined components, actualisation or realisation of this latent potential cannot take place without the individual's will to do so, without deliberate participation in the process or without educational help (Du Toit & Kruger 1993:26).

Rogers (Meyer, Moore & Viljoen 1997: 442), in his person-centred theory, postulates the psychic functioning of the individual as a tendency towards self-actualisation, a need towards developing potential, encouraged by a therapeutic relationship of empathy, understanding and unconditional positive regard, thus endorsing the psycho-educational basis of learning. However, Roby and Dwyer (1991:74) note that we do not live in such an idealistic world. They cite how "achieving self-actualisation and personal self-esteem, along with social adjustment, is possible only when various prejudices are overcome" and assert that "since we live in a pluralistic society and a less than ideal world, this is not possible". They suggest that curriculum development should take into account both current realities and preferred alternatives to behaviours and decisions. The need for flexibility in the education system becomes apparent, in view of the above.

Based on the proposition that self-actualisation is closely bound up with moral maturity (Daniels 1984:29), one can assume that for children to be self-actualised, they would need to have developed moral maturity and consequently have reached a certain level of cognitive development. The teaching of Cognitive Development emphasizes mental processes such as perception, imagery, attention, learning and memory, reasoning, problem solving, reading, consciousness, creativity, concept formation and language comprehension.

In terms of the study, and from the researcher's viewpoint, self-actualisation is seen as the continual striving towards fulfilment of one's purpose in life, towards unlocking one's optimal potential in the process of making one's life meaningful to oneself and significant others. This process of self-actualisation includes a positive self-concept and the ability to empathically reach out to and serve others during one's lifetime.



Behaviour is determined by the interaction between experience, significant attribution and involvement. Self-concept, in turn affects a child's behaviour and the way he experiences situations, attributes meaning to them and becomes involved in them. Thus, the essences of experience, involvement and significant attribution are determinants of behaviour, which forms the self-concept, which determines self-actualisation and behaviour, as seen in the following diagrammatic representation (Oosthuizen & Petrick 1990:19).

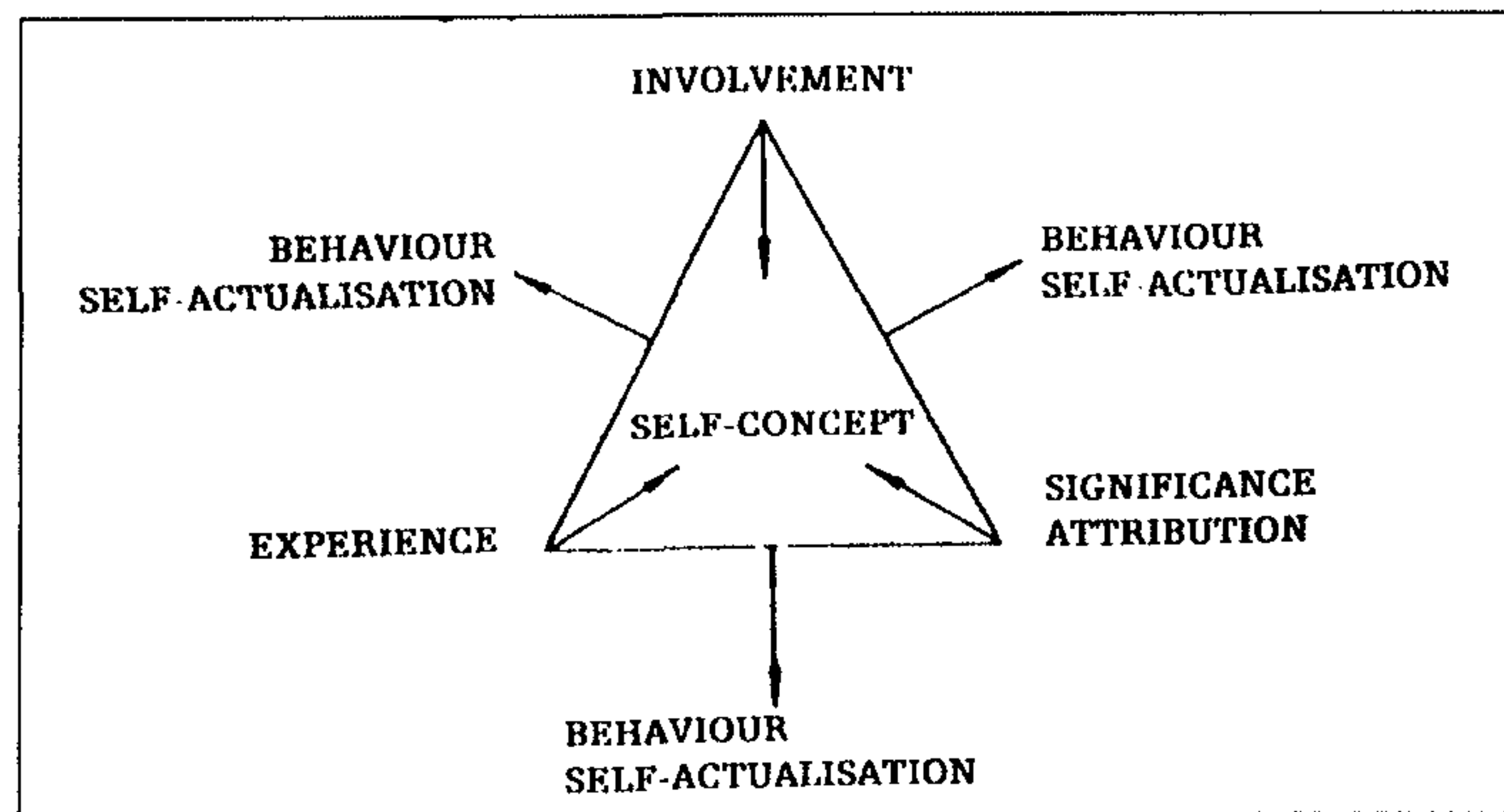


FIGURE 2.5 *Behaviour: the result of interaction between experience, involvement, significant attribution and the self-concept.*

**Source:** Oosthuizen & Petrick (1990:20)

So how do children, who are still in the process of developing a self-concept and who are developmentally egocentric and morally immature, self-actualise? Vrey (1979:26) believes that a positive self-concept is a prerequisite for the adequate actualisation of one's self and that this self-concept requires a certain level of cognitive self-awareness. According to the pedagogical perspective, self-transcendence and self-actualisation are different in children, as children are not yet developmentally capable of transcending self and thus not yet developmentally capable of committing themselves to the service of society. In addition, society is expected to meet the child's basic needs and not vice versa. This, once again, highlights the importance of education of the learner as a primary task.

### **2.3.1 Educational conditions for forming a positive self-concept and its influence on adequate self-actualisation**

Research has shown that the main aim of educators is to ensure that a child attains responsible adulthood, by guiding the child to self-reliant moral maturity. With this level of maturity, learners would then be capable of self-understanding and self-evaluation, in addition to being self-reliant in their decision making, and living a life that is justifiable in terms of their personal life-view (Lefrancois 1997:150). In other words, besides a high level of moral development, the self-actualised individual possesses self-awareness and is self-reliant --- all of which contribute to the individual's commitment to a personalized value system and view of life.

From a humanistic perspective, educators need to view children as being in the process of becoming self-actualised, and thus in need of unconditional love and acceptance, as well as a stimulating environment appropriate to the child's particular stage of development. Expanding on this view, Vrey (1979:12) believes that education and educators play a powerful role in helping children realise as much of their potential as possible, and thus self-actualise, by providing adequate educational support and an environment free from anxiety, thereby promoting positive self-concepts and ultimately self-actualisation. Pufal-Struzik (1999:44-47) reinforces this concept by noting that, "obstacles to the process of self-actualisation are unfair family and school environments as well as low self-knowledge".

Humanistic perspectives promote self-actualisation as the goal of education, and as such, humanistic education is student-centred, with the emphasis on personal growth, and with learning styles that include individual preferences and strengths as they relate to the best conditions for learning (for example visual, auditory or kinesthetic). A criticism, however, of general humanistic approaches to teaching is that most are highly dependent on the personal qualities and skills of individual teachers (Lefrancois 1997:339).

Vrey (1979:12) proposes that self-actualisation requires an increase in "knowledge,

evaluation and esteem of the self-identity” which, he postulates, is directly related to the increase in physical skills, intellectual abilities, emotional experiences and moral awareness. Self-actualisation can thus be likened to Erikson’s developmental stages --- Golinko (1984:749) records how adolescence presents with periods of personal adjustment challenges and states that, if these periods are adequately resolved, it is a necessary transition towards self-actualisation through growth and maturity.

Field, Hoffman, Peter and Sawilowsky (1992: 931-934), note the effects of labelling of learners by teachers, especially when categorising learners according to ability. Besides prejudicing the individual, labels are often rigid and restricting, preventing learners from expressing their true selves and realising their full potential; for example when learners with reading problems are labelled “learning disabled”, they start to perceive themselves in terms of the labels, thereby reinforcing the teacher’s and others’ perceptions of them as learning disabled. As such, a teacher can make a tremendous impression on learners, affecting their development positively by countering the effect of labels, or negatively by reinforcing these labels. As Schanche (1998:41) states, “there is no way to estimate how many lives are touched by a great teacher”.

In line with this, Harter, Stocker and Robinson (1996:258) researched the link between self-worth and approval and found that often self-worth is based on peer approval of the self and on preceding approval from others. This points towards the need for extrinsic motivation to enhance self-esteem and thus the need to focus on the development of intrinsic (internal) motivation through enhancing self-awareness and positive self-concept. Lovecky (1992:24) provides guidelines on how to achieve this: “Focusing on developing a balanced view with strengths and weaknesses defined by them (learners) rather than by the more extreme views of others is more likely to build a good self-concept.” Theories of motivation attempt to answer questions about the causes of and reasons for behaviour.

Motivation is another contributing factor to successful learning. This applies to both teachers and learners. Teachers are in a position not only to diagnose learning problems



with their knowledge of the brain and its functioning, but also to use this knowledge in motivating learners to actualise themselves and give expression to their full potential. The ultimate aim is to enhance 'self-learning'. The level of motivation, personal understanding, attitude towards learning, and the responsibility of the learner with regard to their own learning will influence self-actualisation.

Recent research in educational and developmental psychology has revealed the importance of learning that is self-regulated, independent and flexible. Young children (and less skilled learners in particular) need to manage their own learning by planning, evaluating and regulating their performance on academic tasks (Paris & Cross 1988: 133). They need to set reasonable goals for themselves, persist in the face of failure and adopt standards intrinsic to success. The cognitive consequence of self-regulated learning is that learners become enabled to select and solve problems strategically. The motivational consequence is that they feel empowered to be successful and thereby invest effort in relevant and challenging tasks. One of the broad goals of education is to encourage the application and transfer of skills, rather than simple demonstrations of knowledge or competence in the classroom. Using knowledge to solve problems in everyday tasks is at the heart of strategic learning. But independent learning requires the effective management of time, effort and external resources. Self-management uses all available resources, both internal and external, and is thus a balance of personal motivation and cognitive abilities. Self-management allows learners to make decisions about their academic tasks. Metacognitive beliefs, judgments and choices enable children to become independent learners. Thus, the enhancing of learners' understanding of academic tasks and learning processes is an important educational aim (Le Francois 1997:375-376).

Equally important are the motivational consequences for learners, because self-regulated learning depends on a positive view of their self-competence and expectations for future achievements. The will or motivation to use one's skills has been examined from a variety of cognitive approaches. What these approaches have in common is the central role assigned to personal beliefs about learning and self-perceptions about one's

competence. The selection of goals, the selection of tasks, and the persistence and vigour of learners' efforts all reflect a pattern of belief in one's learning potential. Optimistic beliefs of self-competence empower learners to expend effort, persist and choose challenging tasks. Positive self-evaluations of competence, control and purpose, as well as learning strategies, contribute to learners' sense of power in the classroom.

Van Parreren and Peeck (Petrick & Wiechers 1992:167) explain personal motivation and "level of aspiration", which means the level of achievement a learner would like to attain. To set realistic levels of aspiration in their studies, learners have to know themselves well enough to make demands on themselves that are realistic. In order to set a level of achievement, certain conditions relate to the degree of difficulty of the task as the learner experiences it and the personal significance the learner attaches to the task. A level of aspiration is not static, but is modified by successes and failures. The level of aspiration will be raised after a number of successful achievements and lowered after a number of failures. The level of aspiration for a particular task will depend on the success anticipated by the learner. The lower the level of aspiration, the greater the chance of success, but a real feeling of success will only be experienced if the level of aspiration is higher than can be attained with ease. A learner's level of aspiration is largely influenced by the personal motivational structure. When there is a strong motivation to achieve, a learner will study more actively and set a high level of aspiration.

If learners' motivation to achieve affects their conduct in a particular situation, it also plays a definite role in their evaluation of the difficulty of an assignment. A learner's level of achievement is then based on realistic grounds. A learner influenced by both the motivation to achieve and fear of failure may experience conflict regarding the level of achievement. The way a learner can resolve conflict between personal level of achievement and fear of failure is by rationalising the failure. For example, a learner may ascribe failure to the nature of the assignment, to tiredness or a headache. The following represents the motivation cycle in the learning situation (Wiechers 1994:207).

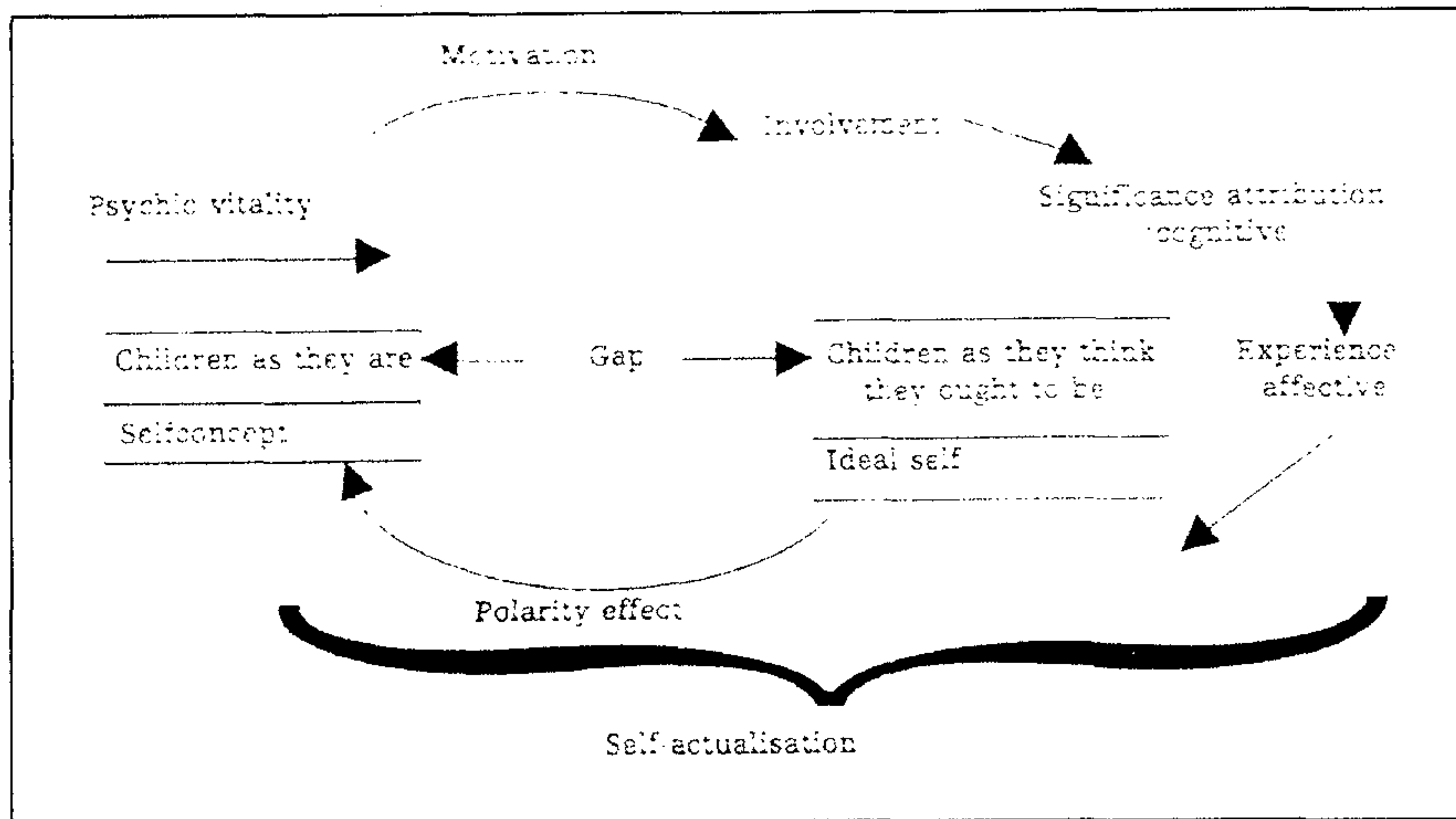


FIGURE 2.6. *The motivation cycle*

Source: Wiechers (1994:207)

A positive motivational cycle contributes to the formation of a positive self-concept in the situation, which also adds momentum to the cycle so that more psychic vitality will be available in the future – and as the researcher has previously stated, a positive self-concept is a pre-requisite for self-actualisation. For the child there will be better motivation, more involvement in a given situation, greater likelihood of success in the future, attribution of positive meaning to himself or herself, and a feeling of satisfaction about the whole situation. The overall result will be a positive polarity effect.

Motivation and perseverance are important characteristics of successful learners (Petrick & Wiechers 1992:168). One expects learners who are strongly motivated to achieve to show greater perseverance, while those fearing failure will be more inclined to drop out. This is not the case: personal motivation to study only emerges when it has been stimulated in the study situation. It is not only learners' approaches to the subject matter but also the degree of difficulty of the work and other factors that can affect their personal attitudes towards studying.



Hamachek (1995:315) notes that classroom motivation and human learning are three-dimensional and include the content, the learner and the teacher – “each play a part”. What happens to children during their school years comprises the most important experiences of their lives. By concentrating on strengths and praising best efforts, school can be a positive experience, thereby enhancing self-concept and encouraging healthy attitudes during the growth towards self-actualisation.

To be in a “resourceful state of mind”, Rose and Nicholl (1997:64) note the importance of motivation. This provides a positive attitude towards acquiring new knowledge. Inner confidence about learning capabilities and awareness that the information is important or promises a “personal benefit from your investment in time and energy” (Rose & Nicholl 1997:64) ensure meaningful learning --- motivation is a factor here. The central element of learning is to turn facts into personal meaning.

Motivation is the catalyst for creative power; much like turning on a car’s engine, motivation acts as “on” switches for achievements. Without motivation as a starting mechanism, the striving resources of the mind will languish as unused potential. With motivation, striving instincts can propel people toward their goals. Kolbe (<http://www.kolbe.com>) defines motivation to embrace values, beliefs, preferences, social style, attitudes, interests, personality, desires and emotions. Will and determination together with motivation allow people to tap into the innate power/potential within them, as they commit to or focus energy on any given task. The Kolbe Creative Process explains the interactions of the three parts of the mind in producing and creating. This process is the path that integrates otherwise separates elements of the mind’s capacity --- the abilities to act with motivation, determination and reason (Kolbe <http://www.kolbe.com>).

### **2.3.2 Ways in which learners reach self-actualisation**

As previously mentioned, according to Vrey (1979:39) learners are capable of actualizing their potential through the attribution of positive meaning to relationships with themselves, peers, God, objects and ideas. Their involvement and experience of these

relationships contribute to a positive self-concept, thereby enabling self-actualisation. Consequently, adequate guidance is essential for learners' personality development, which then contributes to the learner's capacity for self-transcendence and eventual self-actualisation. The emphasis is on the expression of their potentialities, capabilities and talents, facilitated in a loving, supportive, accepting environment. The aim of the proposed self-actualising learning programme (LP) is based on these premises.

The genetically determined components of self-actualisation, include intellectual, emotional and behavioural components, and actualisation or realisation of this latent potential cannot take place without the individual's commitment to the process. As such, the individual's participation in the process, together with educational interventions, influences the personality and promotes self-actualisation (Du Toit & Jacobs 1989:26).

If we look at a time in children's lives that is probably the most critical in shaping their feelings of academic competence and intellectual adequacy it would have to be the early school years. It is during these years that they are most susceptible to the emotional consequences of success or failure precisely because their sense of who they are and what they can do is incompletely formed. If children experience more failure than success at school they can develop the negative self-attitudes that lead to defeatism, despair and hopelessness, none of which are good predictors of later academic success or healthy adjustment during the adult years.

Although we cannot say definitely which comes first, good schoolwork or high self-esteem, we can say that they are mutually reinforcing to the extent that a positive change in one encourages a positive change in the other. Although a learner's self-concept expands and takes shape during the elementary school years it is important to keep in mind that it can be reshaped, redirected and motivated – for better or worse – during the junior high and high school years. Lyon (1993:209) states: "As academic self-concept was found to correlate significantly more strongly with achievement than general self-concept, the use of such a scale may fill a gap in educators' understanding of student achievement and attitudes towards school."

Therefore, the mutual overlapping and interrelatedness of the different aspects of development towards self-actualisation are important aspects of education, as represented by the diagram below (figure 2.7).

The becoming of the child extends beyond early childhood through to adulthood. During the processes of becoming and development, children are constantly forming relationships with themselves, with ideas, objects and with people. Support is therefore necessary to assist learners in all aspects of their becoming and development towards self-actualisation.

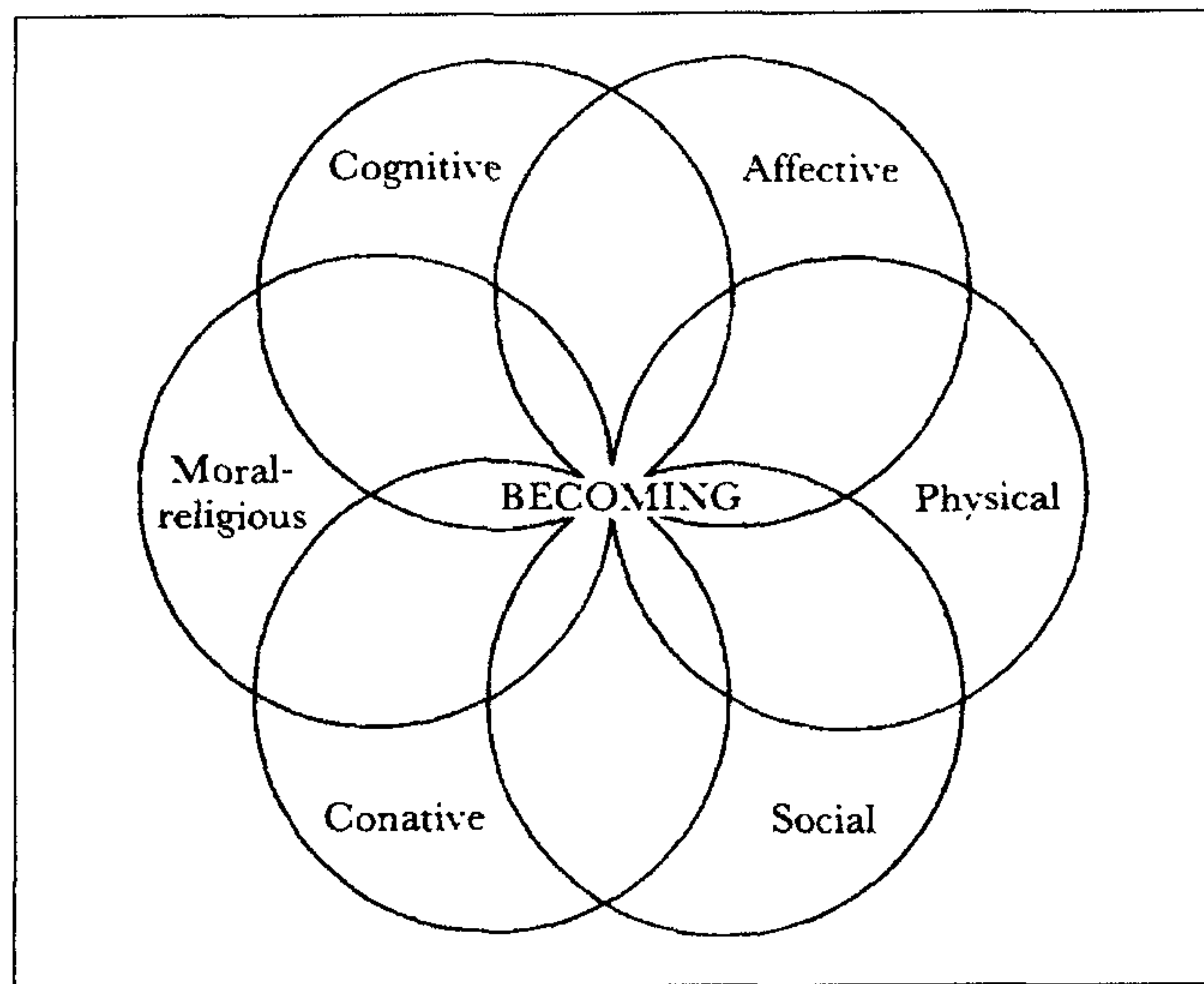


FIGURE 2.7 *The Interweaving of the Aspects of Becoming of the Child*  
Source: Du Toit and Kruger (1993:68)

### 2.3.3 The relationship between the physical and psychological facets of the self-actualizing learner within the educational system

The learner has a physical brain structure and related functions. With this physical brain, the self-actualizing learner functions psychologically by intellectualizing, emotionalizing and behaving. In the education situation, learners can be influenced to direct their



psychological functions towards responsible, independent adulthood (Du Plessis 1994: 204). However, primary school children are not psychologically well defended and therefore tend to internalise bad experiences, incorporating them into their incompletely formed personalities. Because of this, the primary school child's self-concept is more susceptible to feedback from adults and peers.

Sternberg (1995:578) explains how research has shown the interdependence of emotion and cognition. He demonstrates this by the "emotional feedback loop", showing how physiological reactions and cognitive appraisals constantly and reciprocally interact with perceived emotional experiences.

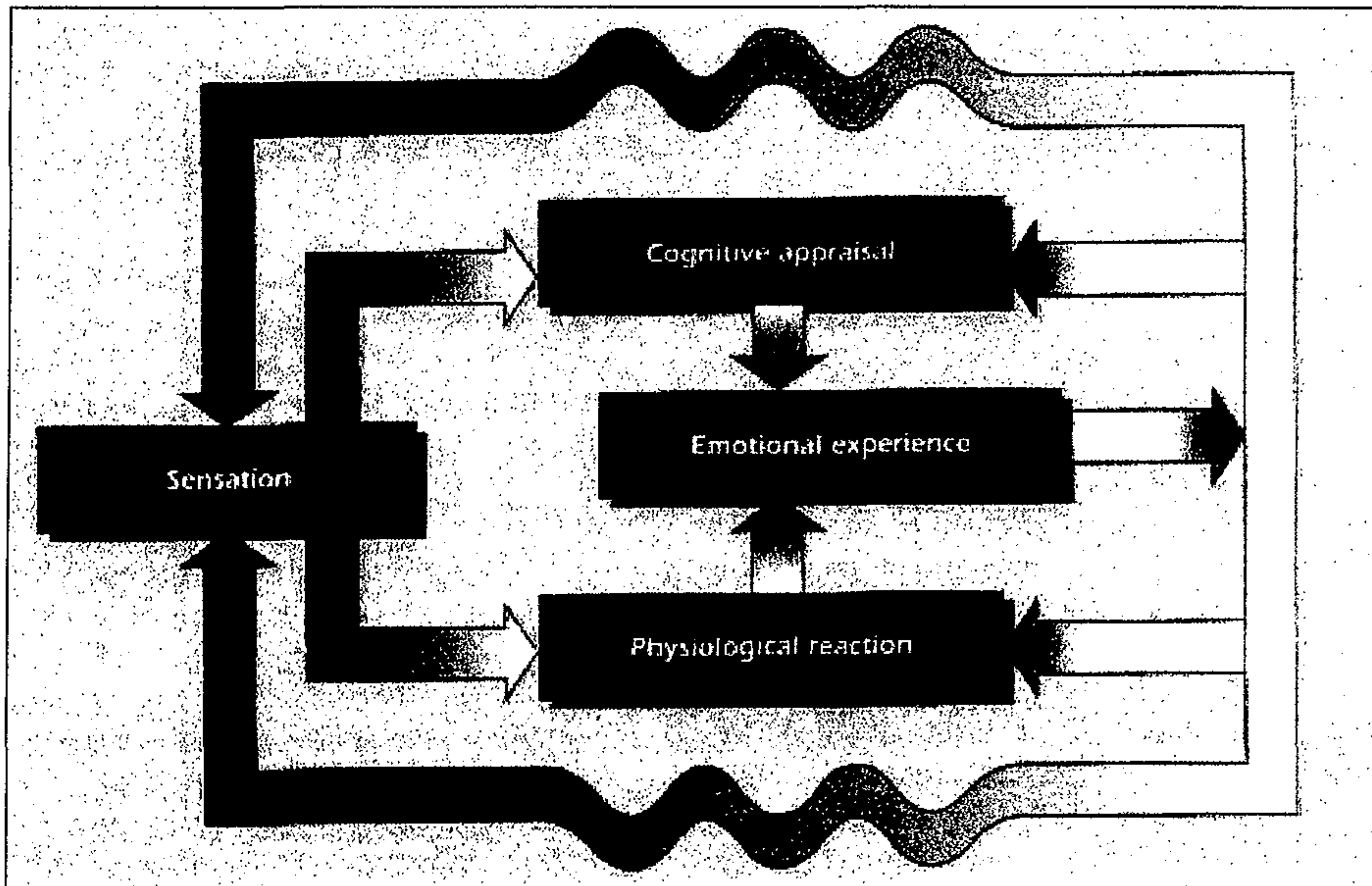


FIGURE 2.8 *Sternberg's emotional feedback loop*

Source: Sternberg (1995:578)

The capacity to conceptualise increases during middle childhood when changes result in a higher level of organisation and integration. The middle childhood years prepare the child for the physical and psychological changes that occur during adolescence. This is a time when most children begin to consolidate a self-image and integrate a personality (Hamachek 1990:90-97). During adolescence, practically every aspect of growth ---

physical, emotional functioning, social experience and cognitive ability --- is subject to change. Adolescence is a time for making the transition from dependence to independence and in the process formulating an identity that incorporates the special feeling of uniqueness.

Conditions for self-actualisation in an educational setting include assistance, through education or affective, cognitive and normative guidance, towards meaningful self-actualisation, as well as provision of ideal role models with whom the child can identify, ideals and principles from which the child can make meaningful choices, orderly systems of values on which a child can build a philosophy of life and conditions for the initiation of relations with others. The extent to which these conditions are met will determine the extent to which the child can achieve self-actualisation (Kokot 1992:90). For positive self-growth towards adulthood, the learner therefore needs support and guidance from significant others. The proposed learning programme (LP) aims at providing the necessary support and guidance, while simultaneously, instilling learners' belief in themselves, and their ability to self-actualise.

Numerous brain development studies have shown major intellectual changes during adolescence. The brain grows through a series of growth spurts and the rate and timing of brain development have an effect on the level of understanding and ability to acquire knowledge. Hormonal changes also add a new dimension to the way adolescents see themselves, because emotions are labile as brain and physical growth take place (Hamachek 1990:90-97).

Hamachek (1990:164) depicts an overview of the cycles of brain growth, integration periods and Piaget's cognitive correlates in the following table. The brain growth cycles link up with views Piaget expressed many years ago regarding the child's cognitive development.



<i>Growth period</i>	<i>Integration period</i>	<i>Cognitive correlates (Piaget)</i>
3–10 mos. 2–4 yrs.	3–10 mos. 4–6 yrs.	Sensorimotor stage movement Preoperational stage Language development Fusion of thought and language
6–8 yrs.	8–10 yrs.	Concrete operational stage Reading/writing
10–12+ yrs. (female brain grows faster than male brain)	12–14 yrs.	Formal operational stage Abstract thought and problem solving
14–16+ yrs. (male brain grows faster than female brain)	16 yrs. and throughout adult life	Self-awareness and problem finding

FIGURE 2.9 *The cycles of brain growth and Piaget's cognitive correlates*  
Source: Hamachek (1990:164)

Even though most children of the same age experience similar rates of brain growth, many individual differences in intellectual performance still exist. Heredity and environmental circumstances play a significant role in individual differences. Biological factors that affect brain growth include neurological and physical brain growth and significant normative sex differences in brain growth patterns, because brain growth occurs *earlier* in girls. These are reasons why some learners are able to comprehend the material at hand, while others cannot. As brain research continues and more knowledge is acquired about related functions, so will the ability to develop curriculum and teaching methods to correspond more closely with the brain's unfolding readiness to learn (Hamachek 1995:165). He quotes as follows: "We might better understand and appreciate intelligence and intellectual development if we first have an understanding of the [brain]". Capitalizing on this concept of individual differences in intellectual performance, the proposed LP encourages learners to discover not only their uniqueness, but also the unique and different ways in which they learn and process information. The learners are thus encouraged to believe in themselves, in spite of being different and furthermore they are taught to respect differences.

## 2.4 GENERAL LEARNING THEORIES

Learning is a process by which behaviour is either modified or changed through experience or training. Therefore, learning refers not only to an outcome that is



manifestly observable, but also to attitudes, feelings and intellectual processes that may not be so obvious (Hamachek 1995:228). Learning involves all changes in behaviour that result from experience, providing that these changes are relatively permanent and do not result simply from growth/development or maturation (Lefrancois 1997:150).

In this section, the different perspectives on learning will be described, as an understanding of the ways in which children learn and process information can greatly contribute to educators' facilitating and maximizing of children's learning and processing. In addition, because success at school, and therefore successful learning, is a prerequisite for self-actualisation, the proposed programme to be implemented in this study, focuses on enhancing learning in Grade 7 children. This will be done by creating awareness in learners of their brain's unlimited potential, in addition to educating learners about how the brain processes, stores and retrieves information. In other words, the programme aims at educating learners about the way in which their brains learn, by introducing them to the anatomy and physiology of the brain. Therefore the perspective that carries the most weight in the study, is the neuropsychological perspective, as this emphasises the role of the brain in learning and self-actualisation. While this is discussed in more detail in chapter 3, learning as such is described from the viewpoint of various learning theories.

#### **2.4.1 Behaviourist learning theories**

These theories are concerned with stimulus-response events and with the effects of repetition and reinforcement.

##### ***2.4.1.1 Two Basic Learning Processes***

###### **➤ *Conditioning***

*Classical Conditioning* involves the repeated pairing of a previously neutral stimulus (conditioned stimulus) with an effective stimulus (unconditioned stimulus) so that the conditioned stimulus brings about a response (conditioned response) similar to that for the unconditioned stimulus (Lefrancois 1997: 355). *Operant Conditioning* maintains that

when an operant is reinforced, the probability of its recurrence increases (Lefrancois 1997: 355).

### ➤ *Reinforcement*

Positive and negative reinforcement are key concepts in behaviourist theory. Both types increase the probability of response. Positive reinforcement is the result of something being added (positive reinforcer) to a situation when a response is made. Negative reinforcement happens when something is removed (negative reinforcer) from a situation when a response is made (Lefrancois 1997: 355).

Behaviourism has been criticized for allegedly depersonalizing or dehumanizing our basic nature because of its emphasis on “quantifying”, “objectifying” and controlling human behaviour. Behaviouristic approaches to motivation stress the importance of positive and negative extrinsic reinforcers, the use of reinforcement, such as praise, encouragement and rewards representing the most powerful implications for teaching and learning concerns (Lefrancois 1997: 374).

### **2.4.2 Social learning theories**

Social learning refers to the way in which learning occurs (through social interaction) or to what is learnt (the product: acceptable behaviours). Bandura’s social learning theory assumes that imitation is a central process in determining behaviour. Social learning reflects the effects of reinforcement, the observer’s awareness of the connections between behaviour and outcomes and the observer’s ability to symbolize. Learning through imitation requires paying attention, remembering, reproducing and being motivated to do so. Three effects of imitation include the modelling effect (the learning of novel responses), the inhibitory-disinhibitory effect (deviant behaviour being disinhibited or suppressed, usually as a function of response consequences of the models) and the eliciting effect (the emission of responses that are related to those made by the model but that are neither novel nor deviant) (Lefrancois 1997:140-143).

In terms of motivation, Bandura suggests that ideas of personal effectiveness are important to determining which behaviours will be undertaken and the amount of effort that will be expended (greater if success is anticipated). Judgments of self-efficacy are affected by enactive influences, vicarious influences (comparisons with others), persuasory influences and emotive influences (Lefrancois 1997:375).

### **2.4.3 Cognitive learning theories**

How we receive, process and remember information is the focus of cognitive learning theories. The main emphasis of these theories is on the mental events involved in knowing, acquiring information, solving problems and remembering. Cognitive theory looks at three areas: knowledge base (learner's existing information), cognitive strategies (processes used in learning and thinking) and metacognition (awareness of the self as a knower and capacity to understand and monitor cognitive processes), in an attempt to make better, more critical and creative thinkers of learners (Lefrancois 1997:185). Cognitive theories stress the importance of the individual learner's cognitive structure and look at how information is processed, organized and recalled. Knowledge is viewed as consisting of vast networks of relationships in which learning is built on previous knowledge and involves information processing.

In terms of motivation, cognitive theories describe humans as active, exploring, evaluating organisms capable of delaying gratification and of explaining the outcomes of their behaviour.

#### ***2.4.3.1 Information Processing Model***

This model describes how people process information that reaches their senses. Processing involves gathering and representing information, or encoding --- holding information or retaining and accessing the information when needed. Information processing theorists approach learning primarily through a study of memory as seen in the following representation.



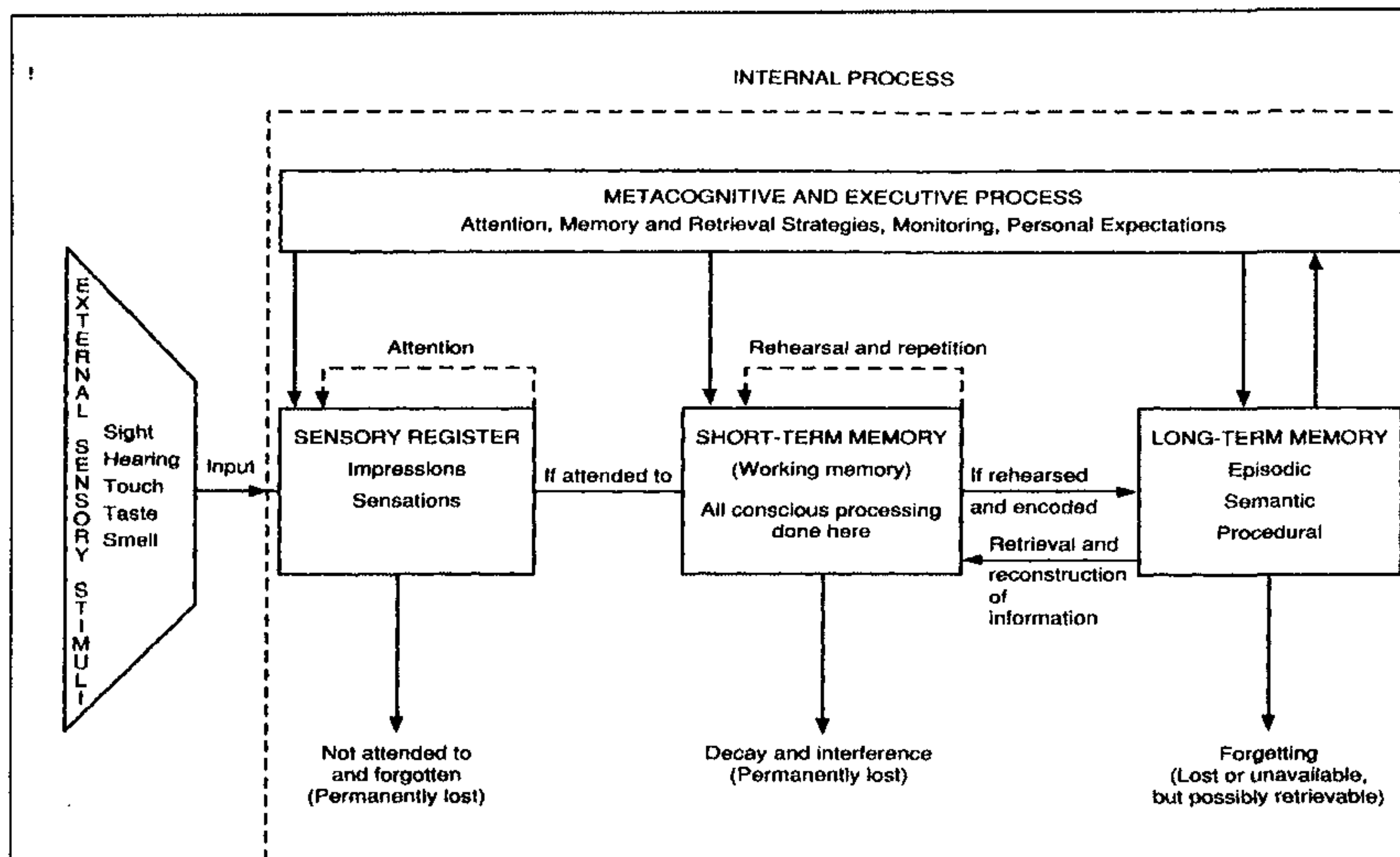


FIGURE 2.10 *Information-Processing Model of learning and memory*

Source: Hamachek (1995:196)

The information-processing model displays how the senses send information to the sensory register for temporary storage. One makes sense of the information through the processes of perception and attention. Transformed into patterns of images or sounds, the information can enter the short-term memory. Here storage is limited and the stay is short; the information is used and lost unless it is rehearsed. Information to be retained for later retrieval is connected with already existing knowledge and therefore encoded in long-term memory, a permanent memory store.

The information-processing model describes the learner as a three-level information processing and storage system, in which the levels are labelled "sensory memory", "short-term memory" and "long-term memory". The way the information is transferred can be seen in the above model (Hamachek 1990:191). Although the researcher utilises the concepts of "sensory memory", "short-term memory" and "long-term memory", the proposed LP emphasises the learner as a complex, multi-dimensional, multi modal information processor.

#### ***2.4.3.2 Ausubel's receptive learning theory***

Ausubel looks at the existing cognitive structure of the learner as a starting point, in an attempt to relate new information to old through meaningful learning processes, such as selecting material, identifying, organizing principles, stressing principles and concepts and focusing on relations. He also considers the mechanisms of change in the cognitive growth of the learner. These mechanisms include the influence of cultural and environmental influence, as well as of direct teaching, on how the learner organizes, assimilates, retains, transfers and reconciles meaningful material (Lefrancois 1997:225).

#### ***2.4.3.3 Bruner's Discovery Learning Theory***

Bruner's cognitive theory describes learning and perception as information processing activities that involve the formation of concepts (categories) that result from abstracting commonalities among events and experiences. Hierarchical arrangements of related categories are referred to as coding systems, which include three stages: enactive mode (external, motor action stage), ionic mode (internalization of experiences and concepts) and symbolic mode (where information is perceived in terms of symbols, ideas, thoughts and concepts. These categories are important for retention, discovery and transfer. Bruner proposes discovery approaches to instruction, which require the learner to structure information by discovering the relationships that exist among concepts. The advantages of Bruner's learning theory include the ability to learn related material, increasing interest because of involvement, lasting retention ability, increased probability of transfer of learning and the development of initiative (Lefrancois 1997:203).

Although Bruner and Ausubel present points of view that are opposite in many respects, both present a fundamentally cognitive view of the person as an active information processing learner, whose efforts to derive meaning from the environment are closely related to the development of associated networks of concepts. Their recommendations for instruction are intended to lead to the acquisition of meaningful concepts, maximize transfer, retention and motivation and to reduce passive learning (Lefrancois 1997:226).

The proposed LP also recognises learners as cognitive beings, but does not restrict their abilities to the cognitive realm. As a cognitive being, the learner actively processes information and is capable of utilizing the brain's cognitive abilities in order to maximise learning, by establishing meaningful connections and forming meaningful categories.

#### ***2.4.3.4 Gagne's cognitive learning theory***

Gagne's theory is based on the standard information-processing (sensory memory, short-term memory, long-term memory) model. It looks for the internal and external conditions that facilitate learning – knowledge of which can improve instruction. The theory classifies learning outcomes in five major domains: intellectual skills, verbal information, cognitive strategies, attitudes and motor skills. He defines cognitive strategies as including both metacognitive and cognitive skills. Metacognitive skills such as comprehension monitoring relate to knowing about knowing; whereas cognitive skills are what we actually do when we learn, think and remember, such as highlighting, underlining, note taking, outlining and making concept maps (Lefrancois 1997:225).

Metacognition refers to knowledge of one's own cognitive processes and to the active monitoring and consequent regulation and orchestration of these processes towards a goal. Metacognitive knowledge is knowledge about knowledge and knowing, including knowledge about the capabilities and limitations of human thought processes, about what human beings in general might be expected to know, about the characteristics of specific people (and especially of oneself) as knowing and thinking individuals. Metacognitive skills may be thought of as cognitive skills that are necessary, or helpful, to the acquisition, use and control of knowledge, and other cognitive skills. They include the ability to plan and regulate the effective use of one's own cognitive resources. In other words, metacognition is awareness of one's own thought processes in the very act of carrying them out. It also refers to the human ability to use this awareness to control actions.



Nickerson, Perkins and Smith (1985:134) note the difference between having information and being able to access it when it is needed, between having a skill and knowing when to apply it, between improving performance and realising that one has done so: "It is in part, the recognition of such differences that has led to the notion of metacognition or metacognitive knowledge, experiences and skills." The emphasis on metacognitive skills is consistent with the general emphasis on thought processes that may be improved through training.

Paris and Winograd (1990:7) describe how metacognition can promote academic learning. The central message is that students can enhance their learning by becoming aware of their own thinking as they read, write, and solve problems in school. Teachers can promote this awareness directly by informing students about effective problem-solving strategies and discussing cognitive and motivational characteristics of thinking. The benefits of this "consciousness-raising" are (a) it transfers responsibility for monitoring learning from teachers to students themselves and (b) it promotes positive self-perceptions, affect, and motivation among students. In this manner, metacognition provides personal insights into one's own thinking and fosters independent learning.

Paris and Winograd (1990:14) conclude with the following quote:

*"In summary, we believe that research on metacognition has illustrated the positive values of students gaining greater awareness about their own mental processes and the purpose of academic learning. Instruction that promotes this awareness can encourage students to make better cognitive judgements, beliefs, and choices in academic situations. Instruction in a variety of formats can promote metacognition in students and teachers. We reviewed the principles of direct explanation, scaffolded instruction, cognitive coaching and cooperative learning to illustrate new approaches to instruction that combine an emphasis on cognitive skills and motivational encouragement. We remain optimistic that students' thinking skills and positive attitudes toward learning can be promoted through these new types of instruction".*

The following diagram represents strategies related to Gagne's information processing model:

LEARNING PROCESS	COGNITIVE STRATEGY	LEARNING PROCESS	COGNITIVE STRATEGY	
Selective Perception	Highlighting	Semantic Encoding	Concept maps	
	Underlining		Taxonomies	
	Advance organizers		Analogies	
	Adjunct questions		Rules/Productions	
	Outlining		Schemas	
Rehearsal	Paraphrasing	Retrieval	Mnemonics	
	Note taking		Imagery	
	Imagery		Executive Control	Metacognitive strategies
	Outlining			
	Chunking			

FIGURE 2.11 *Cognitive strategies related to Gagne's information processing model*

Source: Lefrancois (1997:198)

Two findings from cognitive research have important implications for effective teaching, namely, the more background knowledge a learner has about a subject, the more effective the learning (domain-specific knowledge), and, learners who are most skilled at monitoring and controlling their use of cognitive strategies, learn and solve problems using strategic knowledge, most effectively (Lefrancois 1997:226).

Although useful, the researchers proposed learning approach does not limit the outcomes of learning to Gagne's five major domains --- the approach includes other outcomes such as emotional control, spiritual development etc. As can be seen in chapter 3, the approach however does recognise the importance of metacognitive skills and links these to the concept of self-awareness, where metacognitive skills can be described as the learner's awareness of their cognitive skills. Much of the work on metacognition has been designed to make individuals more knowledgeable about their own abilities and limitations and about how to use these abilities and work around the limitations. These are important aspects of the learning approach and while learners are made aware of thinking skills, this is related to self-awareness and both contribute to self-actualisation.

#### 2.4.3.5 Recent cognitive theories

Thinking strategies form prerequisites for studying. Coles and Robinson (1991:94) describe the Oxfordshire Skills Programme, which was designed to enhance the learner's thinking. Sternberg (Coles & Robinson 1991:11), divides thinking skills into three types, namely, a) executive processes which are used to plan, monitor and evaluate one's own thinking, b) performance processes which are used to actually carry out that thinking and c) learning processes which are used to learn how to think.

According to this programme, team thinking may be equated with problem solving and involves creative thinking, critical thinking and reasoning. The programme team readily accepted the following diagram as a representation of the field of thinking skills.

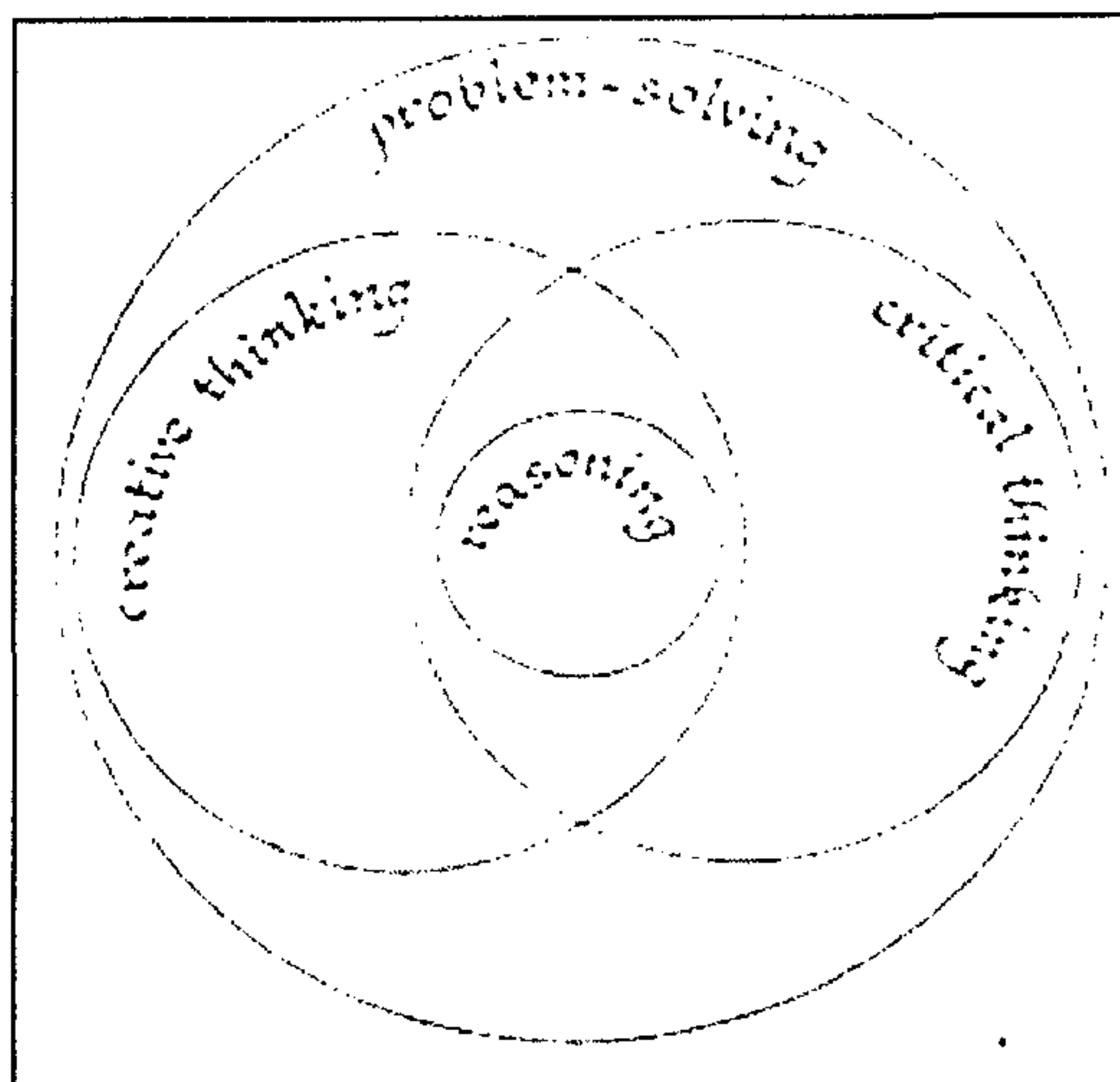


FIGURE 2.12 *Ennis field of thinking skills*

**Source:** Coles and Robinson (1991:94)

Each area of thinking is a concern of this programme. Critical thinking is defined as disciplined thinking, in accordance with given or accepted principles, and is focused on deciding what reasonably to believe or do. Creative thinking is disciplined thinking that



realises new problems, strategies and conclusions in focusing on what to believe or do. Reasoning, at the centre of the field, represents deductive and inductive capability and the resolution of value judgments. Effective thinking exhibits all these qualities.

Another example supplied by Coles and Robinson (1991:115) is the Somerset thinking skills working model. The aim of this model is to produce a set of activities, which, if used according to teacher guidelines, will enhance learning ability. Teaching thinking means taking into account the fact that good thinkers display particular dispositions and attitudes, as well as a wide range of cognitive skills and strategies. Therefore they have also acquired recognition of the need for self-knowledge and self-control of learning and problem-solving strategies as seen in the following outline of this model:

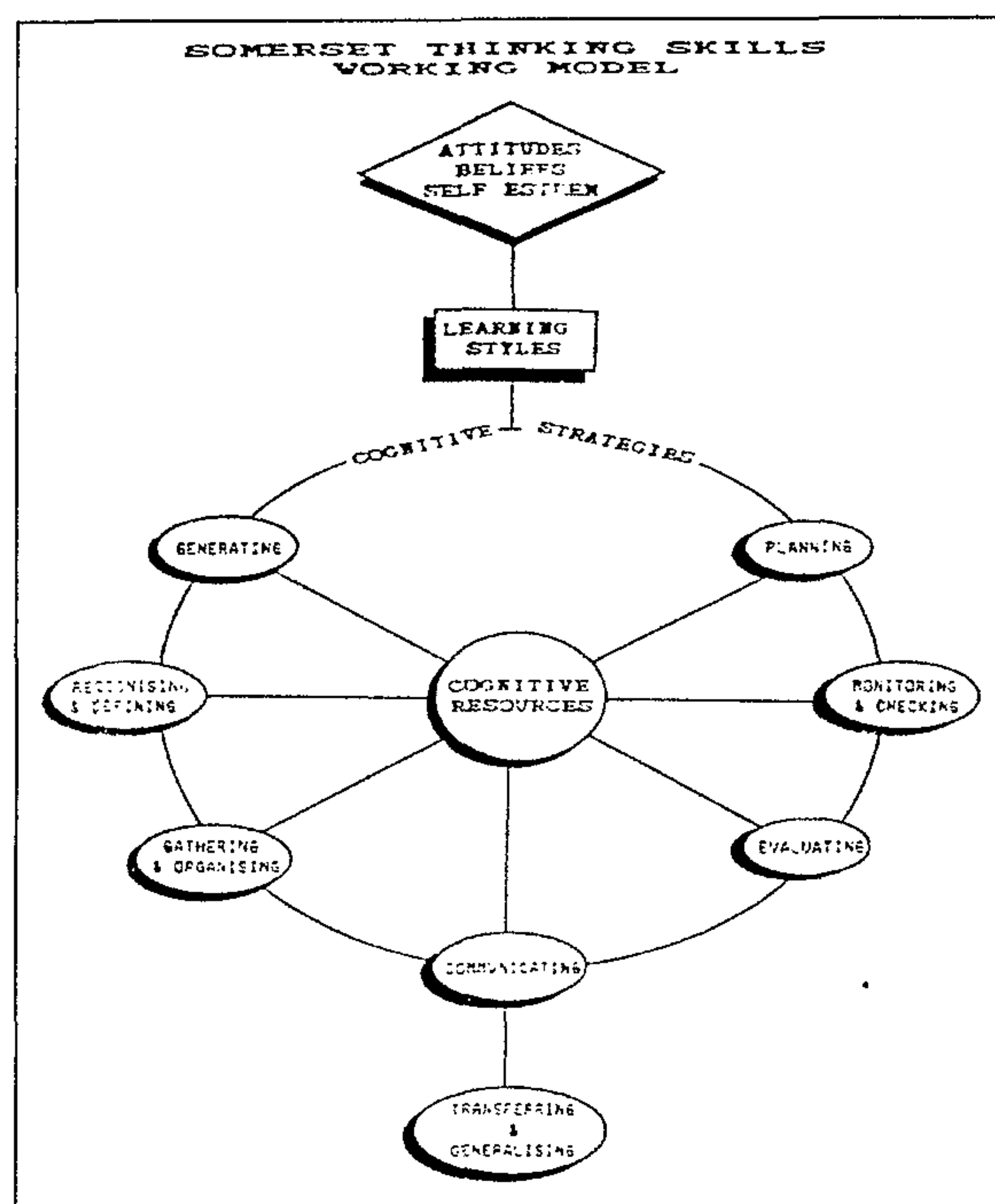


FIGURE 2.13 *Somerset thinking skills working model*

Source: Coles & Robinson (1991:115)

To an extent, an OBE curriculum section of “teaching children to think” (see figure 2.14 below) describes how through OBE, relevant content is used to encourage the development of thinking and problem-solving skills (Evans & Wallace 1998:8-9). The

accompanying representation reveals how the development of the critical outcomes is interpreted into a range of related thinking and problem-solving skills. This model reinforces the adaptability of the researcher's proposed approach to the OBE system.

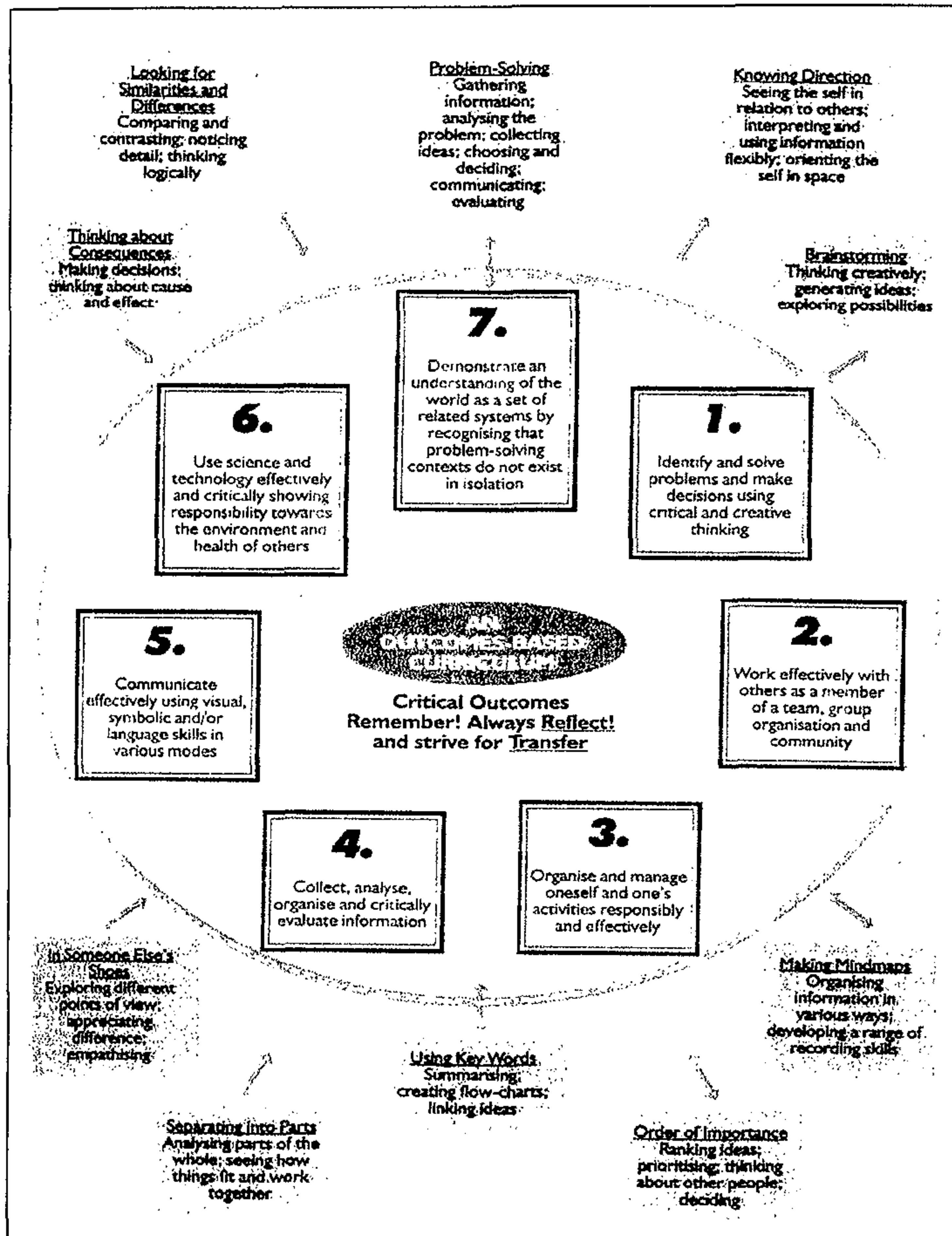


FIGURE 2.14 *Thinking skills developed in "Flexi-Think!"*, the achievement of the critical outcomes of an Outcomes Based Education field.

Source: Evans & Wallace (1998: 9)

#### 2.4.4 Humanistic approach to education

Humanistic approaches emphasize intrinsic motives such as those relating to autonomy, competence and self-actualisation through personal development of students and the enhancement of positive self-concepts. Humanistic theories are concerned with the uniqueness, the worth and the dignity of the self. As previously mentioned in 2.3.1, the major emphases of humanistic approaches are greater attention to thinking and feeling, the development of self, clarification of values, openness, honesty and self-determination rather than to the acquisition of knowledge as illustrated below (Lefrancois 1997:339):

EMPHASIS	PRACTICAL IMPLICATION
1. <i>Affect</i>	School places much greater emphasis on feeling and thinking and less on the acquisition of information
2. <i>Self-Concept</i>	One of the most important educational goals is the development of positive self-concepts in children
3. <i>Communication</i>	Teachers pay particular attention to the development of human relationships and honest interpersonal communication
4. <i>Personal Values</i>	Schools recognize the importance of personal values and try to facilitate the development of positive values

FIGURE 2.15 *Humanistic approaches to education*

Source: Lefrancois (1997:326)

The concept of self-actualisation, as originally formulated by Maslow, and described in 2.3, has been developed over the years by a number of researchers in the light of particular outlooks on humanity, life and the world. According to Prinsloo (1994:91), an adequate guidance situation becomes the pre-requisite for a child's capacity for self-actualisation. The task of parents is to supply an educational climate throughout the child's life with a shift in emphasis as the child develops, from meeting the biological needs through towards freedom and self-knowledge with an increase in opportunities for self-perception, self-evaluation, self-concept formation and ultimately self-actualisation.



## 2.5 INTEGRATIVE APPROACHES TO LEARNING

Ideally, the learning environment should be all-inclusive, thus providing support to optimise learning. The following model for developing human potential shows the components of an integrative education system, aimed at holistic education for the self-actualising learner.

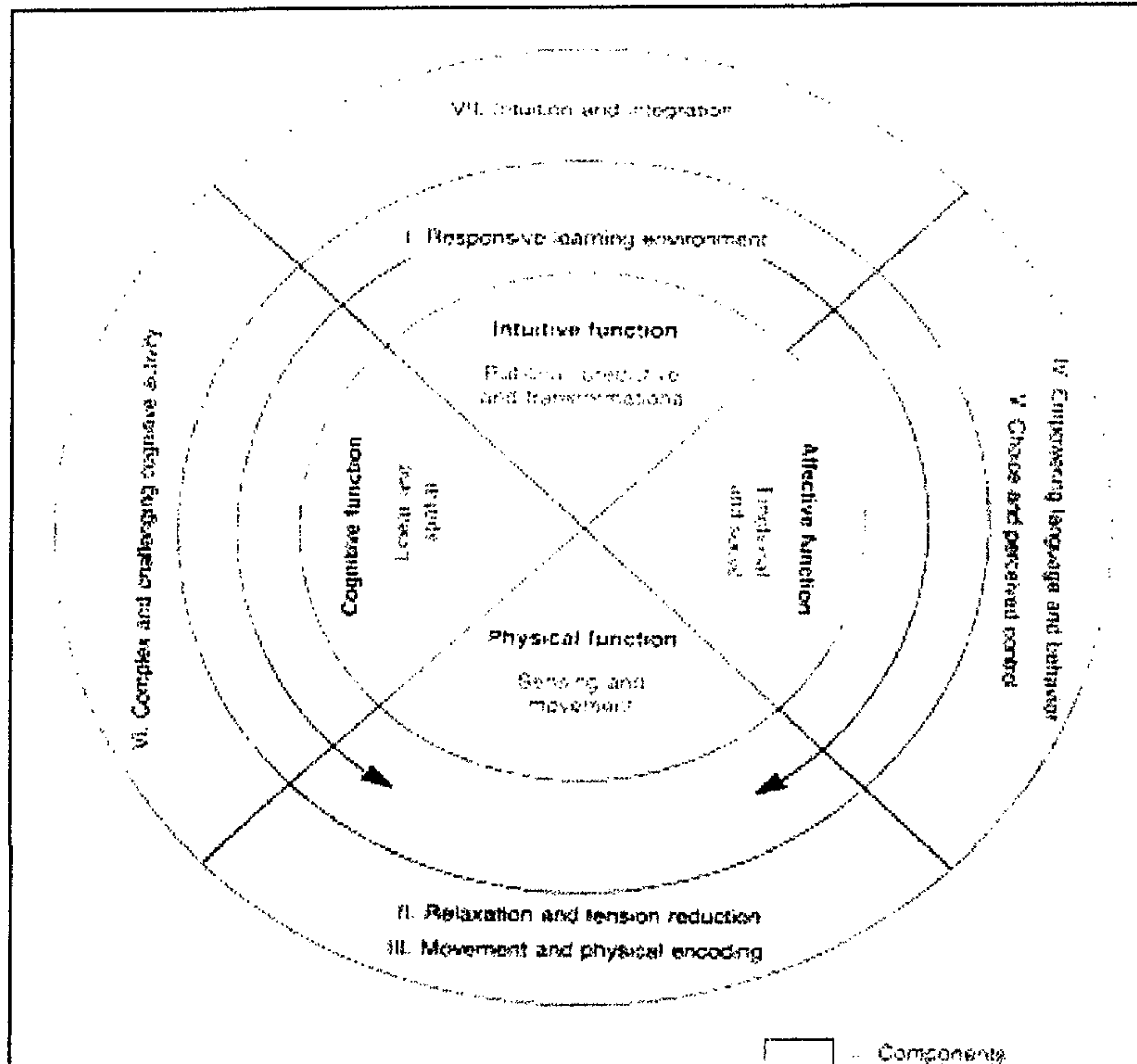


FIGURE 2.16 *An Integrative education model*

Source: Kokot (1992:155)

The child in the learning situation presents a didactic situation that involves adult and child with subject matter relating to the empirical-educational categories of involvement, significance attribution, experience, self-actualisation and formation of self-concept. If, for any reason, there are learning problems this cycle takes a negative turn. The aim is to

achieve a positive course of learning events in order to promote self-actualisation (Kokot 1992:155).

The aim of the new education system, OBE, provides the basis for an integrative learning approach. The rationale behind Life Orientation (LO), a component of OBE, is fundamental in empowering learners to live meaningful lives in a society that demands rapid transformation. Through LO, learners begin to understand and accept themselves as unique and worthwhile human beings, use skills and display attitudes and values that improve relationships in family, group and community, respect the rights of people to hold personal beliefs and values, demonstrate value and respect for human, practice acquired life and decision making skills, assess career and other opportunities and set goals that will enable them to make the best use of their potential and talents, demonstrate the values and attitudes necessary for a healthy and balanced lifestyle and evaluate and participate in activities that demonstrate effective human movement and development.

Life Orientation is an integral part of education and is central to the holistic unfolding of the learners, caring for their intellectual, physical, personal, social, spiritual and emotional growth. LO enhances the practice of positive values, attitudes, behaviour and skills in the individual and the community. LO promotes the achievement of individual learners' potential by strengthening and integrating their:

- self-concept
- capacity to develop healthy relationships
- ability to make informed and responsible decisions
- independent, critical and creative thinking
- survival and coping skills
- commitment to life long learning
- pleasure in the expression and co-ordination of their intellectual, physical, spiritual, emotional and moral powers.

While the above-mentioned theories have proved to be effective in many learning situations, there is no one theory that emphasises the role of the brain as co-ordinator and creator of mental functioning. The value of the researcher's learning approach is that it

focuses on teaching the learners about the unlimited potential of the brain and encouraging them to maximise their potential by concentrating on their brain's capabilities. Neuropsychological theories are used to accomplish this task as neuropsychology provides the necessary link between utilizing the brain's potential and improving academic, personal and interpersonal outcomes.

## **2.6 EXISTING LEARNING PROGRAMMES WITH A NEURO-PSYCHOLOGICAL PERSPECTIVE**

According to resources available to the researcher, very few neuropsychologically based learning programmes have been implemented or developed. As yet no single theory offers a complete answer to the question of what the area of learning and self-actualisation using a neuropsychologically based approach has to offer. However, there have been investigations into this area and the focus appears to be changing in light of the newfound neuropsychological knowledge. Recent studies show that various learning theories link part of their strategies to neuropsychological aspects.

- a) McCarthy (1990:33) describes four major learning styles that categorise learners. They are:
- Imaginative learners (creative, original learners)
  - Analytic learners (creating theories, conceptualizing, sequential thinking)
  - Common sense learners (applying theories in practise, solving problems, strategic thinking)
  - Dynamic learners (thriving on action, challenges, new experiences, influencing people)

To this McCarthy (1990:34) adds the different ways in which the left and right brain hemispheres process information. Certain of these aspects are emphasised/encouraged in the LP, especially the first two imaginative and analytic, e.g., use of imagination in visualisation and formation of memory strategies and use of analysis in formation of categories and concepts.



- b) Hermann (1991:286) describes an entire brain teaching and learning model, as seen below, which divides the learning process into two categories:
- Structured (left) --- where hard processing, dealing with logical, rational, critical, quantitative issues and activities takes place, as well as procedural activities involving planned, organised and sequential elements of the learning process.
  - Unstructured (right) --- where the non-linear and non-verbal aspects of learning are highlighted. This area involves visual, conceptual and simultaneous processing as well as the processing involving emotional, expressive and interpersonal activities.

According to Hermann (1991:287), the structured and unstructured categories comprise the full range of preferences for teaching and learning. "This [means] that every learning point would be expressed through some kind of experiential or unstructured medium in addition to verbal, didactic information".

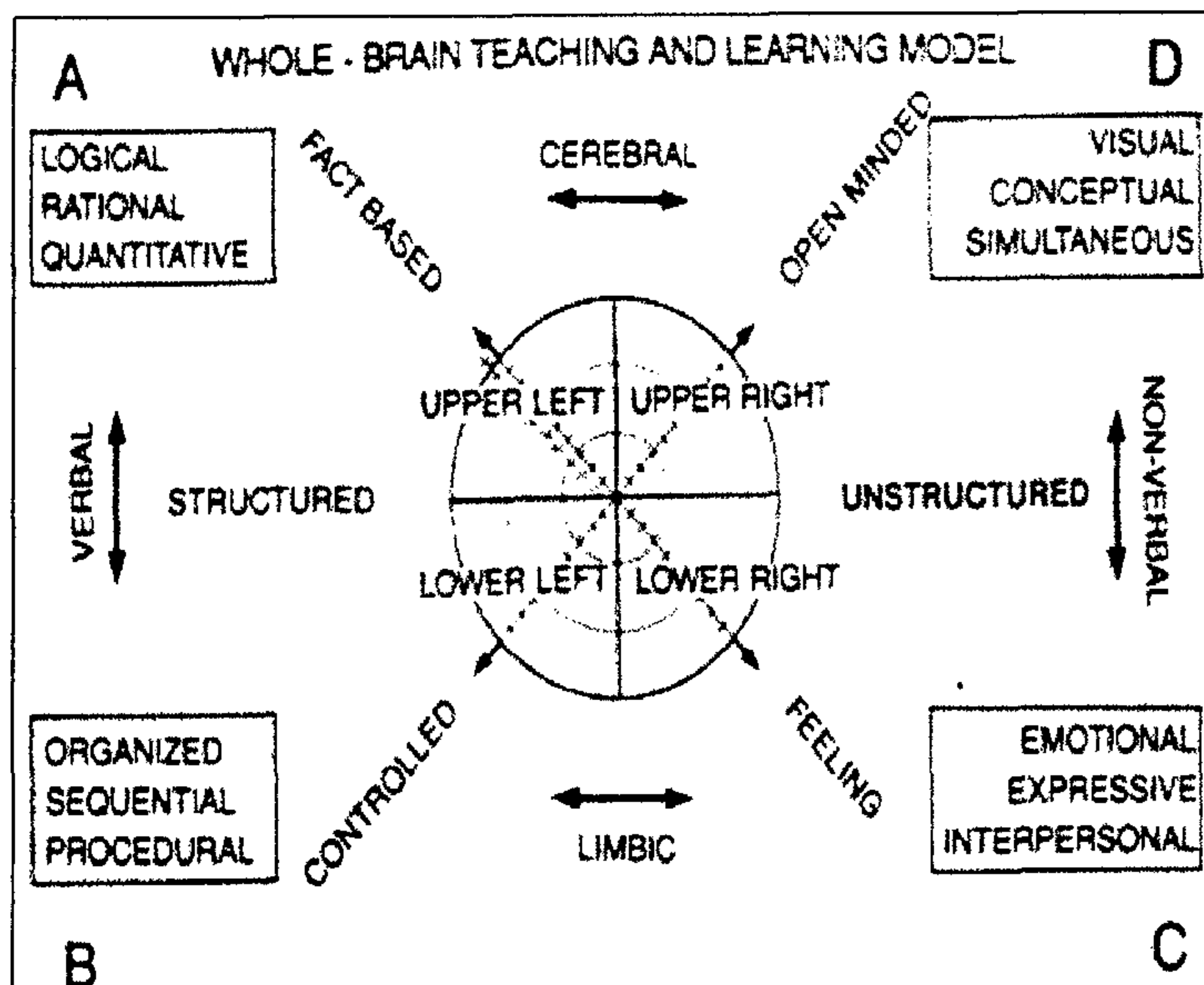


FIGURE 2.17 *Whole-Brain Teaching and learning model*

Source: Hermann (1991:287).

- c) Expanding on Hermann's model, Benziger's Whole Brain Model (Benziger & Sohn 1993:8) shows similarities with Herrmann's brain divisions. Besides this, Benziger attempts to classify "how and why humans think the way they do; why they don't all think alike and why some of them are better at certain types of thinking than others" (Benziger & Sohn 1993:1). This model assists in the understanding, anticipation and management of human behaviour.
- d) Russell (1997:100) describes the organisation of material and the formation of associations as effective learning methods. He notes that associations provide cues giving information about which part of the memory one should look in; the more associations there are, the more specific the search can be. Organisation, however, suggests that through repetition, the mind continuously constructs its own organisation on material. These are two cognitive strategies, which take prominence in the LP.
- e) Fanselow (1999:275-283), in his article "Learning theory and neuropsychology", provides an example of how theoretical and neuropsychological learning approaches can be combined. The formal ideas of learning theory can help detail the operating characteristics of memory systems, based on neuropsychology. Iran-Nejad and Homaifar (2000:153-183) describe how factors that contribute to learning and remembering have their origin in different sources of control and learning processes, and how any active learning occurs with the simultaneous influence of many factors. In this sense, learning and remembering are multi-source phenomena.
- f) Leaf (Sunday Times 1999) describes her note-taking method of metacognitive mapping (an advanced form of mind-mapping) as a useful structural tool which helps organise information in a brain-compatible way, using the brain's natural functions to process, organise, store and retrieve information. The researcher finds these metacognitive maps confusing as some of the information is presented upside down. In the LP, the learners are encouraged to make their mindmaps

(based on Buzan's methods) meaningful, while simultaneously constructing them in an organised, orderly, albeit non-linear fashion.

- g) Ashby and Waldron (2000:10-14) describe how recent neuropsychological insights into learning have produced a neuropsychological theory of category learning. The theory postulates separate, competing explicit and implicit category learning systems that are simultaneously active at all times.

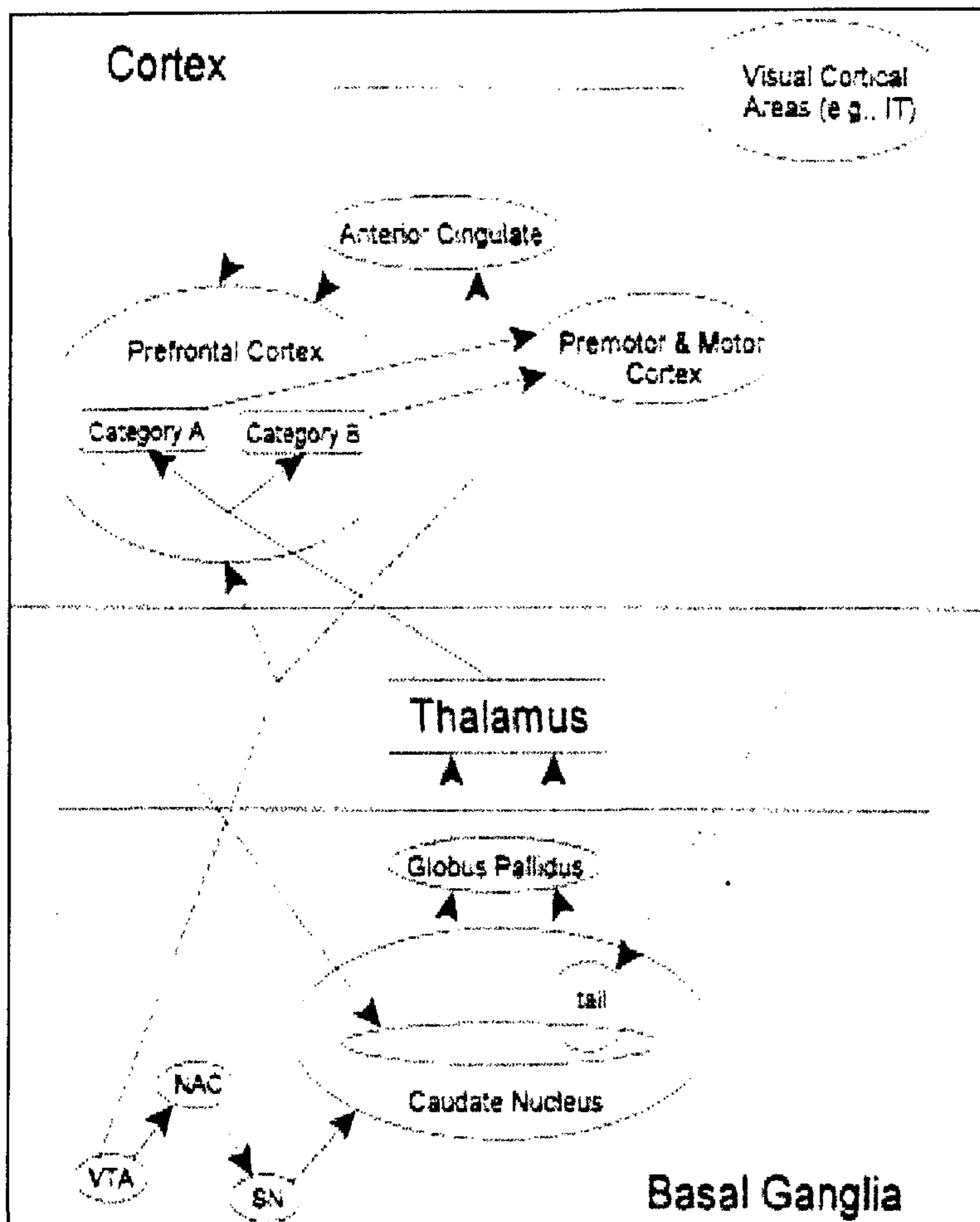


FIGURE 2.18 *Three hierarchical levels in the COVIS theory*

Source: Ashby and Waldron (2000:10-14)



This theory, “*COmpetition between Verbal and Implicit Systems*” (COVIS), includes the most important neural structures and pathways. As seen in the above diagram, there are three hierarchical levels in the COVIS theory, the cortex, thalamus and the basal ganglia. The two systems are mediated by parallel loops following the path: the cortex-caudate-globus and pallidus-thalamus. COVIS assumes that each caudate unit functions to associate a category label, or perhaps an abstract motor response with a large group of visual cortical cells; this (procedural) learning process is facilitated by a reward signal mediated by the neurotransmitter dopamine. This theory once again highlights the use of brain structures in multiple, hierarchically organised forms --- an important consideration for learning theorists Ashby and Waldron (2000:10-14).

### **2.6.1 Criticisms of a neuropsychological approach**

Some authors have strongly criticised the neuropsychological approach, maintaining that, it overemphasises the chronic, medical and pathological aspects of brain damage; that it underestimates the part played by psychopedagogic intervention; that neuropsychological knowledge is still incomplete; that it leads to needless negative labelling, that it shifts the onus from the teacher on to the medical practitioner; that it does not stress the importance of psychosocial factors; and that it leads to a simplistic one to one matching of neurological findings with behavioural manifestations (Botha 1980:34-36).

As neuropsychology means that learners’ general performance is explained on the basis of the functioning of their brains, it has been said that the learner as a person disappears when he or she is analysed in medical terms – the so-called clinical medical model. In defense, it can be said that when learners have certain neurological problems, which are correctly medically diagnosed and treated, they are better able to develop as whole people.

However, the emphasis of the neuropsychological approach should not be underestimated. Many factors influence human behaviour. Psychological and social factors are of equal importance and should also be taken into consideration during

learning. Therefore the affective aspects should be assessed together with the cognitive. Learners in the world must be seen in their totality of being human, in terms of what affects them from outside in their life worlds. Learners are after all thinking and feeling individuals.

## **2.7 IN CONCLUSION**

Studies linking the development of the brain with environmental experience support the concept that early stimulation is extremely important for the neural, motor and intellectual development of children. As brain development and mechanisms for higher cognitive processes are implicated in educational, remedial, diagnostic and therapeutic disorders, in the same way the brain structure and functions can be used to stimulate learning, by enhancing awareness of brain potential.

A curriculum presents with possibilities for meaningful, relevant learning when considered in terms how it can assist learners to find themselves, realise their potential, use their personal resources in productive ways and enter into relationships that have a positive influence on their attitudes towards others and themselves. The psychological content of a curriculum refers to those aspects of schooling that offer possibilities for knowing more about oneself. Learners lose their motivation to learn when meaning, purpose and belief are absent from a curriculum. By providing learners with opportunities to use their knowledge in meaningful ways, learning is enhanced (Hamachek 1995:531).

A neuropsychological perspective allows for individual differences of learners through instruction. Learners' achievements are influenced by their personal characteristics, such as intelligence, study habits, attitude, personality and motivation. Neuropsychology's contribution to learning includes the enhancement of self-awareness and self-concept, knowledge of unique brain potential and related learning processes as well as motivational aspects related to brain awareness. Chapter 3 will provide an overview of neuropsychology, brain structure and functions and how they relate to the proposed learning programme (LP) aimed at unlocking latent potential.

**CHAPTER 3**  
**LITERATURE STUDY**  
**A NEUROPSYCHOLOGICAL APPROACH**

**3.1 INTRODUCTION**

The aim of this chapter is to introduce a learning programme (LP) that will assist the learners to self-actualise and thereby give expression (unlock) to their latent potential. As described in 2.3, research has shown that self-actualisation can be achieved by providing guidance for learners in a supportive and creative environment in addition to creating awareness of and belief in the unique self. The benefits of achieving this through a neuropsychological approach, include enhancing self-concept and providing intrinsic motivation, while creating awareness of the importance of the brain's capacity, structures and functions to the learning process, the need to effectively store information for future retrieval through specific brain processes, brain potential (intellectual potential) and the importance of developing this potential with a view to unlocking potential and leading to self-actualisation.

Neuropsychology is a basis for such a LP, therefore will be introduced as a means to providing insight into various learning fields, such as thinking, memory processes, note-making and self-awareness. The field of neuropsychology assists in the application of brain structure and functions to the psychological aspects of education.

Basic anatomy of the brain is essential in order to understand the role of neuropsychology in learning and as such, needs to be included in this study. Aspects of the LP will be linked to the relevant brain structures where applicable. Of note, however, is the fact that in most cases, more than one brain structure or region is involved in certain learning dynamics.



### 3.2 INTRODUCING NEUROPSYCHOLOGY

The developing brain's higher cortical functions are the ultimate expression of human mental information processing, consisting of a number of psychological processes according to (Luria 1973:66), an authority in the field of neuropsychology.

*“The study [neuropsychology] has two objectives. First, by pinpointing the brain lesions responsible for specific behaviour disorders, we hope to develop a means of early diagnosis and precise location of brain injuries. Second, neuropsychological investigation should provide us with a factor analysis that will lead to better understanding of the components of complex psychological functions for which the operations of the different parts of the brain are responsible “ (Luria 1973:66).*

Since all human actions stem from the function of the central nervous system, Neuropsychology is recognised as the science that places a steadily growing area of knowledge at our disposal, and helps to explain human behaviour.

Neuropsychology has given us greater insight into some of the processes of perception, and cognition (including learning, memory, problem solving and adaptation), as well as behaviour (Walsh 1991:259). Memory and learning skills are frequently impaired following brain damage in childhood; therefore neuropsychological knowledge is important for the efficient acquisition of cognitive, educational and social skills throughout all developmental stages (Anderson & Lajoie 1996:128). Neuropsychological evaluation gives us a clear picture of children's strengths and weaknesses, while providing insight into their distinctiveness. It also emphasises the fact that we are not dealing with a homogeneous group of children, that each child is unique, and due to the specific nature, extent, localisation, etc, of their brain damage, they manifest a unique problem pattern. Based on the fact that neuropsychological assessment provides a lot of insight into the brain's unique way of functioning, current remedial programmes utilise a combination of neurological and psychological material. Just as the learner with brain damage manifests a unique problem pattern, the learner without any damage or

dysfunction also has a unique way of processing and of learning --- a way that does not necessarily conform to the traditional, linear mode of learning. Thus, one of the aims of the LP is to encourage the learners to discover their unique, non-linear modes of processing information, while encouraging them to discover their unique intelligences (see Gardener's theory below in 3.3.3.2), and therefore a most effective way of learning.

Regardless of the vast amount being discovered about the capacity and functioning of the brain, few people know how to make the most of their brains. An important reason being that as children few of us were taught about our brain's potential and about mental functioning. According to Russell (1997:7), "we were probably told to remember various facts, but not taught about how memory works, we were told to remember, told to study and make notes, but not taught in what form information is most easily assimilated by the brain". Russell (1997:7) goes on to explain how the brain thrives on experience and that, to make full use of its innate potential, we should allow it a rich, varied and stimulating environment. He uses Einstein as an example of one of the most creative intellects known – a person who maximised his brain's potential by integrating both left and right hemispheric functioning, and by placing creativity and perseverance above success. Einstein continually stimulated and challenged his brain and was mentally active right up to his death at the age of seventy-seven.

### **3.2.1 Neuropsychological perspectives on learning**

The chief attribute of human beings is their ability to think, and this is the ability necessary for successful living and learning. Progress in schoolwork relies on the learner's ability to think. Although learning and thinking are closely related, broadly speaking the learning precedes the thinking. Vinacke (Behr 1988:85) puts it thus: "Thinking is the use, or reorganization or application, of what has been learned – a definition which does not exclude the fact that a person may be thinking while learning". The cognitive processes known as thinking involve reasoning, judging, conceiving, imagining and problem solving. These complex processes each reflect the interaction of different sorts of behaviour.



In order to understand learning in children from a neuropsychological perspective, the following brain- related perceptual abilities need to be assessed.

- Perception (visual, auditory and haptic)
- Language development
- Imagery – both verbal and non verbal
- Thought – inductive and deductive modes of thought
- Memory – short term, long term, visual, auditory and haptic memory
- Sequence – verbal and non verbal, visual and kinesthetic sequence
- Motor speed and accuracy - motor impairments
- Dominance – preferences of hand, foot and eye
- Sensory motor integration
- Academic achievement – specific problems in an academic context concerning spoken language, reading, writing, spelling and mathematics (Botha 1984: 36).

According to Carlson (1994:432), learning refers to the process by which experiences change our nervous system and our behaviour. Experiences change the way we perceive, perform, think and plan, and do so by physically changing the structure of the nervous system, altering neural circuits that participate in perceiving, performing, thinking and planning. Carlson goes on to describe different types of learning. Perceptual learning consists of changes in perceptual systems that make it possible for one to recognise stimuli and to respond appropriately. Stimulus-response learning, as described in 2.4.1.1 of chapter 2, consists of connections between perceptual and motor systems. Simple perceptual learning – learning to recognise particular stimuli or categories of stimuli – appears to take place in appropriate regions of the sensory association cortex as described in section 3.3.3 (Carlson 1994:437). Motor learning, although it may primarily involve changes within neural circuits that control movement, is guided by sensory stimuli; thus it is actually a form of stimulus- response learning.

Both forms of stimulus-response learning (perceptual and motor) may occur as a result of strengthened synaptic connections, as described by the Hebb rule. The Hebb rule states that if a synapse repeatedly becomes active at about the same time that the post-synaptic



neuron fires, changes will take place in the structure or chemistry of the synapse and strengthen it (Carlson 1994:434). Consequently, the simultaneous use of more than one sensory modality (e.g. visual and auditory) will strengthen these connections and thereby strengthen the memories formed during this process. In accordance with this theory, the LP encourages the learners to make use, of not only multiple sensory modalities, but also of multiple brain pathways, the latter, which is accomplished through the use of mindmaps (see section 4.2.10 in chapter 4). As such, mindmaps are a form of relational learning --- a form of learning that strengthens the relationship between different concepts or phenomena, thereby strengthening the memories formed and rendering the material easier to retrieve.

According to relational learning, the most complex form of learning includes the ability to recognise objects through more than one sensory modality, to recognise the relative location of objects in the environment, and to remember the sequence in which events occurred during certain episodes (Carlson 1994:437). The hippocampus, detailed in 3.5.1, plays a crucial role in complex learning. The original role of the hippocampal formation may well have been to provide spatial orientation and keep track of multiple stimuli that define spatial location, however, this role has now expanded to include learning relations among non-spatial stimuli/situations as well (Carlson 1994:509).

From the descriptions of the different types of learning, it can be deduced that the association areas of the cerebral cortex, the hippocampal gyri of the limbic system and the thalamus are all involved in learning and remembering (as explained in 3.5.1). The fact that the emotional part of the brain (limbic system), is utilised in learning and memory, emphasises the fact that emotions have a profound impact on the learning process, and as such, one needs to utilise one's emotions in learning, as well as exercising emotional control in order to maximise learning, as portrayed in the LP, and can be seen under the section 4.2.4, titled 'Manage yourself'.

The association areas, as described in 3.3.3, are concerned with interpretation of visual, auditory and other general sensory information which all meet in the general interpretive

area. This area lies in the posterior portion of the superior temporal lobe and in the anterior portion of the angular gyrus (see section 3.3.2.1). Because impulses from all of the sensory areas are received and integrated in a general interpretive area, this part of the brain is thought to play a very important role in thinking (Sternberg 1995:295). This concept of integrated functioning is taught to the learner via the LP (see section 4.2.6), which encourages the learners to maximise their brain's potential by utilizing as many areas as possible.

In addition, the learners are challenged to make use of complex, patterned thinking, as opposed to the linear restrictive mode of thinking, which most learners find boring. The human brain is very different from a computer. Whereas a computer works in a linear, step-by-step fashion --- albeit very fast --- the brain works associatively as well as linearly, carrying on thousands of different processes at the same time, comparing, integrating and synthesising.

Luria (1973:175) proposes a view of brain organisation whereby the activities of both hemispheres are responsible for the individual's neuropsychological functioning, while each hemisphere makes contributions at a different level of functioning. Interestingly, Diaz de Chumaceiro (1997:178) quotes Hoppe and Kyle, who note that marked imbalances between the two hemispheric styles can contribute to mental problems, and consequently, in order to promote mental health, the authors suggest the promotion of bilateral integration and the stimulation of more creative mental processes. According to Sperry (Gaddes 1980: 177), there appears to be two modes of thinking, verbal and non-verbal, represented separately in left and right hemispheres, respectively, and that our educational system, as well as science in general, focus's on developing the verbal aspect of thinking and therefore tends to neglect the non-verbal (right hemisphere) form of intellect. The purpose of neuropsychology as a basis of the LP, raises awareness of brain functioning and will therefore encourage the learners to utilise both hemispheres, creatively, in the process of learning, thereby minimizing their effort and maximising their output (see section 4.2).



At some stage the joy of learning often turns into “hard slog”. Learning becomes equated with the acquisition of bits of information necessary to pass tests and get promotion to the next grade. Subjects are isolated both from one another and from the real world --- a source of stress. Why can't learning remain the pleasure it was when we were young – before “learning” became confused with schooling? “Why can't education recapture something of the exploratory excitement of the young child when he is seeing, hearing, smelling, touching, and quite often tasting, the great uncharted world in which he finds himself?” (Rose & Nicholl 1997: 62). Unfortunately, the natural connection between cognitive growth and enjoyment tends to disappear with time. Perhaps because “learning becomes an external imposition when schooling starts, the excitement of mastering new skills gradually wears out” (Rose & Nicholl 1997:62).

One reason young children learn so well is that they haven't developed preconceptions about how they are supposed to learn. Also, they have not developed the notion that play and work are mutually exclusive activities. Play is an important part of the learning experience. When we enjoy learning, we learn better. How do we make learning successful and enjoyable? We can do so by:

- motivating the mind and having high expectations of success
- ensuring the subject is relevant – one wants to learn when one sees the point of it
- ensuring the learning is emotionally positive
- consciously involving all the senses as well as left and right hemisphere thinking
- challenging the brain to think through and explore what is being learnt with as many intelligences as are relevant to make personal sense of the experience
- consolidating what is learnt (Rose & Nicholl 1997:62).

An appreciation of how the brain works is fundamental to an understanding of the learning process --- and an understanding of how the brain functions is a pre-requisite to realising one's brain potential. In light of this, the brain will be briefly introduced using the LP's mnemonic methods, as detailed in 3.4.1.1. The cerebral cortex (the upper brain, variously called the rational brain, the “conscious” brain, the intellectual brain, the “thinking cap” that lies over the central lower brain) is the seat of intelligence – the part



of the brain that makes humans a unique species. This is the part of the brain identified as 'Cedric, the cerebrum' (see figure 3.1), which handles seeing, hearing, creating, thinking, talking – all of the higher mental activities, in addition to the perception of sensation for which the neocortex is divided into specialist lobes for speech, hearing, vision and touch (as seen below and described in 3.3.2). Furthermore, in the neocortex, decisions are made, the world is organised, experiences are stored in memory, speech is produced and comprehended, paintings are seen and appreciated, and music is heard and enjoyed. This means sensory memories are stored in different places (Rose & Nicholl 1997:32).

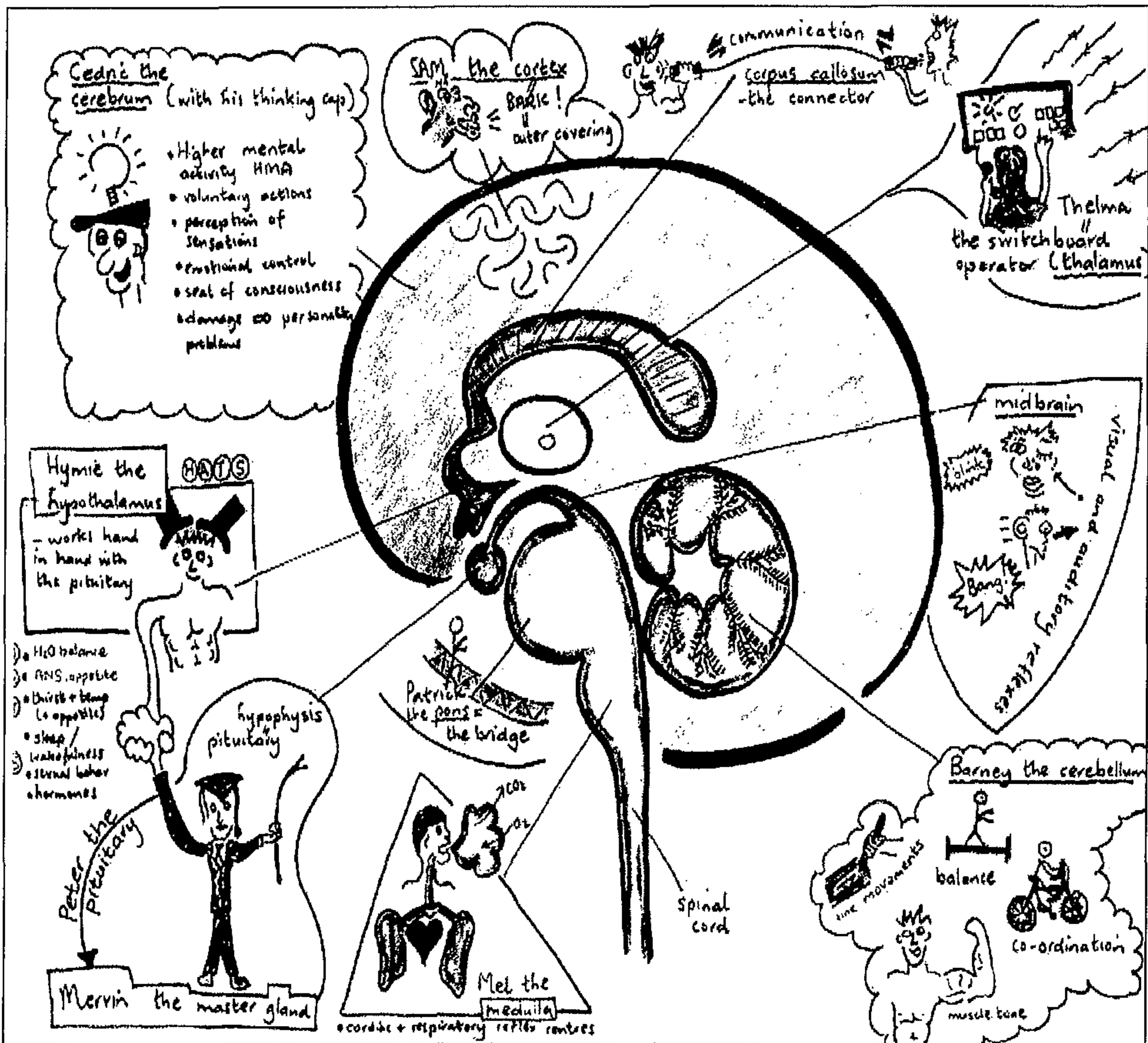


FIGURE 3.1 Memory strategy techniques for learning brain structure and functions

Source: Researcher

The structure and functions of the brain (as a basis of neuropsychology), together with the LP's educational aspects (see chapter 4), form a unit – all contributing to the functioning of the self-actualising learner. The following section, 3.3, deals with basic information about the human brain – its structure and the unique way in which it functions.

This will provide the link between neuropsychology and optimal functioning, where optimal functioning is defined as self-actualisation in the LP (see section 4.2.2).

### **3.3 BASIC ANATOMY OF THE NERVOUS SYSTEM**

The nervous system consists of the spinal cord and the brain consisting of nerve cells or neurons. The human nervous system is a unit, although there are two distinct parts:

- The central nervous system – this comprises the brain, midbrain, brain stem, cerebellum and spinal cord. The brain has two hemispheres, three divisions and four lobes. The spinal cord consists of ascending and descending tracts.
- The peripheral nervous system – this comprises the nerves (cranial nerves and spinal nerves), which form a communication network, that runs from the spinal cord and the brain stem to all the other parts and organs of the body (Kruger 1998:41). It is divided into:
  - a) the somatic nervous system, with sensory and motor components, where sensory components receive information from the environment through the sensory receptors in the body, and motor components, which send impulses to voluntary muscles to control voluntary activities.
  - b) the autonomic nervous systems (parasympathetic and sympathetic branches which control the unconscious activities of the body, e.g., breathing, heart rate, constriction and dilation of pupils and blood vessels and abdominal peristalsis).

The following diagram is an overview of the nervous system and its related components:

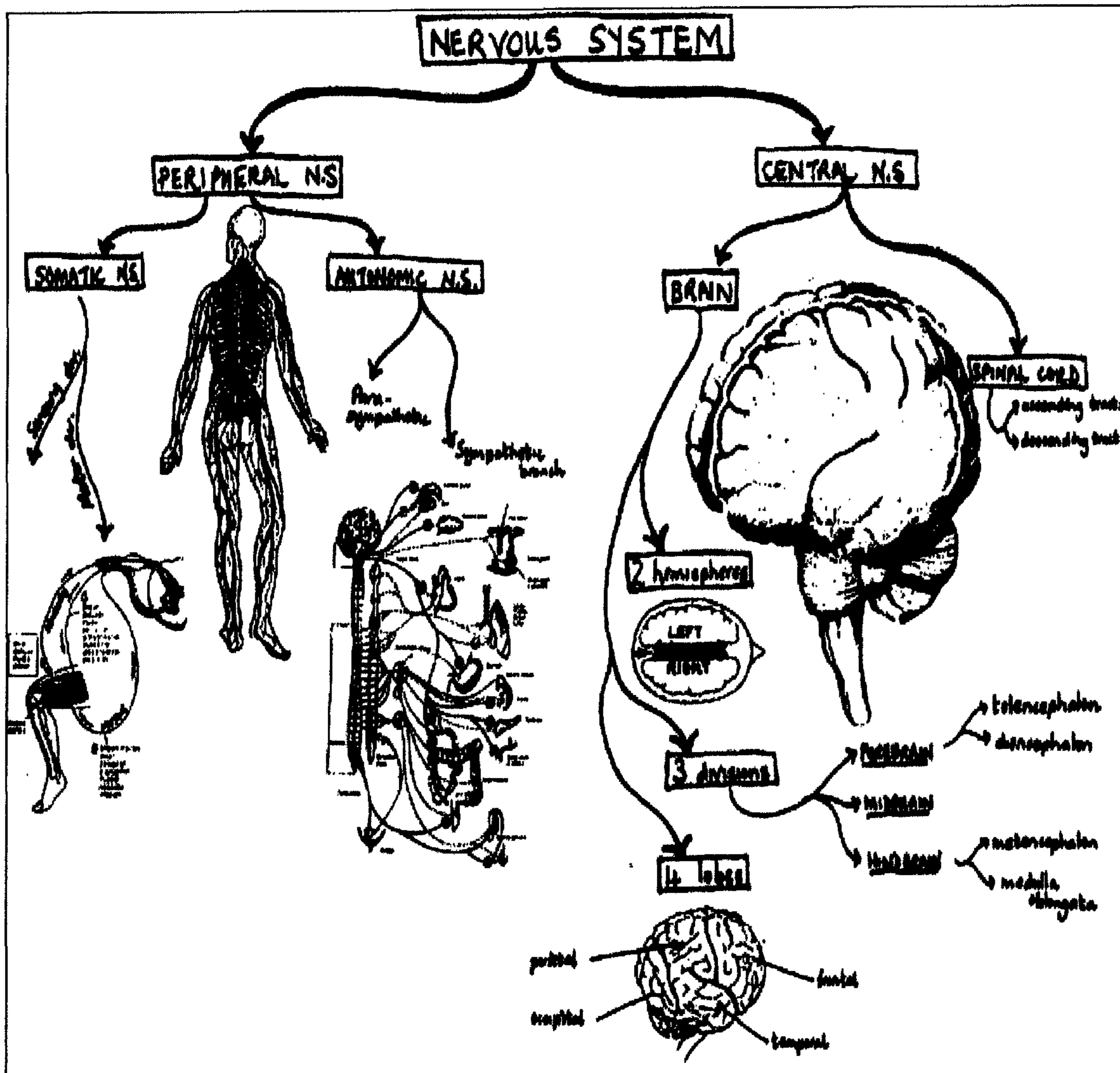


FIGURE 3.2 *An overview of the nervous system*

Source: Researcher



### **3.3.1 Nerve Tissue**

Nerve tissue consists of millions of nerve cells or neurons which conduct impulses, and connective tissue cells or supporting cells called neuroglia, which support and nourish the neurons. Each neuron in the central nervous system is linked to approximately 100 other neurons and that each can also receive impulses from 100 other neurons. The number of neurons in the human nervous system is estimated at more than 100 billion. These neurons are irreplaceable. Dendrites, which form the grey matter in the brain, are relatively small. Axons, which form the white matter, can vary in length, some extending from the head to the base of the spinal cord (Sternberg 1995:105). There are countless number of links that are possible between the approximately 100 billion neurons in the central nervous system. This provides an indication of both the complicated coordinations that are possible, as well as the choice of alternative linking pathways that can be used in the central nervous system.

#### ***3.3.1.1 The Structure of a neuron***

Neurons are highly specialized cells that conduct messages in the form of nerve impulses from one part of the body to another. Sensory neurons receive information from the environment and carry that information towards the spinal cord and/or brain. Motor neurons carry information away from the spinal cord and brain towards the body.

A neuron consists of a cell body and a number of processes (outgrowths). The cell body controls the metabolism and growth of the whole neuron and has a large nucleus surrounded by cytoplasm in which there are many nissl granules which contain ribosomal nucleic acid (RNA) for the synthesis of proteins and chemical substances or neurotransmitters.

Cell bodies are grouped together in the gray matter of the brain, spinal cord and ganglia. The cell body has one or more outgrowths and neurons are classified according to the number of outgrowths. Dendrites are outgrowths or processes that carry nerve impulses

to the cell body, and an axon carries impulses away from the cell body. The axon ends in a number of branches, the axon terminals, which each have a synaptic knob at their end.

The axons and dendrites form the nerve fibres, which make up the white matter of the brain and spinal cord. Most nerve fibres outside the brain and spinal cord are enveloped in a myelin sheath. The myelin sheath is formed by the lipoprotein of the cell membranes of Schwann cells, which are wrapped in several layers around the fibre. The outermost membrane of the Schwann cell is called the neurolemma. The sheath provides insulation and speeds up the transmission of impulses. The myelin sheath is interrupted by the 'Nodes of Ranvier'. Some nerve fibres on the autonomic nervous system are non-myelinated and are only partly enveloped by a schwann cell (impulses move slower when myelin is absent).

Figure 3.3 illustrates a motor neuron, its basic structure and figure 3.4 details the action at the synapse between neurons, as explained in 3.3.1.3.

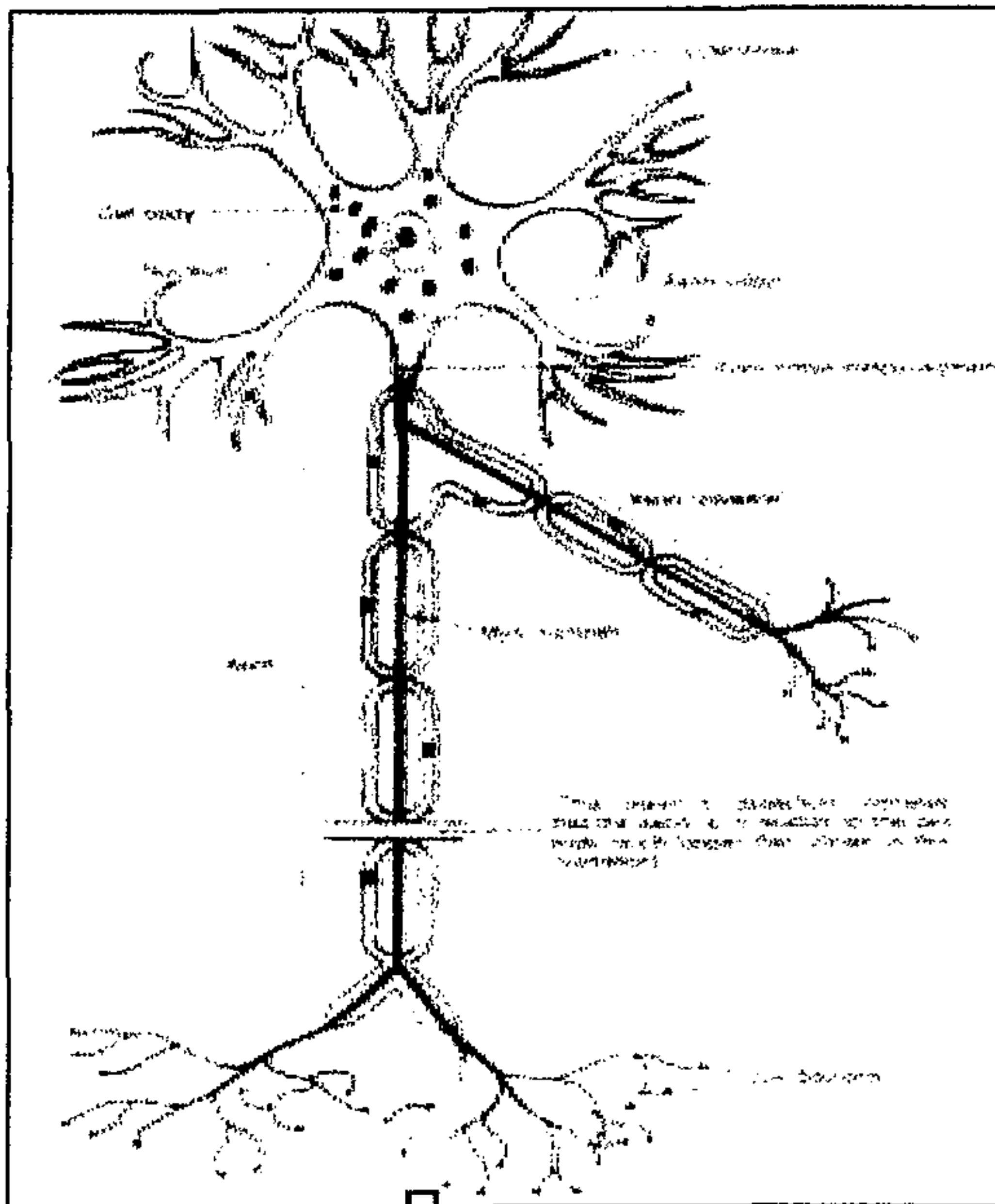


FIGURE 3.3 *A motor neuron*  
**Source:** Jordaan and Jordaan (1992:215)

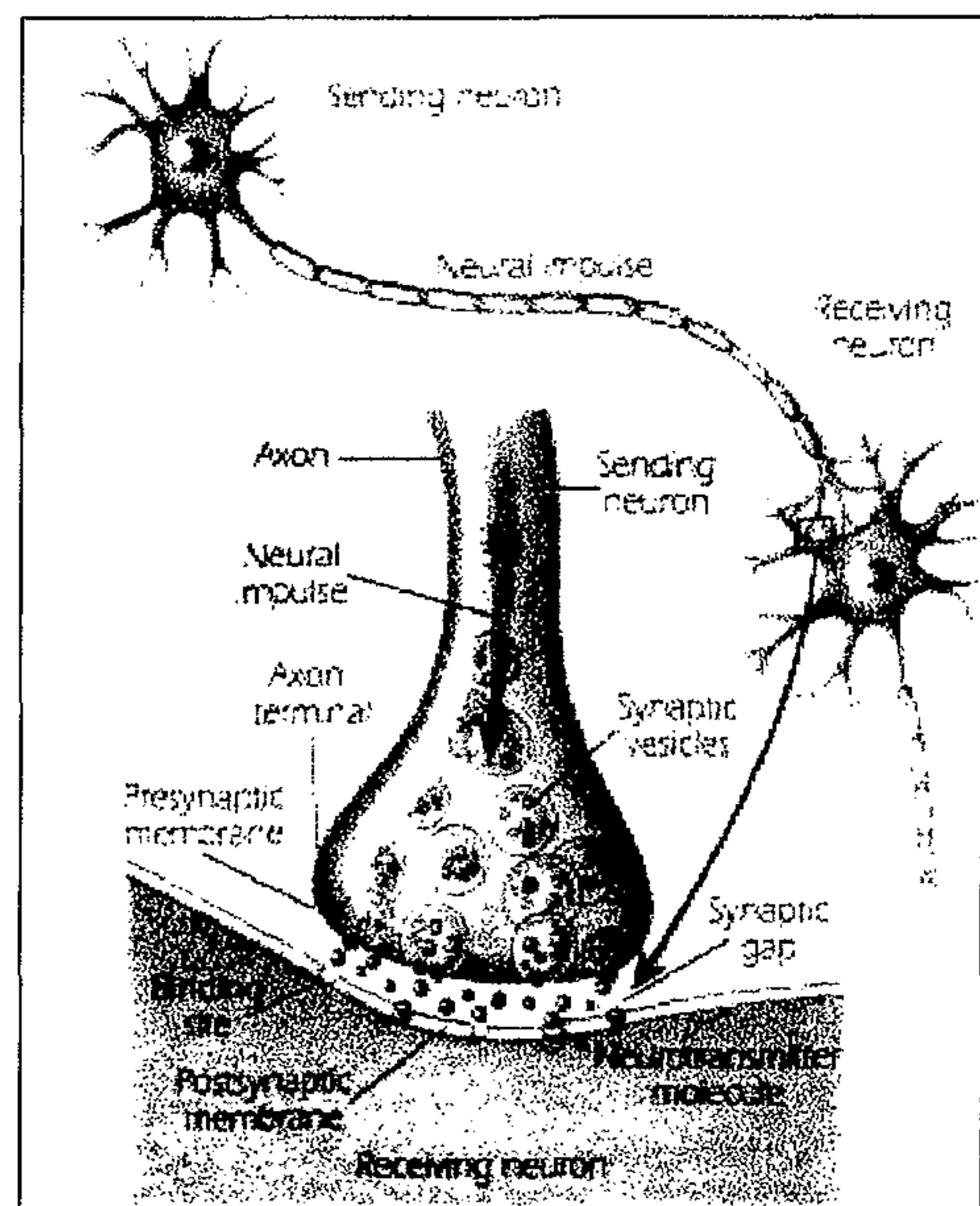


FIGURE 3.4 *A synapse*  
**Source:** Marieb (1995:344)



### ***3.3.1.2 Supporting cells***

The supporting cells in the central nervous system (CNS) are called neuroglia or glial cells. There are several types of glial cells, the two most important being the astrocytes and oligodendrocytes. The astrocytes provide physical support to neurons and clean up debris within the brain as well as providing chemicals for neurons. The oligodendrocytes, while also providing support, produce a myelin sheath around axons, insulating them from each other and allowing for rapid impulse conduction (Marieb 1995:342-346).

### ***3.3.1.3 Impulse Conduction***

Nerve impulses cannot remain limited to the neuron in which they are generated, but must be transmitted to the next neuron, and so on. The transmission of nerve impulses to other neurons occurs through the junction between two neurons, also called a synapse, a microscopic gap, across which a chemical transmitter transmits the impulse. An impulse from the axon of one neuron is transmitted across the synapse to the dendrites of one or more other neurons (see figure 3.4).

The neuron cell body or soma is the area where an action potential takes place. This is the firing of a neuron, or the start of the impulse conduction within the neuron. The neuron sending an impulse to the next one is called the presynaptic neuron, while the one that receives the impulse is called the postsynaptic neuron. The pre-synaptic knobs have vesicles containing chemical substances or neurotransmitters. When the impulse reaches the end of the axon the vesicle releases the neurotransmitter and it diffuses across the synapse and stimulates the post-synaptic neuron. The impulse which arrives in the axon terminal of one neuron releases a chemical substance (neurotransmitter) that influences the dendrites of the postsynaptic neuron in such a way that a new impulse is generated in that neuron (see figure 3.5). The effects of the neurotransmitter on the dendrites of the post-synaptic receptors can either be excitatory (stimulating) or inhibitory (suppressing) and directly affects thoughts, emotions and behaviour (Sternberg 1995:112-114).



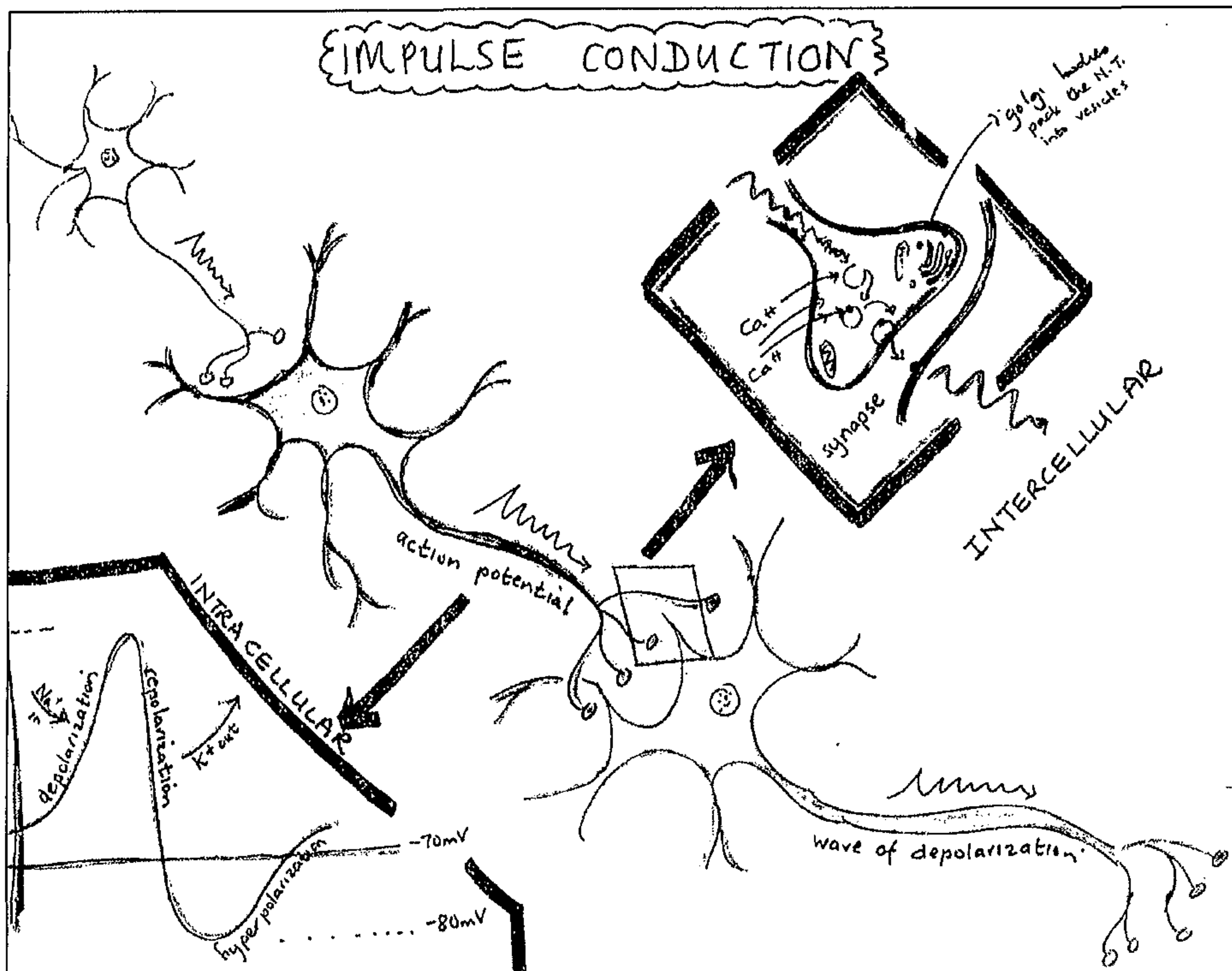


FIGURE 3.5 *Impulse Conduction*

Source: Researcher

An important aspect of the LP includes 'the power of positive thinking' (see section 4.2.4), directly related to enhancing the self-concept. Grove (1996:65) provides the following explanation of the biochemistry of positive thinking: "Messages are transmitted from one brain cell to another. The message moves along the dendrite as an electric impulse. When it reaches the synapse, the electric impulse changes into a biochemical which acts as a transmitter substance and carries the message across to the next dendrite, at which point it changes back into an electric impulse."

Negative thoughts therefore block message transmission because they do not promote biochemical change at the synapse, thus causing an inability to cope. Positive thoughts enhance the biochemical change and create pathways --- constant repetition of positive thinking establishes permanent pathways. Therefore thinking something through opens a

new pathway in the brain. Thoughts that are repeated, form patterns and in the future it is easier for the brain to use these pre-prepared pathways, producing significant changes in the brain. The diagrammatic representation of what happens is illustrated below.

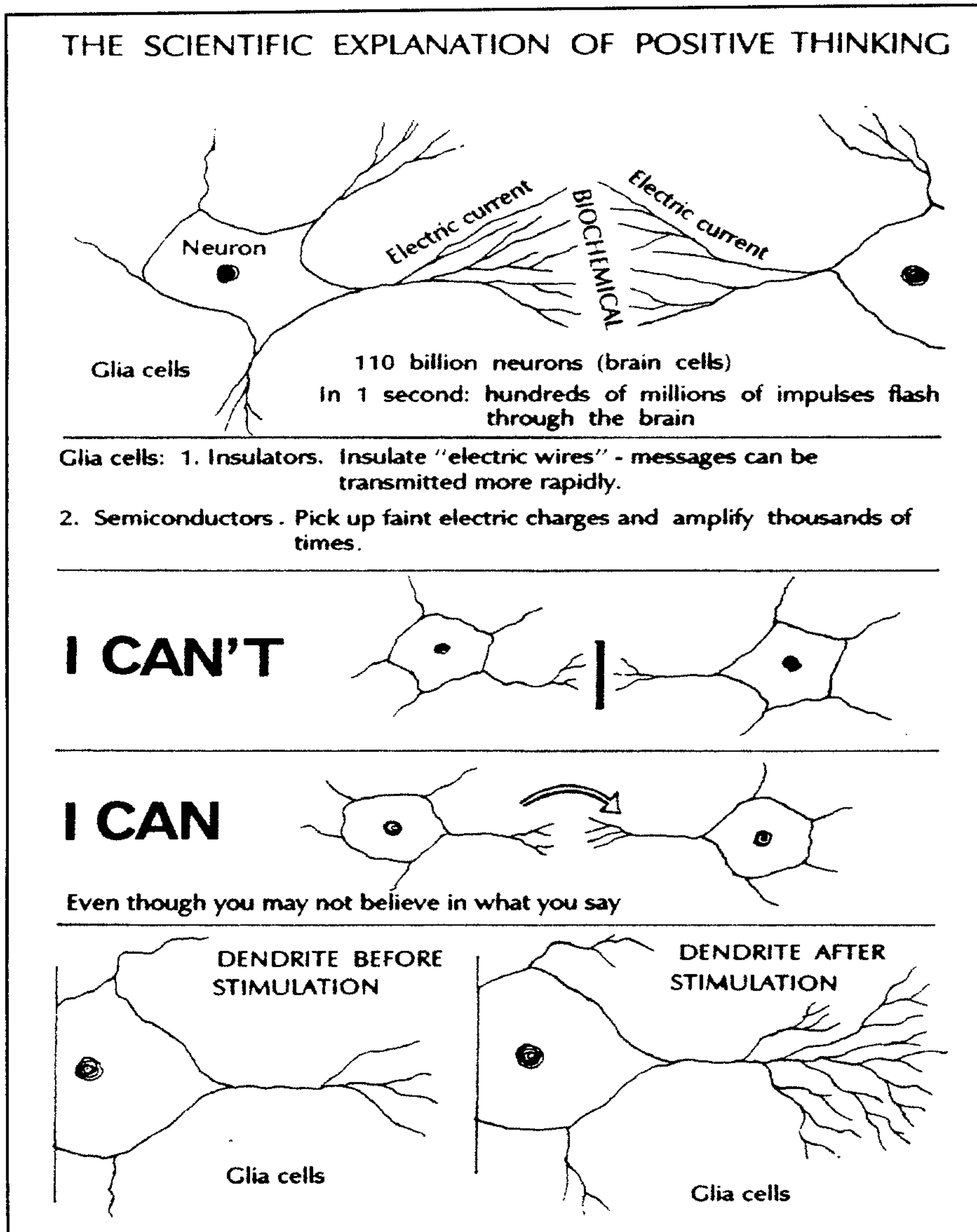


FIGURE 3.6 *Scientific explanation of positive thinking*  
Source: Grove(1996:65)

There is no denying the power of the human mind. It can be used negatively or positively to influence one's life. The choice about which will dominate is up to each individual. Positive thinking can displace negative thoughts and therefore make a difference in future actions. Thoughts charge the body and mind; but a thought only has the power that the individual gives it. The more one thinks a thought, the more power one gives it. However, thoughts can be managed. Positive thoughts can influence the brain's structure and functions (as can negative ones – see section 4.2.4). Kehoe (2000:27) describes using affirmations as the easiest and simplest technique to influence thoughts. Affirmations are simple statements repeated to oneself over and over again. Hill (Rose & Nicoll 1997:69) states, "whatever the mind can conceive and believe, the mind can achieve". However, when people think about how they would like to bring about change in their lives, they may feel that either they are prevented by factors beyond their control or they may feel they do not have enough willpower. The result is a general feeling of dissatisfaction due to negative attitudes, perceived lack of effectiveness and lack of understanding about the conditions needed for change. Smaby and Tamminen (1985:195) suggest that setting up a learning programme for change requires breaking old habits of response and substituting new effective ones.

Thinking, (as a cognitive tool), forms the basis of all behaviour, and is influenced profoundly by one's belief system. In addition, from a systemic perspective, behaviour and beliefs are recursively related and therefore thoughts can be seen to influence behaviour. Due to the fact that attitudes have a cognitive as well as an emotional component, our thoughts can influence our attitudes, the latter which are personal dispositions an individual transmits to others. A positive attitude is the outward manifestation of a mind that dwells primarily on positive thoughts through conscious effort. Chapman (1990:3-16) describes a positive attitude as "the most powerful and priceless personality characteristic one can possess" since it can "provide higher energy levels, greater creativity and an improved personality". Because attitudes are linked to thoughts and beliefs, a change in one area will result in a change in another area. It can therefore be said that managing one's thoughts amounts to managing oneself, and in particular to managing one's mind.



Thoughts, feelings and actions therefore depend on how the brain is “programmed” (Grove 1996:60-63). Clearly, if change is needed, brain programming needs to be restructured. While one cannot change the nature of one’s experiences, one can change the state of mind, which evaluates these experiences, as illustrated by Kehoe (2000:12) when he writes: “Your mind is like a garden which can be cultivated or neglected, and you are its master gardener. You can cultivate this garden, or you can ignore it and let it develop whatever way it will. But make no mistake: you will reap the harvest of your work or your neglect.” Finally, Rose and Nicholl (1997:85) express the importance of “simple, powerful belief in the possibility of changes” in an attempt to “get into the right state of mind” through controlling the mind.

### **3.3.2 The cerebral cortex**

The outer layer of the large brain (or cerebrum) is called the cerebral cortex. The largest part consists of white matter – this is the myelinated axons. The grey matter is formed by the cell bodies of the neurons. The cerebral cortex constitutes the largest part of the human brain. The cerebral cortex forms the outer layer of the cerebral hemispheres; it plays a vital role in our thinking and other mental processes and is composed of grey matter. It enables us to perceive, communicate, remember, understand and initiate voluntary movements --- that is, conscious behaviour (Kruger 1998:45).

The chief attribute of human beings is their ability to think, and this is the ability necessary for successful living and learning. Progress in schoolwork relies on the learner's ability to think. Problem solving and reasoning are two forms of productive thinking. Problem solving is based on the assumption that learners are in the process of becoming self-regulating individuals who have the ability to resolve conflicts. As learners gain self-awareness and a sense of self, they are freed to utilise the power of choice to direct themselves towards self-actualisation (France & McDowell 1983:223). Reasoning involves making some sort of claim, assertion or statement and then supporting it with evidence of one kind or another (Jordaan & Jordaan 1992:466-467). Reasoning is a

process concerned with activities such as evaluating an argument, making a deduction, establishing a generalisation.

### 3.3.2.1 Cerebral lobes

Elevated ridges of tissue called gyri, separated by shallow grooves called sulci, mark almost the entire surface of the cerebral hemispheres. The rounded, folded parts are called gyri. The smaller folds are called grooves or sulci. Deeper grooves called fissures separate large regions of the brain. Each hemisphere is divided into four lobes: the frontal lobe, the parietal lobe, the occipital lobe and the temporal lobe, as seen in the following diagram (Sternberg 1995:97).

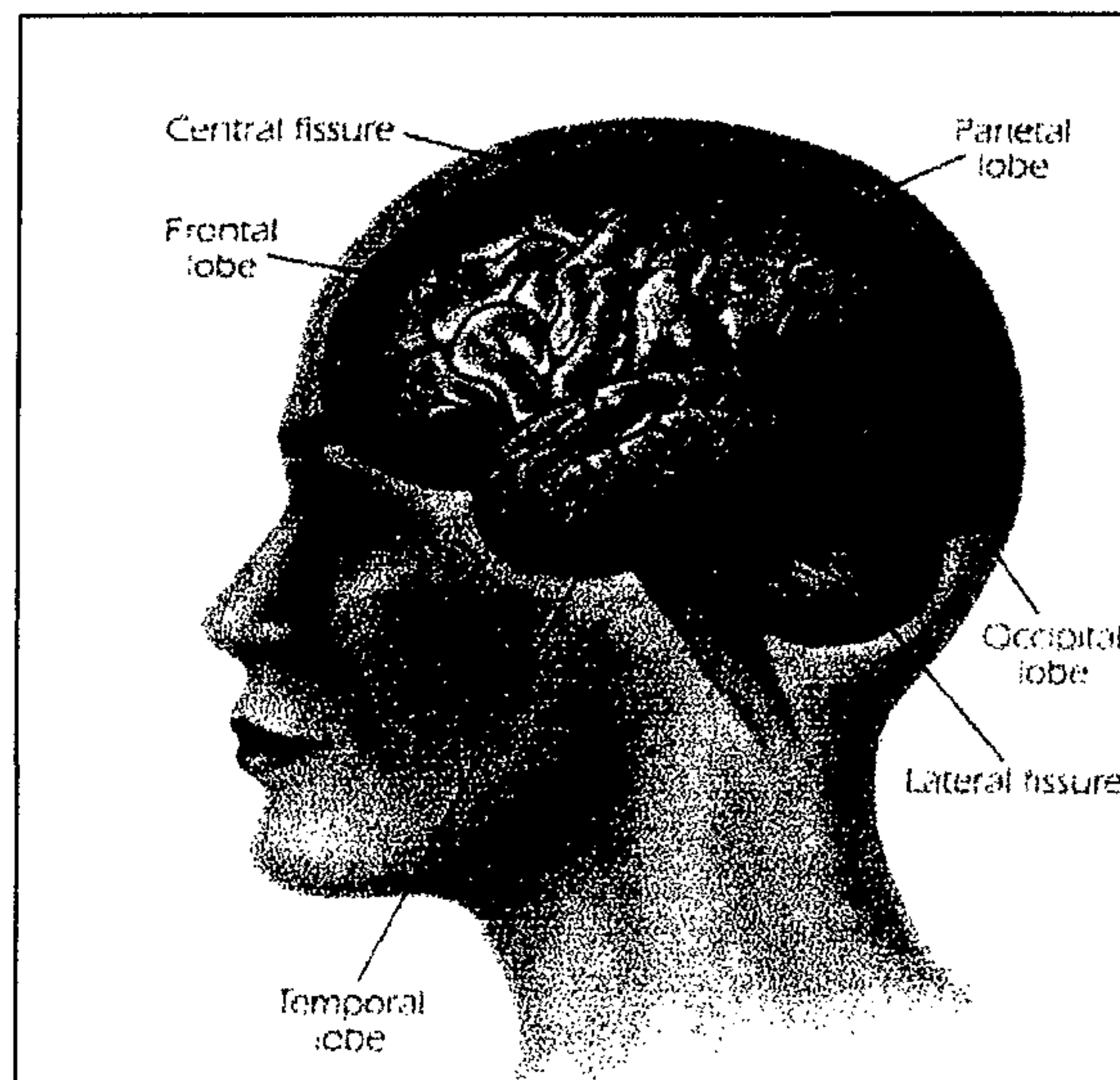


FIGURE 3.7 Lobes of the brain

Source: Sternberg (1995:97)

Functions of the lobes are as follows:

- *The occipital lobes* – Functions such as visual perception (e.g. figure/ground, form discrimination), visual memory, visual sequential memory, visual-motor speed and coordination, are, among others, the result of the workings of the occipital lobes (intra and intermodally).

- *The temporal lobes* – auditory perception of verbal and nonverbal stimuli, auditory sequential memory, listening skills, written and spoken language, verbal memory, verbal imagery, receptive and expressive language, etc. is housed here.
- *The parietal lobes*- The important functions here are tactile form perception, tactile sensations, localisation of tactile stimuli, sense of direction, body image, kinesthetic sensations etc.
- *The frontal lobes* – Factors which play a role here are motor speed and accuracy, firmness of handclasp, motor speech and various other motor and postural skills, as also the higher planning, affective, motivational and attention aspects.

Besides the specialised functions of the various brain areas mentioned above, the different areas of the brain are inter-connected by a highly ramified network of associative nervous pathways. Thus no single area functions in total isolation. In the final analysis it is always the brain as a whole and man as a totality that function (Botha 1980:92-95).

### ***3.3.2.2 The cerebral hemispheres***

The brain consists of two halves that are known as the cerebral hemispheres. The two hemispheres of the brain communicate with each other by means of the corpus callosum, a connecting commissure. There are a number of commissures, such as those that link the corresponding parts in the two hemispheres of the brain. Parts in the one hemisphere are thus connected with parts in the other hemisphere that relate to function, structure and position (Kruger 1998:47).

The human brain is more sophisticated than the most “intelligent” computers and it reveals “the breathtaking potential that none of us ever fully realizes” (Rose & Nicholl 1996:26). The two hemispheres of the brain perform different functions, but function



optimally in unison, made possible by the corpus callosum, which connects the two halves of the brain.

### 3.3.2.3 Lateralisation

While we use both cerebral hemispheres for almost every action and they both are involved in memory processes, each hemisphere has unique abilities. While the brain presents with lateralisation, the corpus callosum, made of commissural or connecting fibres, connect corresponding areas of both hemispheres allowing them to function as a whole. This network – the corpus callosum – shuttles information backward and forward between the two halves of the brain. The left hemisphere of the brain specialises in what is commonly labelled “academic” aspects of learning e.g. language and mathematical processes, logical thought sequences, and analysis, whereas the right hemisphere of the brain is principally concerned with “creative” activities (e.g. utilising rhyme, rhythm, music, visual impressions, colour and pictures). The right hemisphere of the brain is often described as the “metaphorical mind” that looks for analogies and patterns, in other words, it synthesizes and integrates while the left side analyses and deconstructs (Botha 1980:92-95).

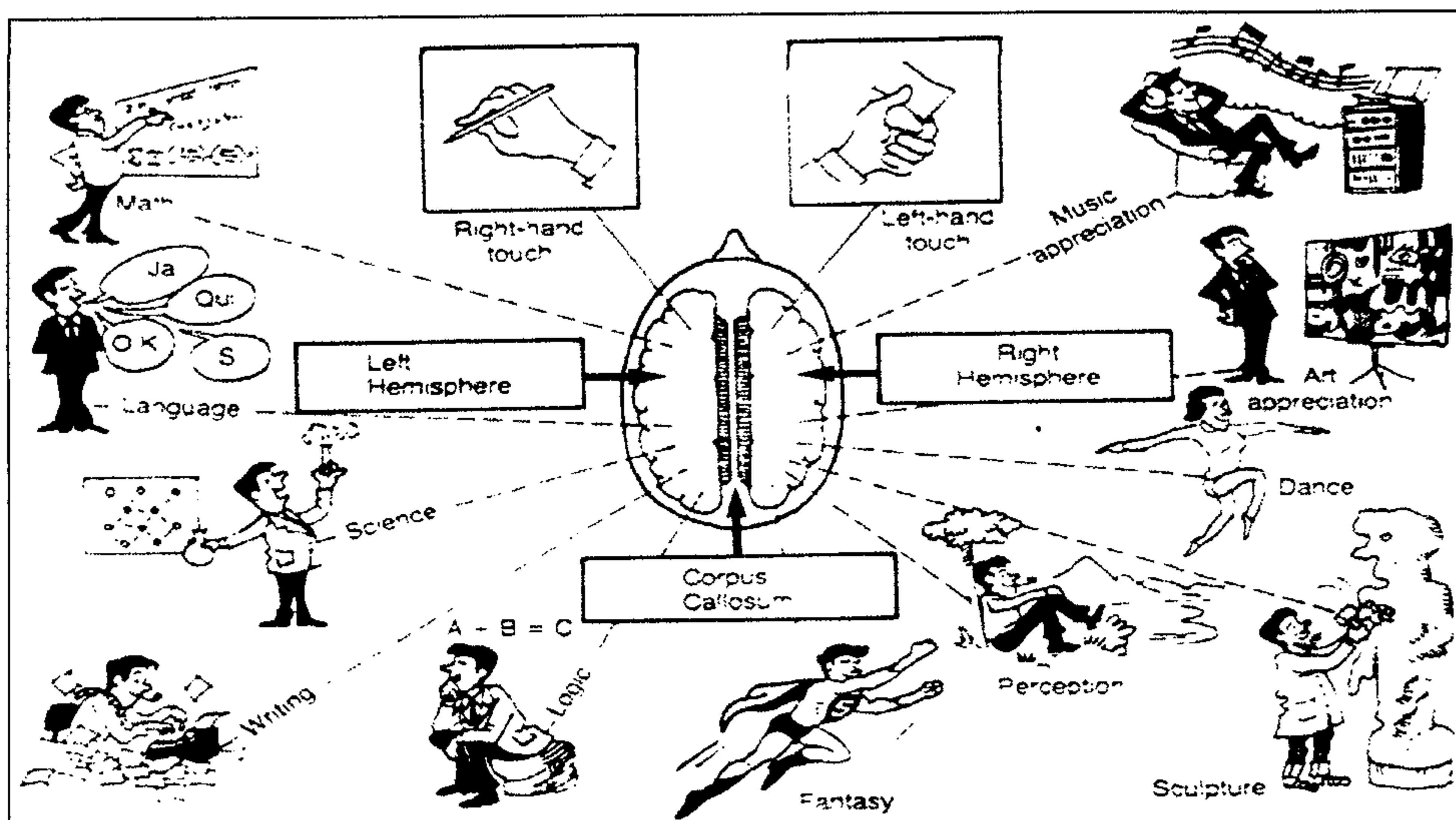


FIGURE 3.8 How the brain divides its work

Source: Jordaan & Jordaan (1992:215)

Botha (1981:104) makes note of the following related functions, which are illustrated in figure 3.8.

Left hemisphere functions include:

- Controlling of speech and gestures connected with speech
- Receiving, storing and synthesising verbal information, linguistic structures and syntax, verbal assignment of meaning and verbal memory
- Consciousness (and organisation) of time and the sequence of perceptions
- Awareness of the passage of time in logical order (and hence also of objective thought, order and logic)
- Understanding of social and other values related to culture, social interaction, competition, religious beliefs and religious conduct
- Socialisation and understanding of social relationships, which leads to the adoption of normal social codes of behaviour
- Understanding the relationship of authority (social and political), self-assertion and philosophical thinking
- Higher and more complex mathematical concept-formation

Right Hemisphere functions include:

- Recognition and understanding of non-verbal sounds (the right hemisphere normally plays a subsidiary role in linguistic ability)
- Integration of complex motor co-ordination and sensitivity to sensory information relating to movement
- Recognition of form, spatial form relations, the outward actions of people and objects, and the assignment of meaning to general non-verbal spatial data
- Intuition and insight
- Perception of the whole (holistic thought and Gestalt perception)
- Inventive, creative and improvisatory abilities
- Recognition and synthesis of musical perception and rhythmic activity
- Artistic ability and aesthetic appreciation of art
- Simple mathematical calculations (Botha 1981:105).

Although each hemisphere is dominant in certain activities, they are both involved in almost all thinking. When processing information, some people prefer a slow step-by-step build-up of information. We call them the “linear” type of learner. Others need to see the “big picture” – to have an overview. They are the “global” type of learner (Rose & Nicholl 1997:34). The most effective learning takes place when the brain utilises both hemispheres in an integrated and balanced fashion (see section 4.2.6).

#### ***3.3.2.4 Non-linear ways of thinking***

In demonstration of how the brain utilises both of its hemispheres in carrying out a task, the process of listening to a conversation will be described. When we listen to a conversation, the left hemisphere is concentrating on what was said (the content), while the right hemisphere is picking up how it was said (the emotion). In addition, the emotional/limbic system of the brain is engaged in the interpretation of the conversation; in other words, the whole brain is actively involved. It is therefore understandable that when words are combined with music or with pictures, and when words are spoken with emotion, they are remembered better and thus are faster to learn (Rose & Nicholl 1997:34). In line with this, the LP will introduce the various modules utilising both hemispheres of the brain, encouraging children to use their strongest forms of intelligence, and in so doing, find learning easier and more enjoyable.

Buzan (2000:38-40) proposes that how using only half of our skills (through a left-hemisphere, linear approaches), we have “trapped our creative brains” between the lines of the page that we write on. He illustrates (see figure 3.9) how our brains think – “radiantly and explosively” – and how our thoughts should be compatible with this. As explained in the literature survey, this type of thinking radiates from a central point, using multiple, patterned pathways, in a complex (as opposed to linear) fashion, processing information via multiple modalities, a type of thinking which utilises not only both hemispheres, but also different parts of the brain simultaneously. In keeping with this concept of radiant thinking, the LP aims to utilise as many parts of the brain in any one task, thereby strengthening memories and enhancing recall (see section 4.2.6).



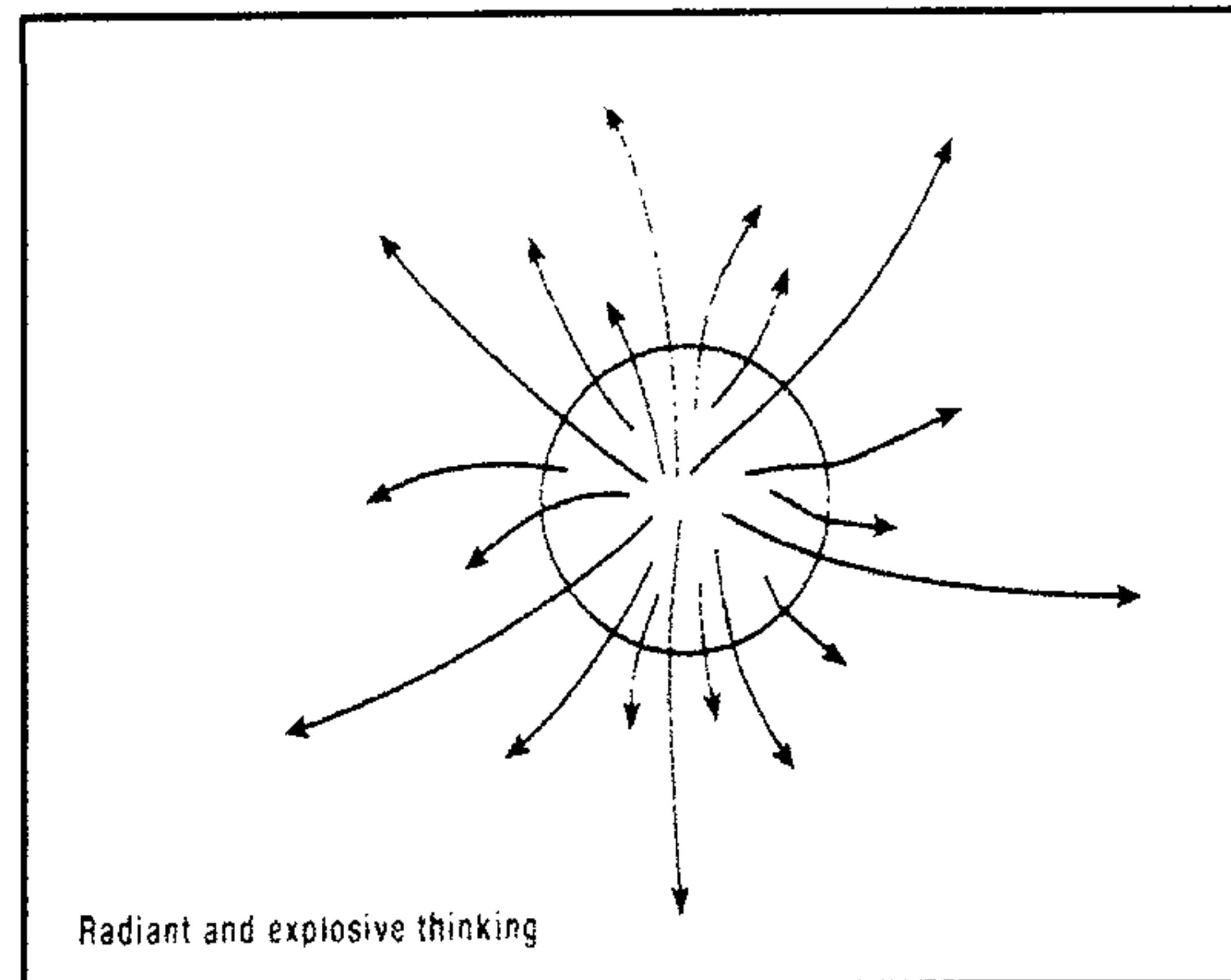


FIGURE 3.9 *Radiant and explosive thinking*

Source: Buzan (2000:36)

The brain prefers complex, multi-path learning, according to Jensen (1995:5) who notes that research has shown how the brain simultaneously operates on many levels, processing all at once a world of colour, movement, emotion, shape, intensity, sound, taste, and more. It forms patterns, composes meaning and sorts daily life experiences from an extraordinary numbers of clues. The brain is always processing on many paths, in many modalities and on different levels of consciousness. It's designed to process many inputs at once – in fact, the brain seems to thrive by pursuing multi-path, multi-modal experiences. “Some scientists say that there is very little learning that the brain does best in an orderly, sequential fashion” (Jensen 1995:5). Therefore it stands to reason that we learn most from rich, multi-modal influences such as field trips, simulations, excursions, discussions, real-life projects and personal life activities.

Buzan (1993:17) connects the psychological functions of “radiant thinking” and “mind mapping” as techniques that imitate the physical structure of the basic brain cell (the neuron). Paradoxically, the brain operates holographically as well as whenever a particular function is related to a particular area, it needs to be remembered that it is done for purposes of simplification and understanding and does not represent how the brain functions in reality. Kehoe (2000:3) states that the nature of reality is holographic. A

hologram is an entity in which “the whole” is contained in each and every one of its parts and that proposes that the brain operates holographically as well.

Researchers have investigated the possibility that memory may be stored in the brain in holographic fashion (Russell 1994:151). Buzan (2000:35) likens this process to creativity and poses the question: “Do you make notes in the kind of way that your brain makes its thoughts visible?” He suggests that by adding qualities of the right hemisphere of the brain to the established creative thinking process, extra images, colour and dimensions would establish infinite creative capacity. He explains the formation of “mind mapping” when this is done. Information already present in the brain forms a grid or outline of basic facts or information and everything a person reads and learns is automatically hooked onto that existing grid. If there were no grid, the information would have nowhere to attach itself.

In accordance with the brain’s preference for complex, non-linear, multiple modality learning, the LP will be implemented using visual strategies, namely “mind maps” (see section 4.2.10), a technique initially developed by Tony Buzan (Rose & Nicholl 1997:97). In creating mind maps, left and right brain hemisphere processing styles are both involved (thereby using the whole brain in an integrated fashion). The format appeals strongly to the visual learner, where the emotional brain is more involved through colour usage and the personalisation of information. While linear note making is unable to keep up with the complexity of thought, mind mapping allows the recording of considerable amounts of information on one page, providing a holistic view of the theme, and in so doing, demonstrating relationships among various concepts and ideas (Rose & Nicholls 1997:97), thereby making studying significantly easier.

Jordaan and Jordaan (1992:419-420) explain how concepts are related to one another and that conceptual hierarchies arise and form a grid, as a person’s knowledge and experience increase. In the same way as this “grid” forms, concepts with their particular determining characteristics can be built on other concepts with their particular determining characteristics --- thus creating conceptual hierarchies, as illustrated below.

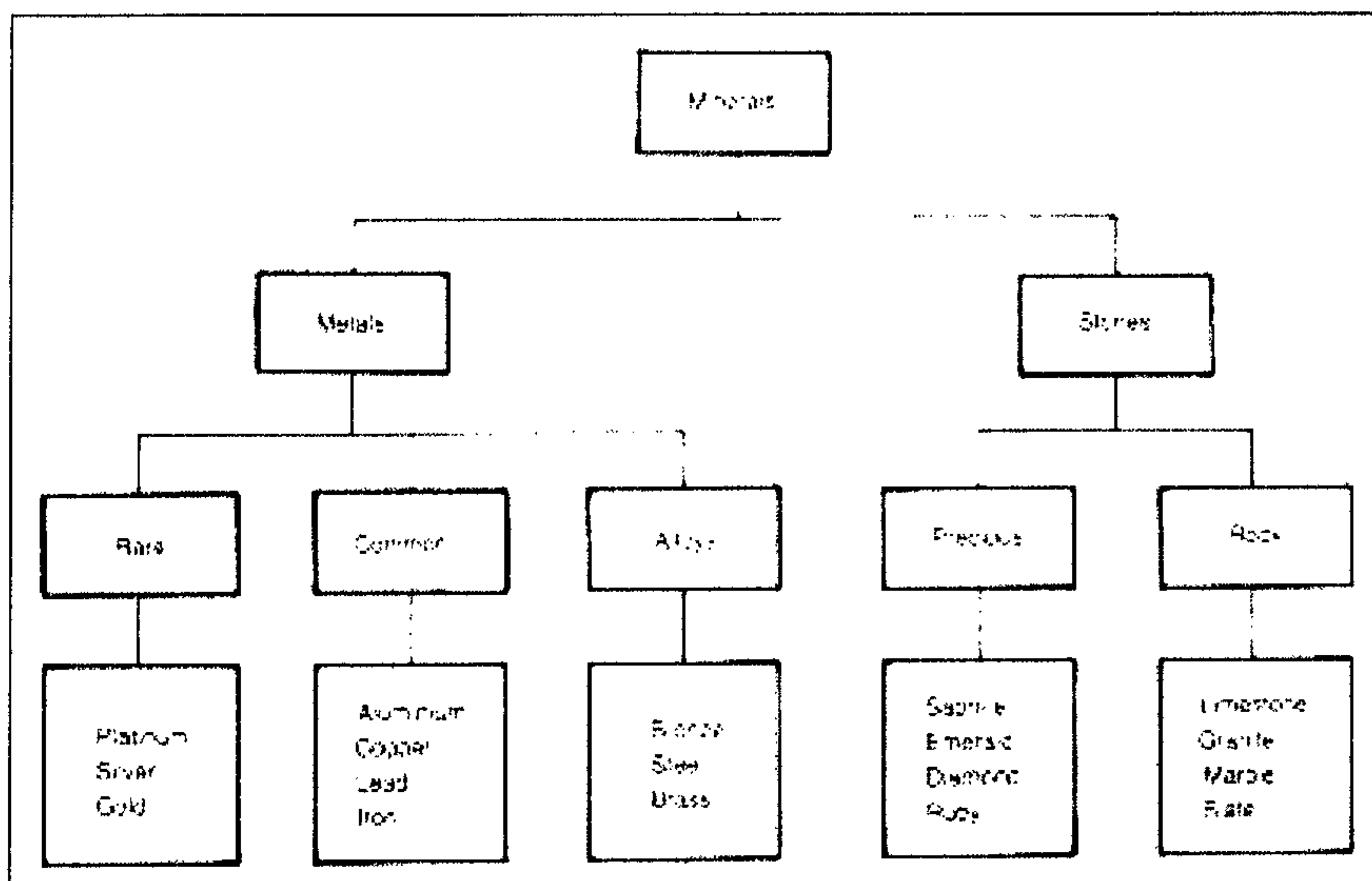


FIGURE 3.10 *Conceptual hierarchies*  
 Source: Jordaan and Jordaan (1992:419)

Buzan (1989b:112) notes how “concise and efficient note-making has been a problem for everyone who has gone through the normal school system”. He outlines traditional note-making methods and presents the latest evidence for the effectiveness of new keyword note-making techniques and more creative and flowing note-making. Keywords were defined as those, which incorporated the most relevant sense in the shortest way possible. Keywords tend to be the nouns and verbs in a sentence – though sometimes adjectives and adverbs may be significant enough to become keywords. Keywords are generally concrete rather than abstract. It has been found that concrete words generate images faster than abstract words – one and a half seconds faster on average – and that the images they generate are richer and have more associations (Russell 1994:172). Because of their greater meaningful content keywords “lock up” more information in memory and are “keys” to recalling the ideas. Making keyword notes eliminates ninety percent of unnecessary note making, thus improves learners’ effective writing/note-making speed as much as ten times. In addition to this advantage, learners’ recall will also be greatly improved, because time will not be wasted on sifting through all the unnecessary words.



Therefore, in terms of the LP, note-making (see section 4.2.10) is only a part of a process. Because the most comprehensive note-making systems require learners' attention, they must be alert enough to take legible, meaningful notes. They can't rely on "writing everything down" because a lot of information won't help them to actually learn the material. It is important therefore to determine specific relevant points. By rewriting their notes, they become more familiar with the material and therefore mentally reinforce concepts and enhance memory.

More advanced techniques can help learners to recall even better. Referring to the information about memory, as described below in 3.5.1.1, learners can use the fact that people recall linked things and outstanding/striking things better to make notes which will be many times more effective than even the best standard keyword notes. Using arrows, colours and special codes, learners can make connections between their keywords, which will immediately show them where the relationships lie. This is far superior to lines or lists of keywords, which give the essence but do not show the relationship between the ideas.

To make these newly linked keywords and images even easier to recall, learners can make them stand out in various ways, by including colour, three-dimensions, shape, size, variation, outlining and underlining. Making notes in this way will enable learners to speed up even more, for they will not need as much repetition as even the best keyword note-maker sometimes finds necessary. These new notes will develop a mental map of information for the learner, improving all aspects of mental performance. Having reached a stage where note making gives the essence, and does not concern itself with unnecessary and irrelevant words, the learner will already be a much quicker note-maker.

What Buzan developed and called "mind maps" Grove (1996:170) describes as brain maps. The researcher also recognises mind mapping as the most effective way of note making, but other suggestions are made to accommodate unique individual differences.

Grove (1996:170) states research has shown that this is the most effective way of making a summary, as

- the brain absorbs this configuration far more readily than linear print
- the brain map organizes material in a way that makes it easier to understand and remember (colour is also used as a means of organization)
- although it may initially take more time to draw the brain map, revision can be done very quickly
- it is more fun making a summary like this, and organized work makes sense
- the brain map is more like a picture than any other type of summary, especially when colour and drawings are used
- one increases one's creative abilities through mind mapping.

A further advantage of this form of mind map notes, is that it allows learners to develop other mental areas in addition to recall. This applies particularly to developing their creative, organisational and presentation abilities. Buzan (1989b:188) describes how rewriting in the form or structure of a mind map will make teaching and learning easier, more enjoyable and more productive, adding that "by concentrating on the individual and his [or her] abilities we will finally and sensibly have placed the learning situation in its proper perspective". Buzan (1989b:119) bases his findings on, among others, the Gestalt Psychologists who discovered that the human brain has a strong tendency to complete things, therefore providing a complete picture that assists learning. He provides the following mind-mapping laws:

- Start in the centre of a blank page turned sideways
- Use an image for your central idea
- Use colours throughout, because colour stimulates creative thinking, helps you distinguish areas of your creative thought, stimulates the visual centres of your brain and captures your eyes' attention and interest
- Connect your main branches to the central image and connect your second and third-level branches to the first and second levels, etc, because your brain works by association and if the branches are connected on the page the ideas will connect in your head and spark off more creative thoughts. It also creates and

sustains the basic structure, in the same way that your skeleton, muscles and connective tissue hold your body together

- Make the branches curved rather than straight-lined
- Use one word per line. Each single word or image generates its own vast array of creative thoughts. When you use single words, each one is better able to spark new thoughts. Phrases or sentences tend to dampen this triggering effect
- Use images throughout, because images and symbols are easy to remember and stimulate new, creative associations (see section 4.2.10)

Grove provides the following example of a brain map, based on Buzan's mind maps, using the mind-map laws as the related concepts.

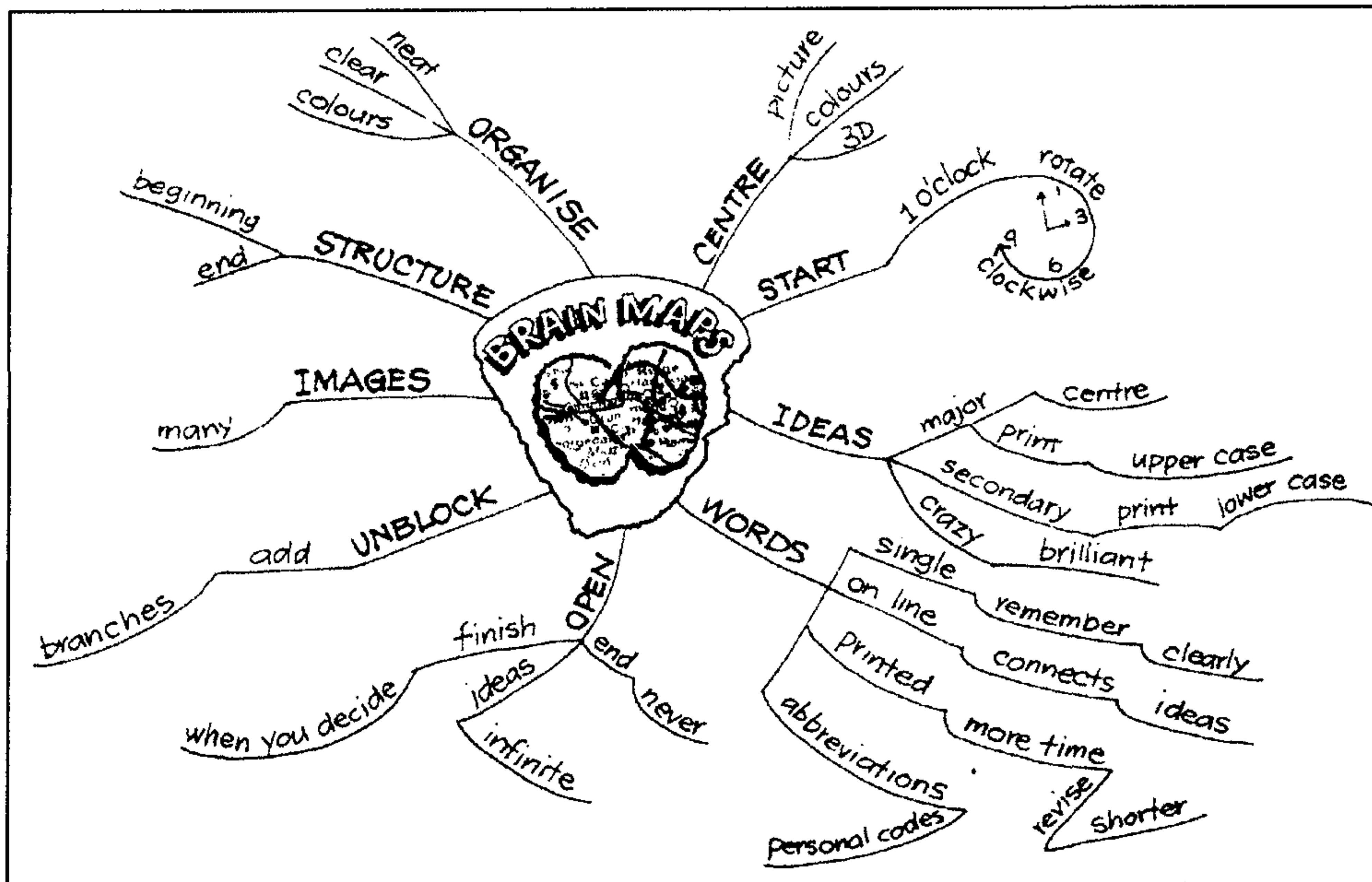


FIGURE 3. 11 Grove's brain map  
Source: Grove (1996:173)



### 3.3.3 Sensory, motor and association areas

The cerebral cortex (neocortex) contains three functional areas:

- motor areas (control voluntary motor functions)
- sensory areas (provide conscious awareness of sensation)
- association areas (integrate diverse information for purposeful action) (Marieb 1995:385-386).

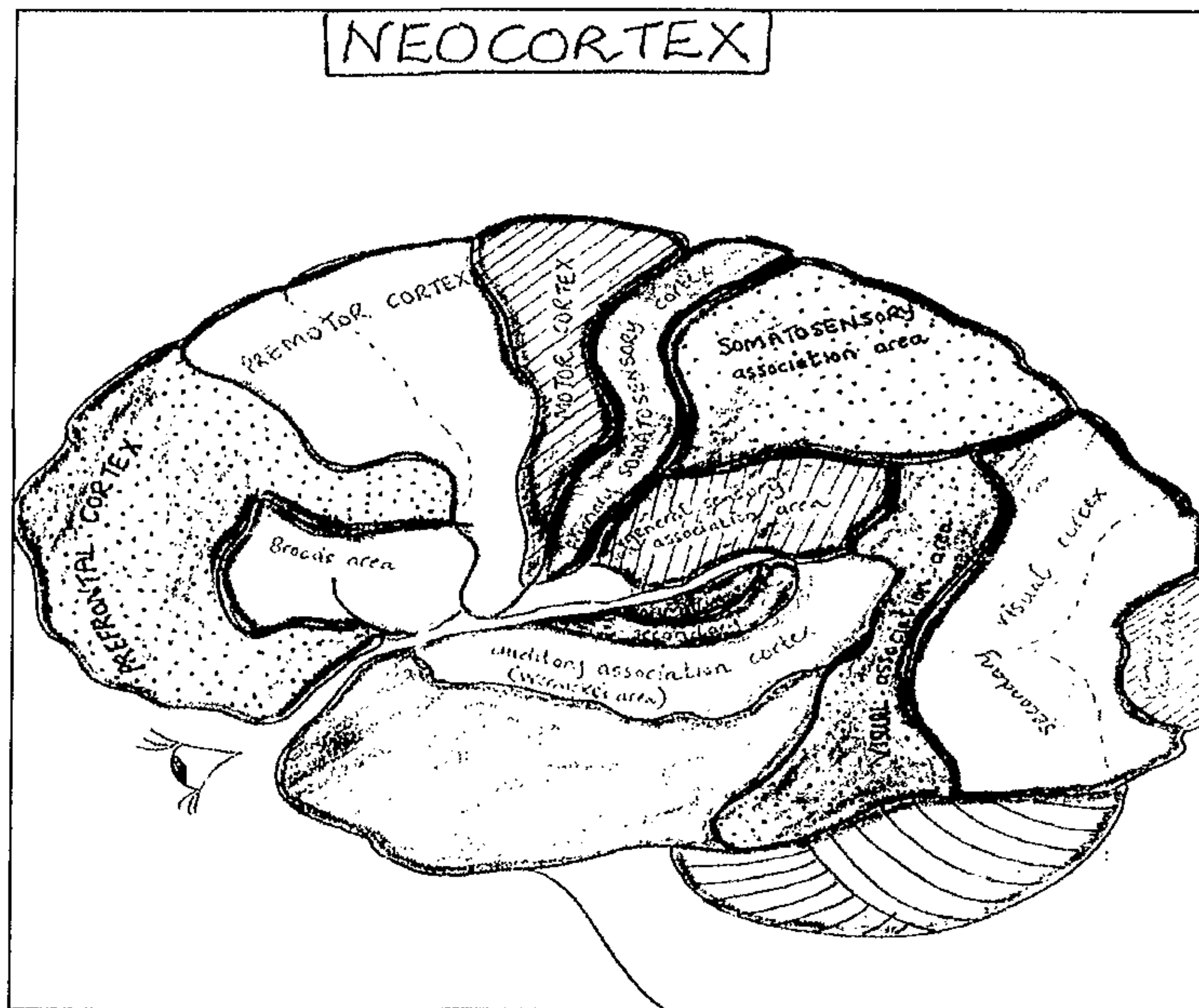


FIGURE 3.12 *The neocortex illustrating the sensory, motor and association areas*

Source: Researcher

Each of these systems has a hierarchical structure (Luria 1973:167). There is a primary zone (area) with adjacent secondary and tertiary associative zones for each of the visual, auditory and somesthetic areas. The primary receptive areas are concerned with receiving the purely visual, auditory, somesthetic and other such stimuli. The more complex analysis and synthesis of the impulses occur in the contiguous secondary

associative areas. The integration of information, which emanates from various sense organs, occurs chiefly in the tertiary associative areas.

Different regions of the cerebral cortex have different functions:

*a) Sensory areas* – perceived by the cerebrum. This brain area receives and processes all sensory stimuli, that is, information from the sensory receptors regarding touch, taste, smell, sight, hearing, pressure, pain, warmth, cold. In this area, the posterior brain areas such as the parietal, occipital and temporal lobes, are involved. The occipital lobes mainly decode visual impulses; the temporal, auditory ones, and the parietal receive, store and analyse somesthetic stimuli. Auditory information from the right ear is conducted by the auditory nerve via certain mid-brain structures mainly to the primary auditory area of the left temporal lobe. The same holds for impulses from the left ear to the right temporal area. (A minor quantity of these impulses does in fact go to the temporal lobes on the same side as the ear that receives the impulses).

*b) The associative area* in the brain is responsible for visual tactile integration. This is situated between the primary somesthetic and the primary visual areas. Damage to this area leads to spatial orientation problems and a distorted image of one's own body. Concepts such as, for example, above, under, alongside etc. will be particularly difficult for such a child to understand. The auditory-visual-tactile integration is situated approximately in the middle of this brain unit. In the left hemisphere it plays an important role in all verbal processes. Damage in this area leads to problems in remembering names of objects, in naming colours, and remembering verbal material Botha (1981:95-103).

*c) Motor areas* send impulses to voluntary muscles to control voluntary activities, e.g., writing, running, dancing, playing an instrument, and talking. The motor areas are situated at the very back of the frontal lobes, directly opposite the somesthetic areas of the parietal lobes. There is a gradual transition from motor to sensory functions in the sulcus in between the two lobes. The premotor areas (associative areas) are located immediately in front of the primary motor areas in the frontal lobes. It is here that the

sequence of automatic movements is controlled (e.g. in writing proficiency) Botha (1981:95-103).

The brain is a highly differentiated system whose parts are responsible for different aspects of the unified whole. The implication of this therefore is that teaching can play a role in improvement of brain functioning. Spoken language, reading, writing, spelling and mathematical calculations are complex skills, which are based on the co-operation of many brain systems.

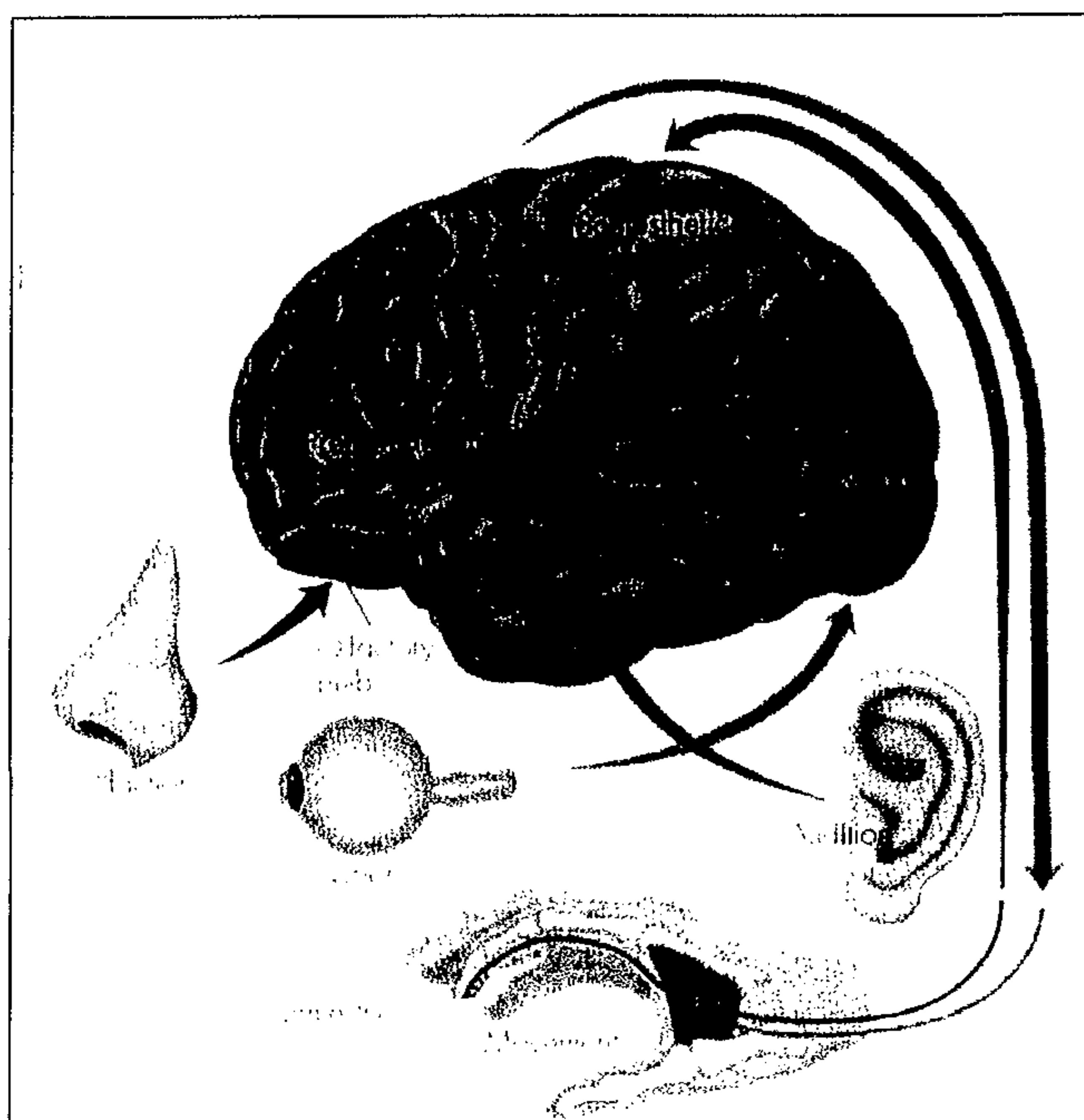


FIGURE 3.13 *The primary sensory cortex for vision, hearing and body sensations, the primary motor cortex and the olfactory bulb, responsible for the sense of smell*

**Source:** Kalat (2001:104)

### ***3.3.3.1 How the learner acquires information***

In line with the somato-sensory areas illustrated above in figure 3.13, it appears that everyone has a different way of receiving, processing and applying information. Learners



are not always aware of how they absorb new information most effectively and need to be encouraged to discover this. While information is processed and learnt through the senses, one sense is generally used predominantly. Neuro-linguistic programming experts Richard Bandler, John Grinder and Michael Grinder (Rose & Nicholl 1997:91) have identified three distinct communication and learning styles according to the predominant sense:

- visual – learning through seeing (pictures, diagrams, videos)
- auditory – learning through hearing (listening to lectures, audio tapes)
- kinaesthetic – learning through physical activities and direct involvement

Most people use all three types to some degree, while showing a preference for one over the other two. To maximise learning, learners need to acquire and absorb basic facts presented in the way best suited to their sensory learning preferences (see section 4.2.2).

Learning styles add another dimension to effective teaching and learning. According to Meighan (1985:30), “learners have individual learning styles and therefore adapting teaching material and strategies to the learning preferences of each child can make a difference in how well students learn”. Research has shown that when teachers draw on as many senses as possible during teaching, learners are provided with opportunities to use their learning styles and associated sensory strengths, promoting the reinforcement of the concepts being taught (Meighan 1985:30).

### ***3.3.3.2 Types of intelligences***

Gardner’s theory of multiple intelligences (Rose and Nicholl 1997:36), expands the concept of intelligence beyond that of just verbal and mathematical skills. Traditionally, academic subjects have been taught in ways that largely involve just two intelligences – linguistic and logical-mathematical. While these two are very important there are at least five other types of intelligence, and it is only when all the intelligences are realised that the full power of the brain can be used (Rose & Nicholl 1997:37-38).

Teaching learners about their different intelligences will enable those, who for example, are musically talented, to see that they too are intelligent, thereby enhancing their self-esteem and encouraging self-actualisation. Gardner defines intelligence as “an ability to solve a problem or fashion a product that is valued in one or more cultural settings”. Gardner outlines seven distinct intelligences, as illustrated in 3.14:

1. linguistic intelligence – the ability to read, write and communicate
2. logical-mathematical intelligence – ability to reason and calculate logically
3. visual-spatial intelligence – the ability to think in pictures (visual)
4. musical intelligence – the ability to compose, sing and understand music
5. bodily-kinaesthetic intelligence – the ability to use the body to solve problems
6. intrapersonal intelligence – ability for self-analysis and reflection
7. naturalist intelligence – ability to recognise and explore flora and fauna productively (see section 4.2.2)

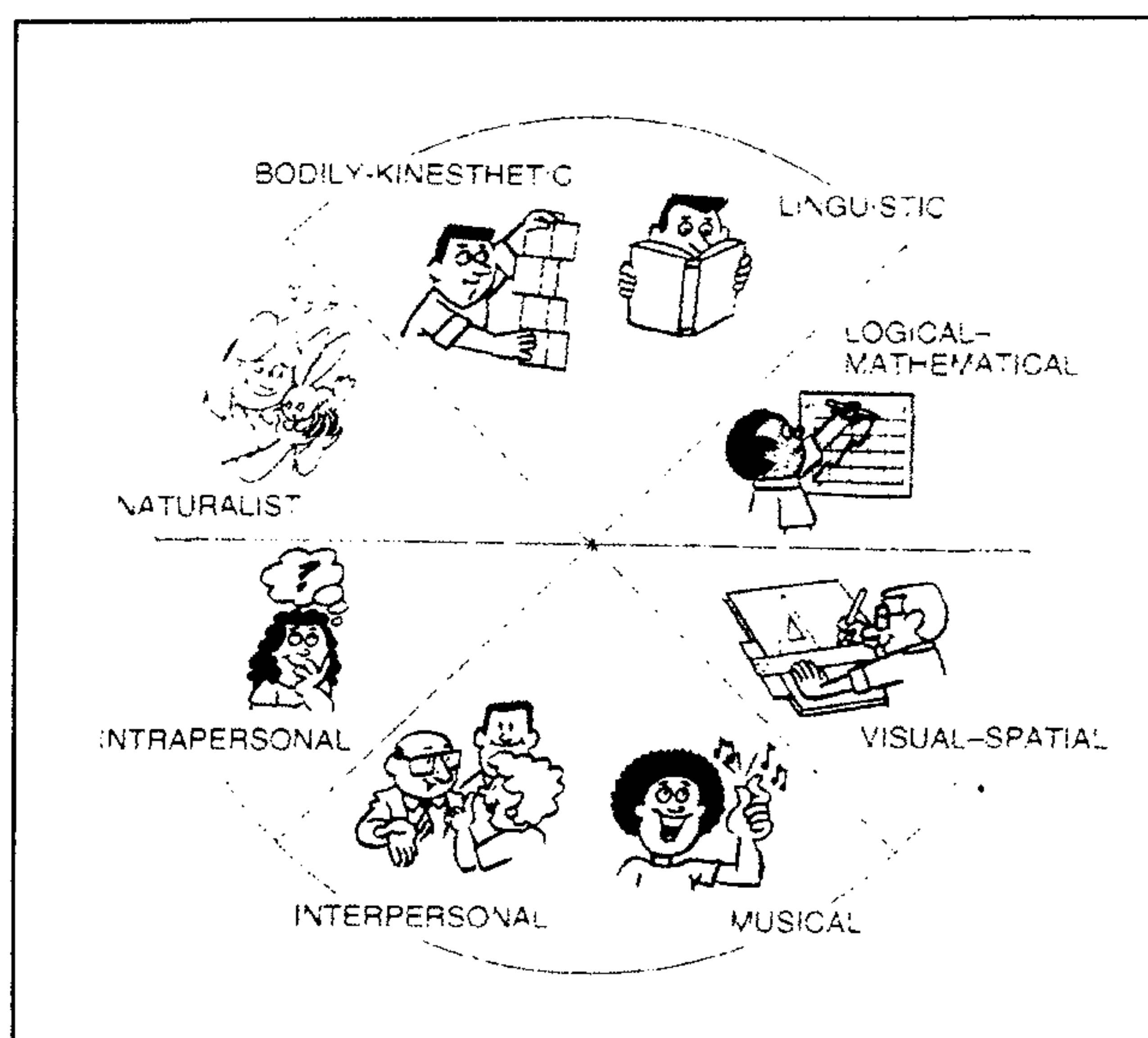


FIGURE 3.14 *Gardner's seven intelligences*

Source: Rose and Nicholl (1997:36)

### 3.4 SUBCORTICAL STRUCTURES OF THE CEREBRUM

In this section, the diencephalon, basal ganglia and the reticular formation are discussed. These structures are also known as the subcortical centres of the cerebrum.

#### 3.4.1 The diencephalon

The diencephalon forms the central core of the brain. It is surrounded by the cerebral hemispheres and consists of:

- the thalamus (relays incoming sensory information)
- the hypothalamus (interacts with the limbic system, regulating behaviour that is related to species survival and is part of the endocrine system)
- the epithalamus (involved in sleep-wake and mood regulation) collectively surrounding the third ventricle (Marieb 1995:392).

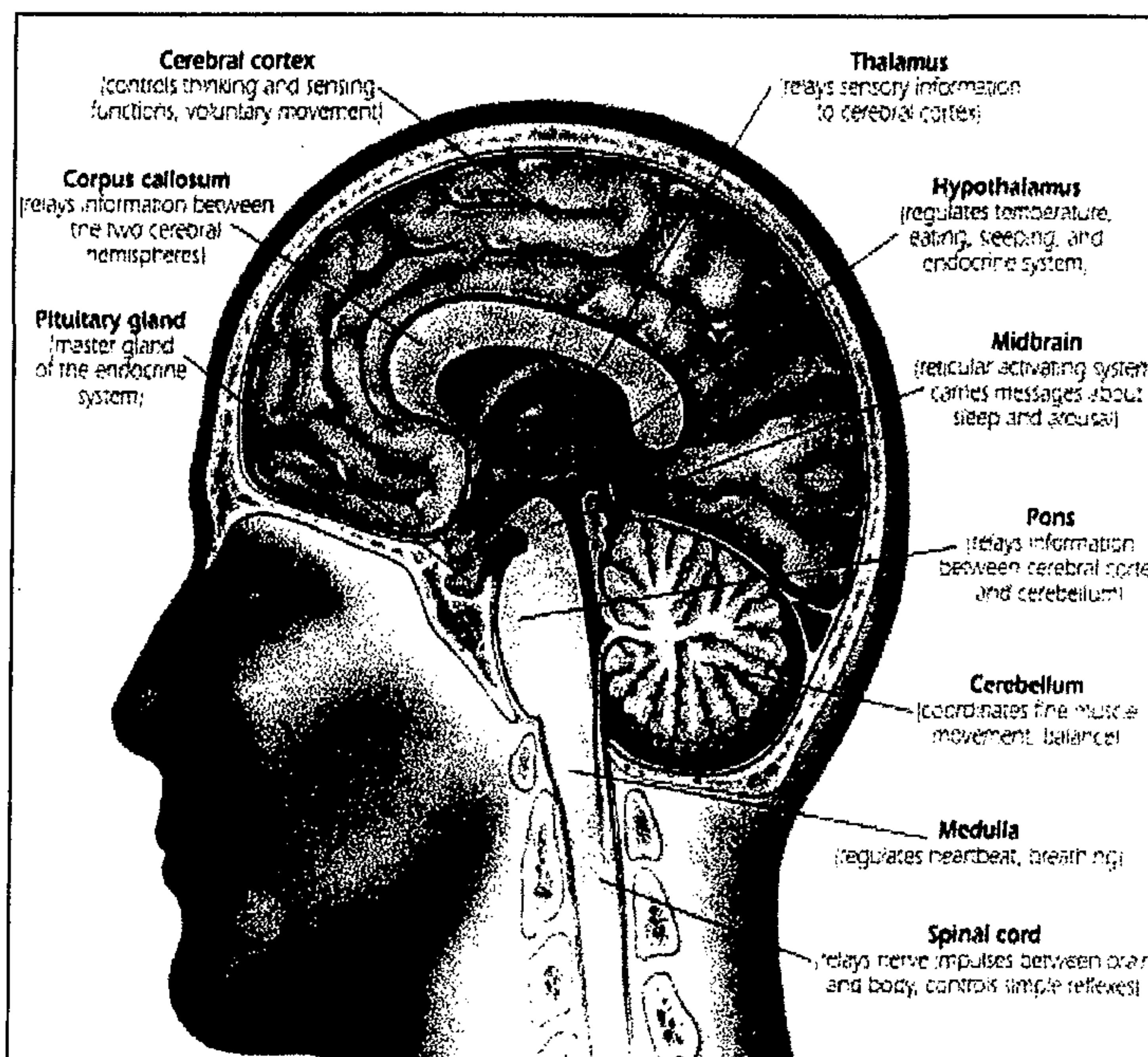


FIGURE 3.15 *Subcortical structures of the brain*

Source: Sternberg (1995:86)



### ***3.4.1.1 The thalamus***

The thalamus lies below the corpus callosum (bridge of white fibres) of the cerebrum and above the midbrain (see figure 3.15). The thalamus forms the largest part of the diencephalon and is a very important part of the subcortical structures in the middle of the brain. The chief function of the thalamus is the redirection of nerve impulses. It receives the impulses from nerves in the body and brain and relays them to the correct areas in the cortex. In this respect the thalamus acts like a relay station that ensures that every impulse ends up at the right place. The thalamus has connections with almost all the parts of the central nervous system. This extensive network of connecting pathways with other areas of the brain makes the thalamus the major coordinator of the brain that correlates the workings of all parts with each other and ensures that they function in synchronisation with all other areas as an integrated unit. The canal of the thalamus is enlarged into the third ventricle and its floor is the hypothalamus.

### ***3.4.1.2 The hypothalamus***

The nervous system is supported by the endocrine glands, which secrete hormones that control the metabolic activities in all parts of the body. The endocrine glands are largely controlled by the hypothalamus of the brain (see figure 3.15), via the master endocrine gland, the hypophysis. The hypothalamus is always mentioned together with the hypophysis (or pituitary gland), because the hypothalamus carries out its most important functions through the latter. As the name indicates, the hypothalamus is situated underneath the thalamus. It is the control centre of the autonomic nervous system and is involved in some way with most forms of bodily activity, especially those with regard to life functions. The functions of the hypothalamus and hypophysis are as follows:

1. the regulation of body temperature and its accompanying features such as perspiration and heat production
2. the regulation of cardiovascular functions (the heart and the circulatory system) together with aspects such as heartbeat and blood pressure

3. the regulation of the metabolism – included here is appetite behaviour such as hunger and thirst, the maintenance of the water balance in the body, digestive processes and speed of the metabolism, for example the rate at which carbohydrates are burned
4. the regulation of secretions of the endocrine glands which influence or control a large number of bodily functions such as metabolism, growth processes, sexual characteristics and reproduction processes
5. the regulation of the sleep cycle, conditions of sleep and wakefulness.

The hypothalamus exercises its control over emotions by means of the autonomic nervous system, which is not subject to voluntary control. This includes associated feelings of rage and aggression, behaviours associated with aggression and reproduction and the control of the release of hormones from the anterior and posterior pituitary (hypophysis).

### **3.5 FUNCTIONAL BRAIN SYSTEMS**

The hypothalamus and the thalamus (as part of the limbic system) together form the most important control centers of human emotional life. Conscious control over emotional states takes place in the limbic system. Learners are exposed to this information through the sub-section “Manage Yourself” (see section 4.2.4)

#### **3.5.1 The limbic system**

The limbic system lies hidden deep within the interior of the brain. The limbic system links with parts of the subcortical structures, namely the basal ganglia, the hypothalamus and the thalamus. The limbic system together with the subcortical structures with which it is connected, is involved in important psychic functions in humans, such as control over aggression, emotions and memory.

Limbic functioning is concerned with the evaluation of an experience as pleasant or unpleasant and with memory retention “of information about the evaluation as a control

for future behavioural adjustments in similar or comparable situations” (Jordaan & Jordaan 1992:177).

The limbic system comprises four central interconnected cerebral structures:

- hippocampus
- amygdala
- septum
- limbic cortex

The limbic system is our emotional or affective (feelings) brain. The amygdala plays a role in anger and aggression. The hippocampus is involved in memory processes and the comparison of incoming information with information stored in the memory bank as well as in the generation of conscious activity in humans. The septum is involved in anger and fear. The limbic cortex has an inhibitory effect on the subcortical limbic structures, which may be altered through arousal of the neocortex.

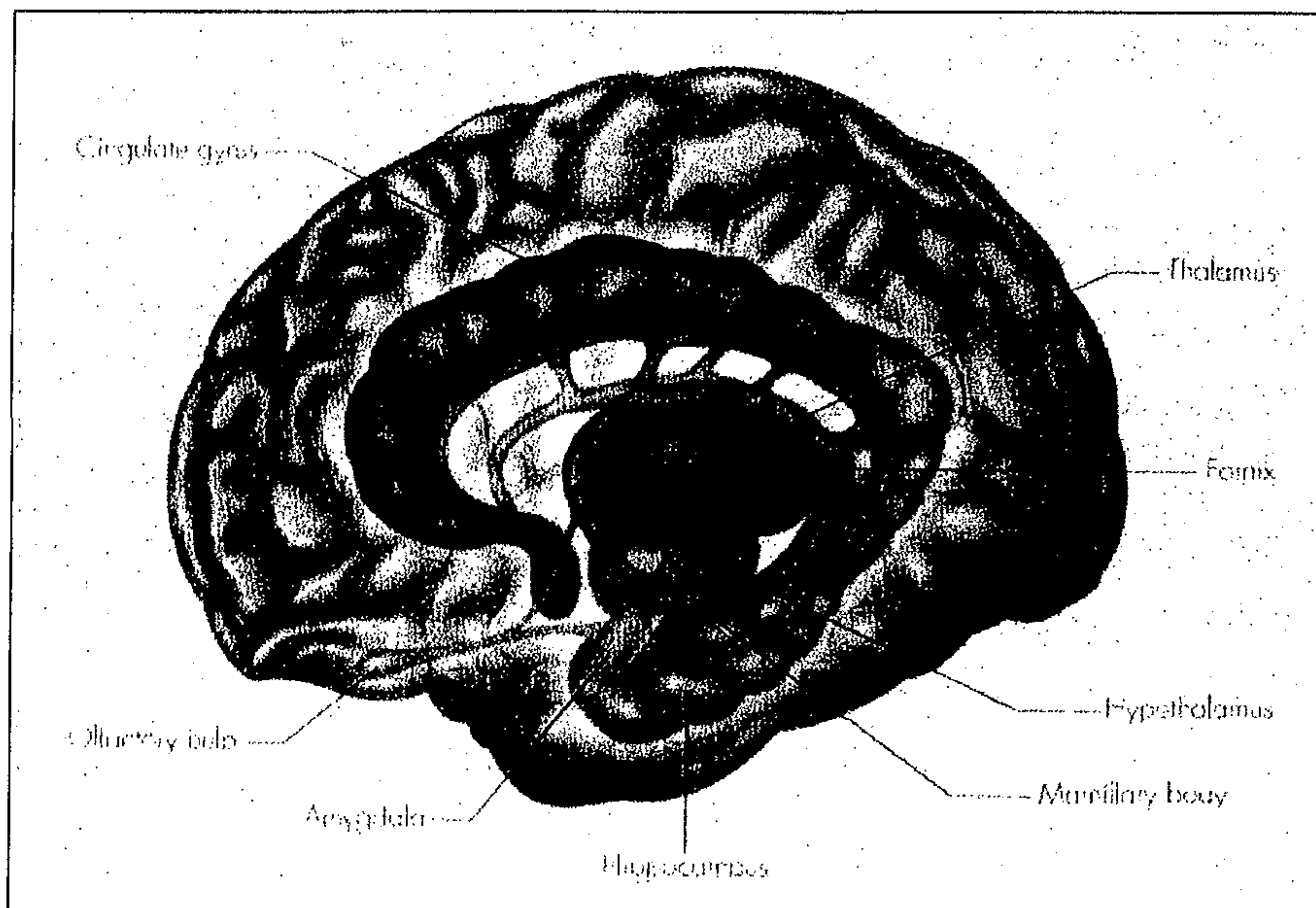


FIGURE 3.16 *Major Components of the Limbic System*

Source: Kalat (2001:96)



### 3.5.1.1 Memory

Kalat (1995:447) relates how the hippocampus acts as a map of where memories are stored in the cerebral cortex and how studies have shown that, after damage to the hippocampus, an individual will have trouble locating the memory that is correct for that moment, and will have difficulty distinguishing it from similar stored past memories. Patients with lesions to the hippocampus usually forget information obtained recently, but retain the ability to recall old memories. When the hippocampi or the circuits of Papez are no longer functional, memories of earlier events are retained because these have already been established. Connections of the hippocampal formation and amygdala in the forebrain and Diencephalon, including the circuit of Papez, can be seen in the following diagram.

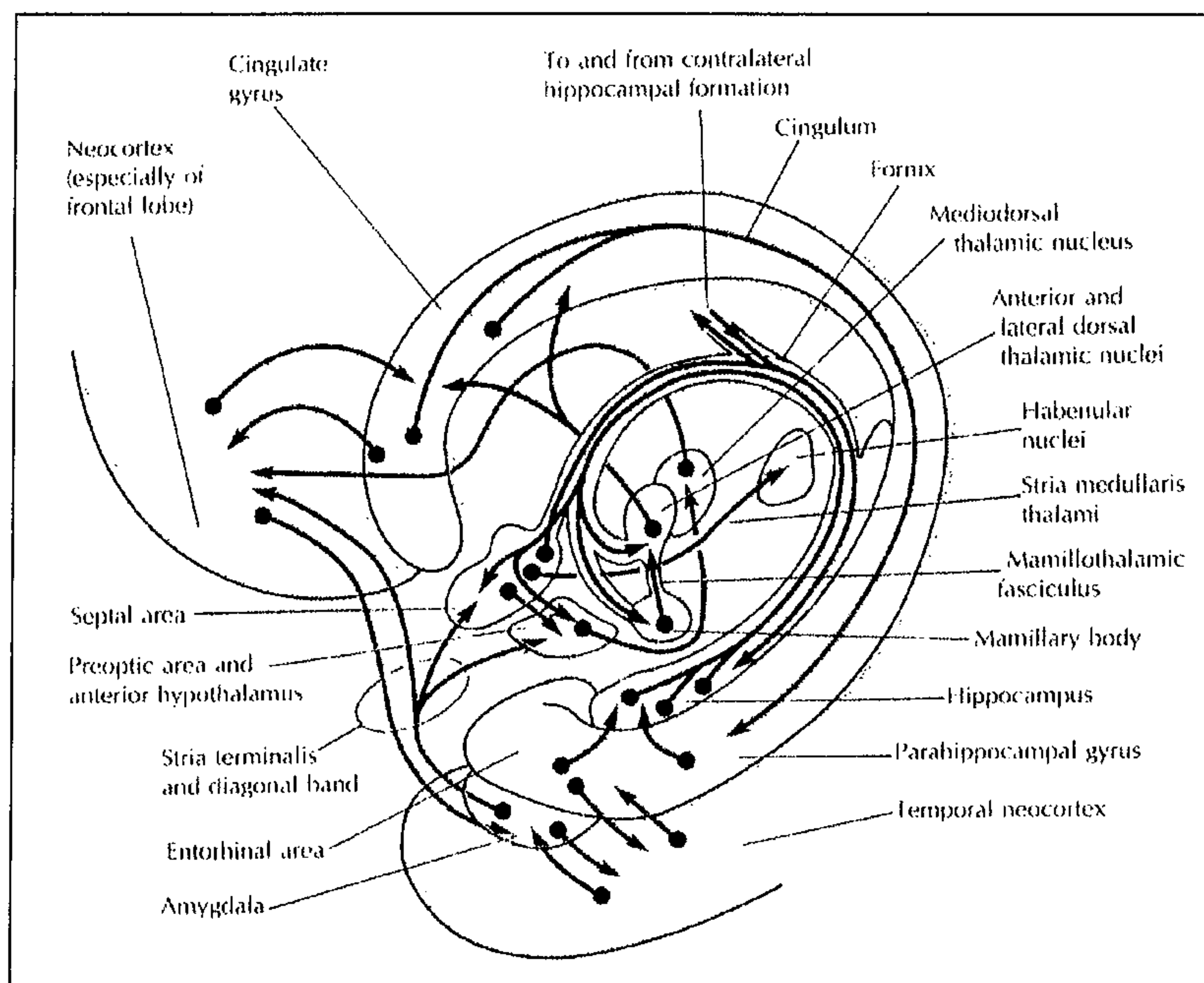


FIGURE 3.17 *Connections of the hippocampal formation and amygdala in the forebrain and diencephalon, including the circuit of Papez (red) and other connections (blue)*

Source: Kiernan (1998: 333)

Neurons in the association area form highly complex pathways that permit complicated reverberation. Several minutes are required for a memory to become consolidated in the long-term memory bank. The formation of permanent memory traces may involve the synthesis of new proteins and the formation of new synapses. The neuronal changes representing long-term memory are believed to be present throughout the parieto-occipito-temporal and frontal association cortex (Kiernan 1998: 327-328).

In line with this, neural models (where neural stimulating demonstrates specific properties of memory function) have assisted in characterising the processes carried out by cortical and hippocampal memory circuits. These processes include recognition and recall dynamics, sequences of activity, and consolidation of intermediate-term episodic memory into long-term memory (Hasselmo & McClelland 1999:184-188). Utilising this concept of recognition and recall in teaching the LP, the learners are encouraged to “shut their eyes and visualise what they have learnt or summarised.” During this process of visualisation, the learners are encouraged to visualise their mindmaps and to recall the information by using the mnemonics they have created. Research has shown that recalling information strengthens memories and minimizes the rate of forgetting. Experience changes the synaptic connections and these changes represent what is learnt. Knowledge of the relation between synaptic changes and neural circuits comes from a recent approach to modelling the function of neural circuits, called “neural networks”, where elements are given properties like those of a neuron. These neural networks can be taught to recognise particular stimuli. The characteristics of neural networks are similar to many of those exhibited by human nervous systems, which show generalisation and discrimination, providing a neural basis for learning (Carlson 1994:445).

In order to gain more insight into the role of memory in learning, Kalat's (1995:452) categorisation of memory and his proposed memory circuits will be introduced below. Short-term memory determines memory for events that have just occurred, intermediate memory for medium-term memories that require the activation of second messengers to keep intracellular changes active and long-term memory – memory for events from the past, which Kalat proposes is divided into:

- declarative – conscious memory for facts and events
- non-declarative – implicit or procedural memory consisting of motor skills and perceptual learning

Non-declarative memory is further subdivided into episodic and semantic memory. Episodic memory, created in the hippocampus, is the memory for specific personal experiences involving emotions. Semantic memory, located in the angular gyrus, is the memory for words and symbols and what they mean, representing our general knowledge about the working of the world (Rose & Nicholl 1997:47).

According to Kalat memory consolidation occurs when short-term memories are consolidated and strengthened to form long-term memories or “*building up of meaningful links*” (1995:453). Furthermore, knowledge of these different types of memory, provide insight into how these memory stores can be utilised in order to effectively encode the information, and in so doing make it readily accessible and thus speedily retrievable.

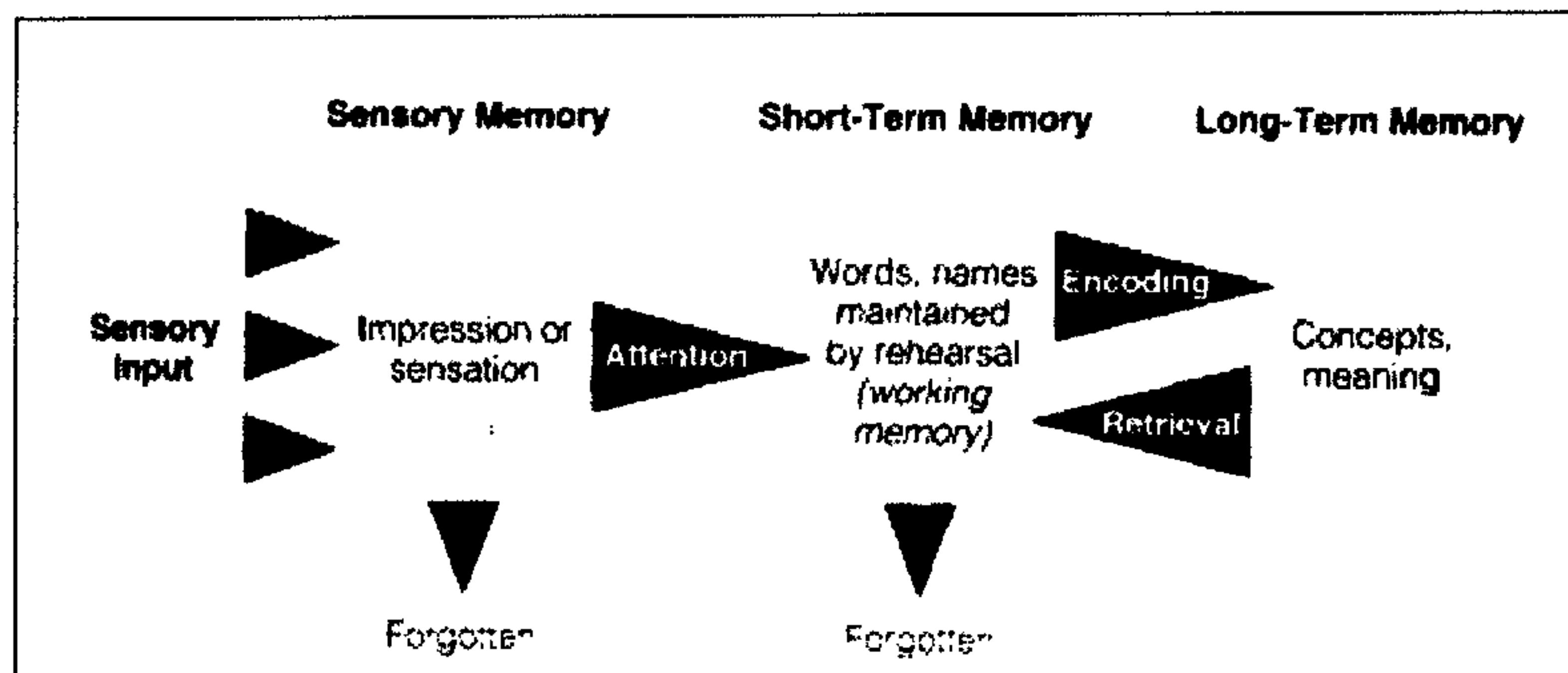


FIGURE 3.18 *Sensory Memory*

Source: Kalat (1995:452)

The three components of memory as seen in the above figure, include sensory memory, short-term memory and long-term memory. Sensory information first enters sensory memory (iconic or echoic memory). From there it may go into short-term memory (also



called primary memory). Some of the material in short-term memory may then be coded for long-term storage, where it might take the form of meanings and concepts.

Should information need to be preserved, there are strategies such as rehearsal (repetition) and chunking (recoding into smaller units or chunks for better control) which can facilitate preservation. Short-term memory (STM) is able to put certain elements on hold for the reader to focus attention on the rest of the sentence. According to Swanson (1991:142,143), factors affecting the capacity of STM include the ability to encode the size of the information load, the similarity of the items, the processing of succeeding activities and the time interval. Information then passes into the long-term memory (LTM). The long-term memory (LTM) is the knowledge base, the seat of all prior knowledge. Prior knowledge exerts a powerful influence on processing, as new information is compared to, and integrated with old knowledge (Lategan 1999:32-33).

Through organized chunking or semantic coding, information enters LTM and is stored permanently for retrieval. Not all information can be retrieved but the more efficiently it is organized, the better for retrieval. The LTM capacity is almost unlimited but, as opposed to the sensory memory and STM, the rate of input is very slow. Information is stored in different forms in memory; declarative (knowledge of what, or where, for example, facts and word meanings; procedural (knowing how to perform) and conditional (knowledge of when and why to perform) (Lategan 1999:32-33).

There are various models of the way in which information is semantically organised in long-term memory. One of the best-known models is the network model, as illustrated below (Jordaan & Jordaan 1989:564). According to this model, every word and its meaning forms part of a configuration including other words and their meanings. Taken together, all of these words form a hierarchical semantic network. This shows that information in LTM is not randomly stored.



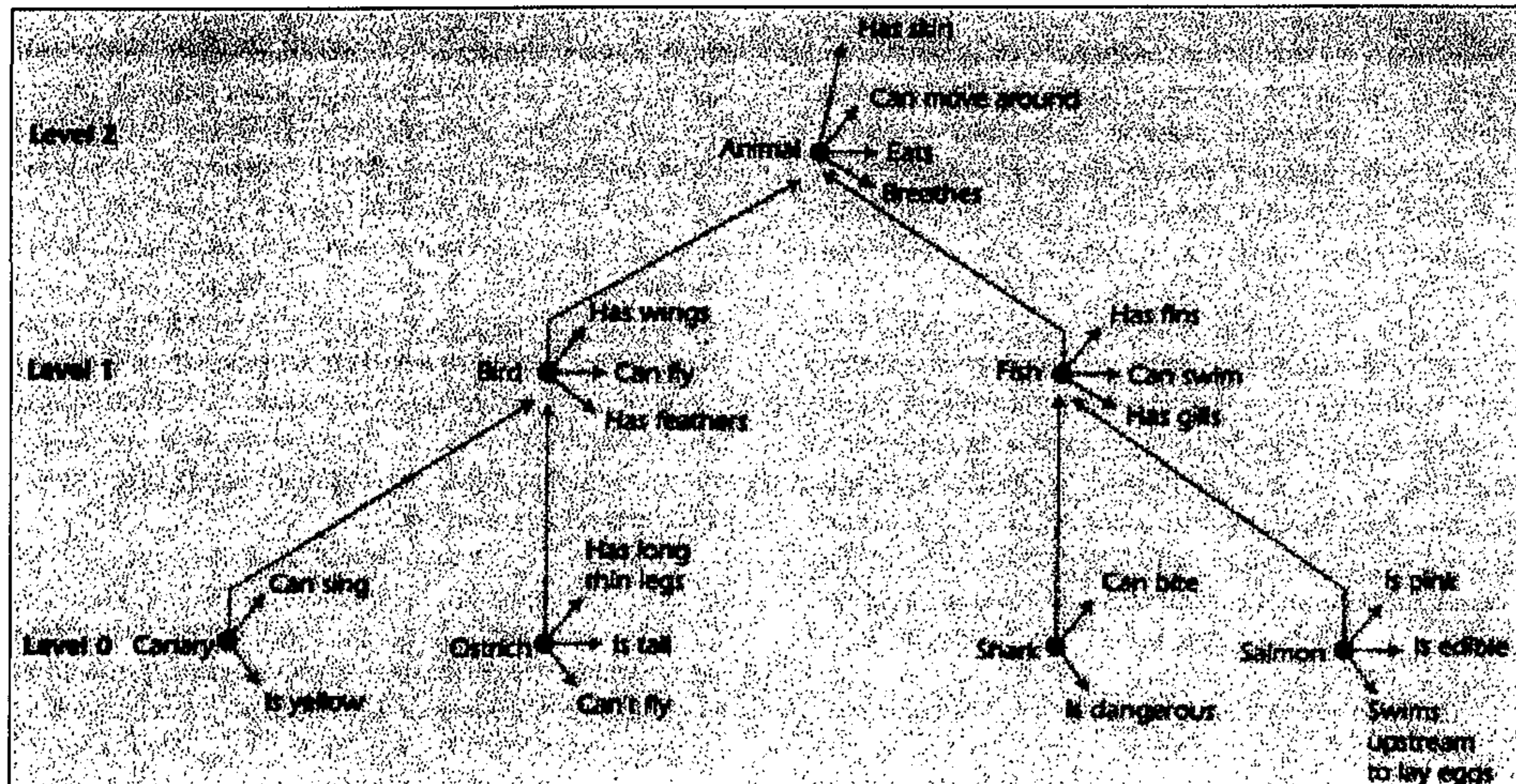


FIGURE 3.19 Hierarchical System of categories

Source: Sternberg (1995:295)

This network model highlights the need to organise information in hierarchical categories in order to maximise the encoding and thus the retrieval of the information so stored in the brain. In line with this, the LP provides learners with ideas as to classifying and categorising information, and to use keyword triggers in order to speedily access these categories.

Russell (1997:103) describes how memories are organised in terms of meaning. Meaning, he explains, is the essential part of all thought processes, giving order to experience. Deeper processing requires conscious involvement with the material. The more one consciously attends to something, the greater will be the depth of processing. The greater the depth of processing, the more meaningful the material becomes. The more meaningful it becomes, the better the memory and the more opportunities there will be to make relevant connections with new material in the future. Kihlstrom (1995:379) emphasises the importance of a person's conscious effort in recalling memories, based on the three different modes of recognition: remembering, inferring and knowing. The LP emphasises this concept of meaningfulness of the material to be learnt, by teaching the learners to consciously involve themselves with the material (see section 4.2.7).



Sternberg (1995:296) describes how we are “rapidly approaching the day when we will be able to expand our normal memory capacities through neuropsychological intervention”. The researcher believes that neuropsychology is beginning to make itself known in the field of education, and utilises this concept in the LP. The researcher considers all interventions that enhance the brain’s output as being neuropsychological in nature, as it is through tapping into the brain’s neurological processes that the individual’s psychological functioning is enhanced.

The researcher strongly believes that the use of memory strategies facilitates, not only the preservation, but also the access to, and hence retrieval of this encoded material. Consequently, the LP devotes considerable time to teaching the learners how to use memory strategies (see section 4.2.7). This LP also teaches the learners how to focus and sustain their attention, and how to optimise their STM functioning through effective categorisation (i.e. the linking of similar items together, and the accessing of this grouped information via mnemonics as described below).

Rose and Nicholl (1997:130) describe how Microsoft chairman Bill Gates still remembers hundreds of lines of source code for his original ‘*BASIC*’ programming language, and how his great achievement of recollection can be ascribed to his particular memory strategies. Improving our memory means improving our methods of learning --- achievable if imagery and memory are combined. Imagery is a sensory type of experience in the mind; to create a mental image is to “imagine”, an essential element of the memory process (Russell 1994:110). “Visual mental imagery is 'seeing' in the absence of the appropriate immediate sensory input, auditory mental imagery is 'hearing' in the absence of the appropriate immediate sensory input” (Kosslyn, Behrmann & Jeannerod 1995:1335). Imagery plays an important role in memory and reasoning as well as skill learning and language comprehension. From a neuropsychological perspective, the right hemisphere plays a special role in processing imagery.

Visualisation is a crucial element of imagery and a necessity to enhance memory. To visualise effectively, learners should focus on concrete nouns rather than abstract nouns,



visualise using clear pictures, all the senses, colour, adding movement and elaboration to their visual picture. This creative visualisation is powerful in directing their own innate power. The use of the senses is substantiated by Erickson and Leide (1992:25) who studied the importance of the involvement of the senses of touch, taste and smell in remembering. Richardson (1995:1345) records how training and instructions in the use of mental imagery can lead to improved retention in patients with memory impairment as the result of brain injury or disease. These techniques “enable brain-damaged patients to impose some associative structure on an arbitrary and unstructured domain of information”. However, Richardson (1995:1352) notes that the deployment of these techniques depends on the patient's metacognitive skills.

Associated with memory is recognition, retention and recall. Retention is the ability of the mind to take in and store information. Recall is the ability to select from that vast store the piece of information needed at any given time. A number of memory strategies are provided in the learning LP (section 4.2.7). A memory strategy is a method of encoding or memorising an event. The process of memorising is the ability to form new links (associations) in one's memory network.

The link system is fundamental to memory strategies, with the need to “link” concepts or ideas through methods of association. The advantages, according to the learning LP, consist of the transfer of knowledge into long-term memory in a structured method, such that recall of one item will lead to the others in a set learnt order. However, certain conditions are required to ensure effective recall. These are the importance of linking only two keywords at a time (no stories!) by sticking, crashing, weaving or wrapping them together: for example “the snake weaves through the sticks” or “the bicycle crashed into the bus”. Here Buzan (1997:51) provides the following guidelines.

“The connections between your basic Memory System Images and the things you wish to remember should be as fundamental, pure and uncomplicated as possible and may be accomplished as follows”:

1. crashing things together

2. sticking things together
3. placing things on top of each other
4. placing things underneath each other
5. placing things inside each other
6. substituting things for each other
7. placing things in new situations
8. weaving things together
9. wrapping things together
10. having things talk
11. having things dance
12. having things share their colour, aroma, action (Buzan 1997:47).

Buzan (1997:47) substantiates how the link system can improve the memory, and that while using this system, the following will assist association techniques: sensuality/synaesthesia or blending of senses, movement, association, sexuality, humour, imagination, number, symbolism, colour, order and/or sequence, positive images and exaggeration.

Similar to the link system are the number look-alike and number sound systems. Based on Buzan's (1997:51-64) "number shape system and number rhyme system", these two memory strategies are similar to the link system but use special lists of "key memory images" that never change, to which everything the learner wishes to remember can be linked and associated.

In the number look-alike system, the number and shape make up the key memory images. Buzan provides the following examples, which are also introduced to learners as seen in section 4.2.7.

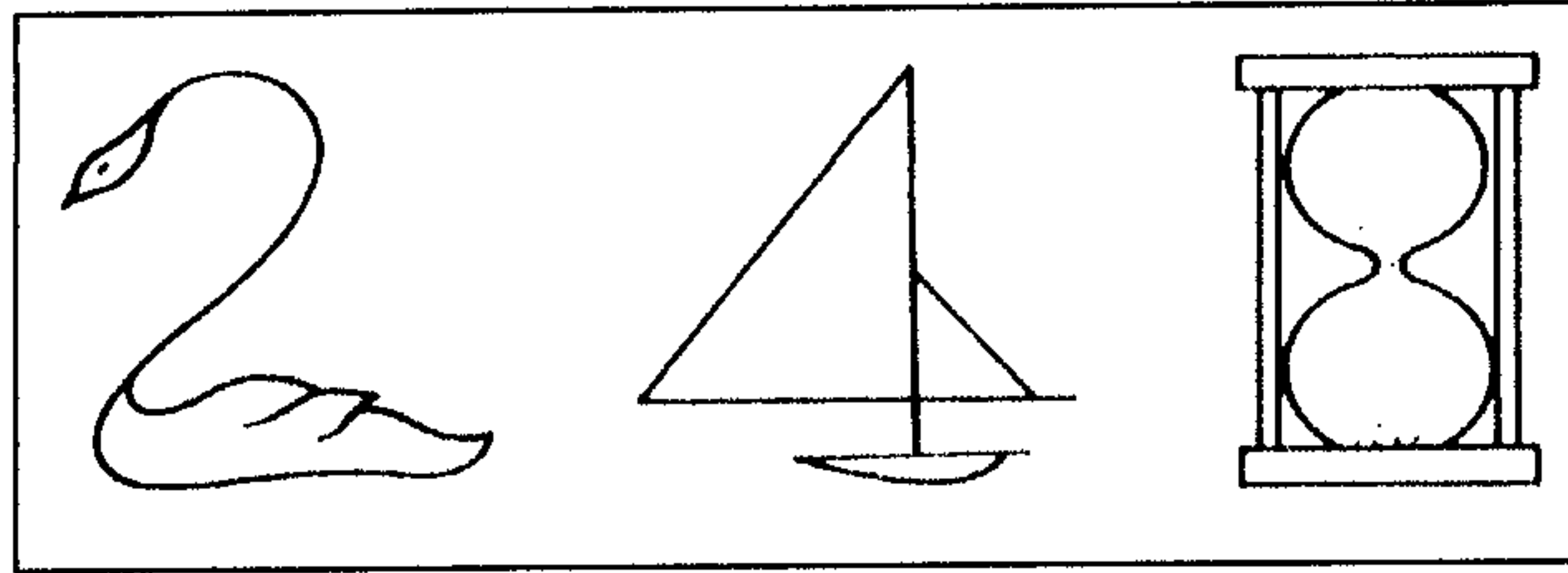


FIGURE 3. 20 *Buzan's key memory images*

Source: Buzan (1997:52)

In the number shape system, images that “look like” the number are used as hangers, or hooks, on which to link items the learner wishes to remember. As seen above, a common “key memory image” for the number 2 is a swan. In the number sound system, “key memory images” are represented by a word that rhymes with the sound of the number. Thereafter, it is used in exactly the same way as in the number look-alike system.

Another memory strategy involves organisation or categorisation, where words are grouped as objects and subjects that have associations which fall into the same category. Through organisation of learning material, active involvement with the material ensures formation of meaningful associations, thus enhancing memory recall. Associations (as explained in chapter 2) provide cues which give information about which part of the memory one should be looking in; the more associations there are, the more specific the search can be. Without associations, memory would be “like a vast library without a catalogue” (Russell 1997:103).

### ***3.5.1.2 Emotions***

As previously described, the limbic system is situated in the centre of the brain and is connected to a large number of brain areas by a rich network of nerve pathways, including the reticular activating system (RAS, described in 3.5.2). It functions continuously so that there is always an intimate link between human emotions and the consciousness of impulses, which originate both from within and without the person. Thus emotions and attention form an integral part of all human mental activities.



McGaugh (Jensen 1995:33) has researched the link between emotions and learning, concluding that “emotions can and do enhance retention”. In terms of learning, the ability to engage positive emotions will enhance meaningful learning. This is due to the fact that when the brain is in a state of positive emotional arousal, endorphins or “pleasure chemicals” are released. These, in turn, trigger an increased flow of the neurotransmitter acetylcholine, which promotes connections between brain cells, thus providing a neuropsychological basis for effective learning through emotional involvement (Grove 1996:30). In other words, deliberately invoking positive emotions can make learning more effective. The LP emphasises this link between the positive emotions and powerful learning, encouraging the learners to think and feel positively about the material that they are required to master, by equipping them with the necessary learning skills (see section 4.2.4).

In confirmation, Sternberg (1995:578) highlights the interdependence of emotion and cognition, suggesting that if one learns something while experiencing a particular emotion, one is more likely to remember. In addition, Robbins (1992:437) proposes that one is able to influence one’s destiny and determine one’s life experiences, by deliberately taking charge of one’s emotions. This is based on the realisation that changing how one feels and thinks is the motivation behind behaviour, highlighting the need to be aware of one’s emotional patterns. The LP therefore encourages emotional awareness and emotional control, as an aid to effective learning.

Stress can be beneficial if the individual experiencing it has the necessary cognitive and coping skills to maximise its benefits and minimize its harmful effects. In situations of tension and stress, while there may not be a conscious awareness of the body’s reaction, the autonomic nervous system works to increase heartbeat, cause pupils to dilate, as well as increasing body temperature and blood pressure. In situations where the body perceives a threat or danger, the focus is on fighting or fleeing the situation – a state which precludes sitting down calmly and trying to think about or rationalize the most appropriate response. The emphasis is thus responding immediately without employing the higher mental activities of the cerebral cortex, consequently the brain receives a

message to shut down anything that may detract from the problem at hand, and in this case complex thinking would detract from the individual from responding instantaneously. In this way, the brain tries to deal with an influx of unnecessary information utilising a shut-down system where parts of the cortex experience “down-shifting of brain functions” (Grove 1995:30). Looking at the brain’s response to stress (see figure 3.21) emphasises the importance of staying in control of the situation, and using this stress to motivate and not minimize or reduce the functioning of our higher brain. This optimal state can be achieved by creating a balance between cognitions (thoughts) and emotions (feelings), and by exercising control over one’s emotions through the utilization of positive speech/confession, as described to learners in 4.2.4.

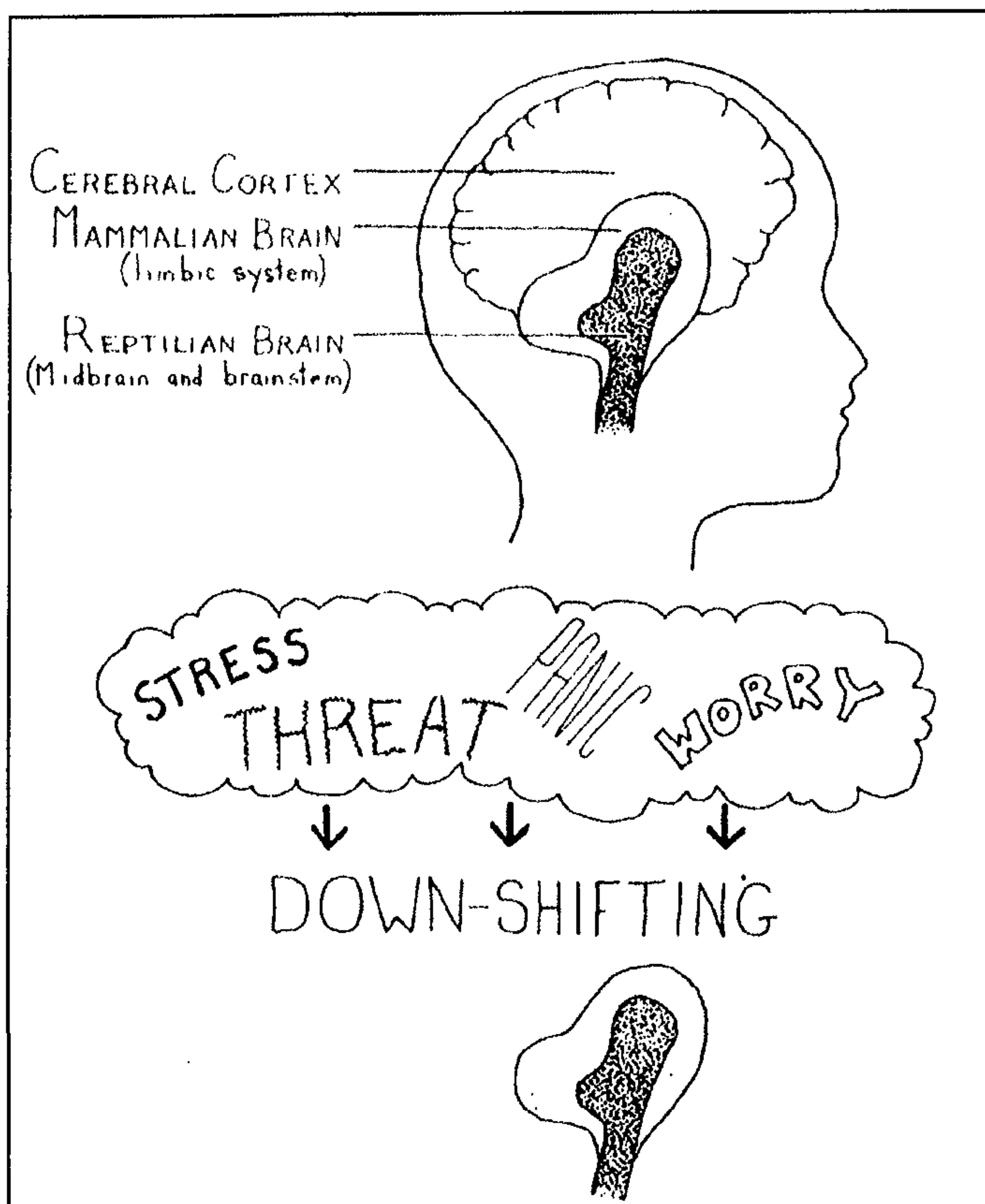


FIGURE 3.21 Grove's "down-shifting of brain functions"

Source: Grove (1995:30)

Thoughts lead to feelings and since situations themselves do not have emotional content, it is one's perception of the situation which gives rise to one's feelings (Le Roux & De Klerk 2001:56). Consequently perceiving a situation as stressful, and perceiving oneself as not being able to cope, will result in a fight/flight response which triggers the "shut-down" of the cortex – a process which prevents an appropriate cognitive appraisal of the situation and thus prevents an appropriate response.

Learners who fail to effectively manage their emotions display emotional lability/instability and lack of emotional control, which often indicates social uncertainty, immaturity, feelings of inadequacy and anxiety that all contribute to a low self-concept, and ultimately prevent self-actualisation. Neuropsychologically speaking, the thalamus, hypothalamus, and limbic system control one's emotional reactions and are therefore the brain areas utilised the most in this module of the LP. A person's behaviour in a particular situation is more effective when an optimum level of arousal is maintained. When this level is disrupted (e.g., during times of emotional turmoil or stress such as panic, anxiety, intense anger or euphoria), then behaviour becomes less effective, with the concomitant disintegration of the balance among the emotional, intellectual and decision-making functions of the brain (Jordaan & Jordaan 1992:252). This highlights the need for emotional control and emotional stability in managing oneself and ultimately in self-actualising (see section 4.2.4).

According to Le Roux and De Klerk (2001:10), "emotional intelligence is a type of personal and social intelligence which includes *emotional awareness* (the ability to perceive, recognise, understand and react to one's own and others' feelings), *emotional literacy* (distinguishing between various feelings and identifying them as well as understanding the relationship between thoughts feelings and behaviours), and *emotional control* (expressing and controlling one's feelings appropriately). Furthermore, it relates to the ability to listen to others, to have empathy with them and to communicate one's emotions effectively, as well as being able to take charge of one's own thoughts and actions.



According to Le Roux and De Klerk (2001:10-12), emotional intelligence has numerous benefits, which enable the learner to interact socially in a mature manner. These authors summarise the benefits as:

- Gaining emotional awareness, which in turn enables one to recognise one's own feelings.
- Finding a balance between expressing and controlling one's feelings.
- Recognising that one is responsible for one's own feelings.
- Empathising with the feelings of others thereby promoting understanding of others.
- Improving communication skills and promoting healthier relationships with others.

Emotional control is one of the most important features of emotional intelligence, and this control is based on knowledge of one's emotions, and awareness of one's personal feelings. People who are in control of their emotions are able to cope with any situation with a certain amount of confidence, since such people are able to control their feelings by changing their thinking patterns. Emotional control also requires that one distance oneself from one's feelings in order to think logically and objectively about the situation, therefore enabling one to respond appropriately instead of reacting defensively (Le Roux & De Klerk 2001: 98).

### **3.5.2 The Reticular Activating System**

The reticular activating system (RAS) is comprised of a network of neurons essential to the regulation of consciousness (sleep, wakefulness, arousal, attention) as well as to heart rate and breathing functions (Carlson 1994:88). The reticular formation extends the length of the brainstem. Ascending arrows on the diagram (Figure 3.22) indicate input of sensory systems to the RAS and then reticular output via thalamic relays to the cerebral cortex. Other reticular nuclei are involved in the coordination of muscle activity. The arrows descending the brainstem indicate their output.

The reticular formation in the medulla oblongata and brain stem (medulla, pons and midbrain) is a large complex of nerve fibres forming the central sections of these structures and continuing into the thalamus. In the thalamus the reticular formation is present in specific nuclear groups. Generally speaking however, the function of the reticular formation may be described as relatively diffuse (Marieb 1995:402).

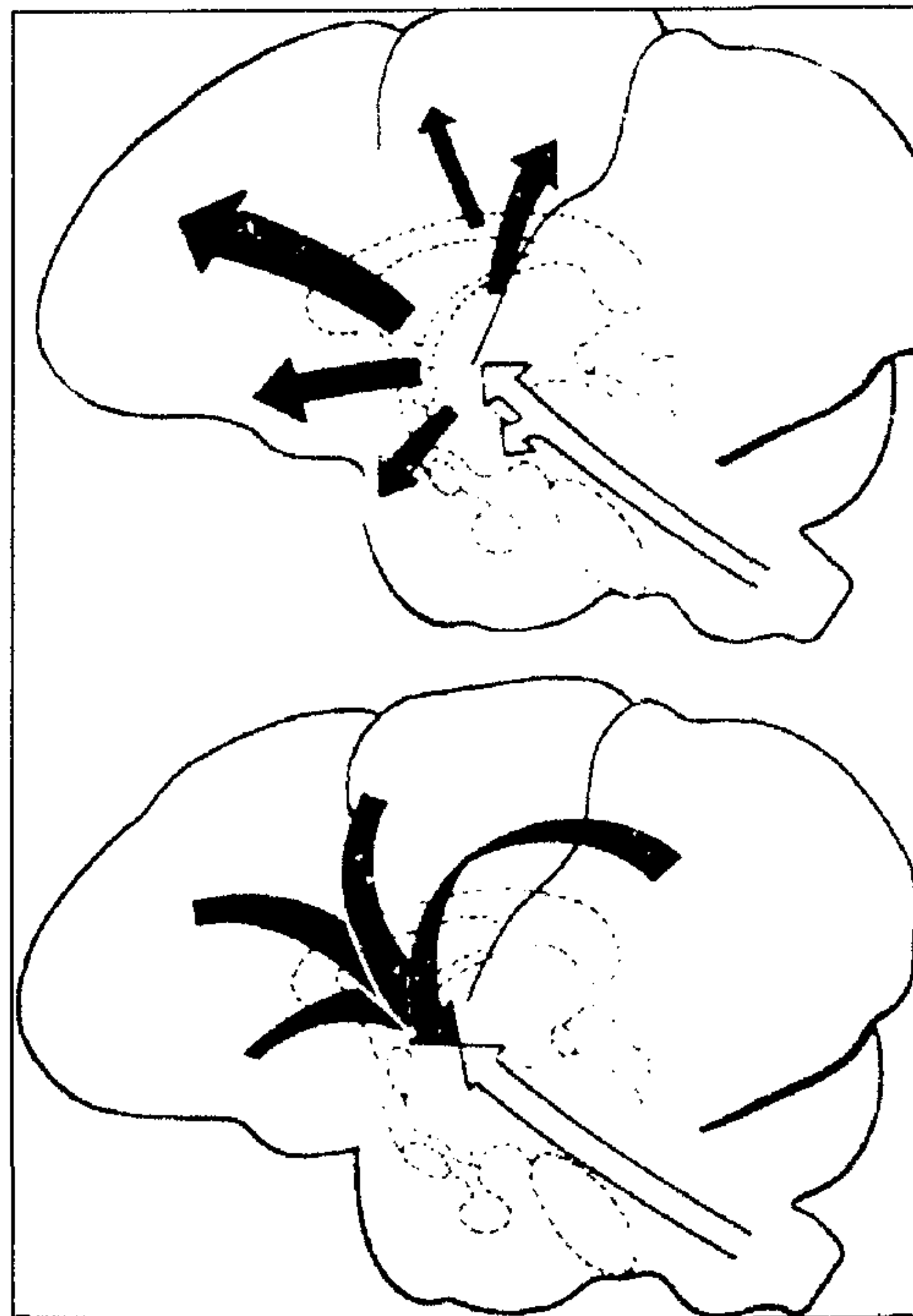


FIGURE 3.22 *The Reticular Activating System (RAS)*  
Source: Marieb (1995:402)

The reticular formation has projections to the cerebral cortex itself, to the basal ganglia, as well as to the cerebellum. Further, the reticular formation receives its input or incoming impulses from virtually the whole central nervous system: from the spinal cord, the cranial nerves, the hypothalamus, limbic lobe, basal ganglia, cerebellum and cerebral cortex. All these connections contribute to the fact that the reticular system acts as the

most important linking system between the widely scattered nerve centres of the central nervous system.

The main function of the reticular system, regarding the sensory and motor processes in the central nervous system, is to regulate the input and output of nerve impulses. As far as sensory input is concerned, the reticular system receives, analyses and sifts all impulses from the somatic senses, the facial nerves as well as from the eyes, ears, nose and balance (vestibular) senses. These sensory impulses are modulated by the reticular formation and to some extent processed before being sent further to the higher brain centers (Marieb 1995:404). The motor functions are an integral part of the extrapyramidal system. The extrapyramidal system, which acts as a final output tract of impulses, performs its functions through the reticular system.

The reticular formation also has a role in the activation of attention. When the reticular formation is brought to a state of readiness to receive the sensory stimuli along the specific projection tracts, this action is termed the reticular activation response or the alerting or arousal response. The reticular formation is therefore also referred to as the reticular activation system (RAS). This activity of the reticular activating system takes place when sensory stimuli are received which are important for the organism and which call for attention. When no important sensory stimuli are being received however or when stimuli are monotonously repeated or regarded by a person as unimportant, the reticular activation system suspends its impulses to the cortex and the person concerned becomes drowsy and may even fall asleep. It is generally accepted that various centers in the central area of the brain (such as the hypothalamus) have a role in the sleep cycle, and it is surmised that the reticular formation has a control centre which helps to determine a sleeping or waking state by suppression of the reticular activation response.

The normal functioning of the reticular system is therefore of the utmost importance in the teaching situation, due to its influence on, and even complete control of, attention memory and motivation. Robbins (1992:288) mentions that the RAS is directly responsible for



how much of a particular reality individuals consciously experience, since it heightens their constant awareness of this reality.

Concentration is important for both reading and listening. However it is a skill that is learnt, requiring practice; the more it is used and developed, the easier it becomes. “In fact, as you develop your powers of concentration, not only will you find it progressively easier to direct your thoughts towards whatever purpose you have chosen, you will also find your own mental clarity and powers of insight greatly enhanced” (Kehoe 2001:70). Attention is the link between the enormous amount of information that assails the senses and the limited amount of information that is actually perceived, as explained in 4.2.2.

Buzan (1989a:12) provides a list of problems relating to concentration. Among the main problems experienced in hearing and listening are the following:

- physical factors
- distractions
- boredom
- forgetting what was heard
- indistinct sounds

In the same way that it can switch off, the brain can also “switch on” its listening abilities. One of the most effective ways of eliminating distractions is to organise the listening/learning situations so that understanding and recall are maximised, as explained in 4.2.8. If this is done, the mind will tend to concentrate on the listening, and not “wander off” because of sagging recall and attention. By listening with the attention directed to what is being heard, the mind will readily take in all the information being received.

To remember what has been said, the concentration should not be on the general flow of sentences, but on those key elements that are the basis of what is being said. As these key elements gradually build up, learners should try to build a linked pattern of these elements in their minds, visualising the overall map of ideas as the talk continues. Key

selection will not only enable learners to recall far more of what they have heard, but will also significantly increase the ability to understand what they are hearing.

### 3.6 THE BRAINSTEM

The brain stem is the general term for the midbrain, pons and medulla oblongata. The anatomical structures that are found here serve as a link between the brain (cerebrum), spinal cord and cerebellum (small brain). The cranial nerves emanate from the brain stem.

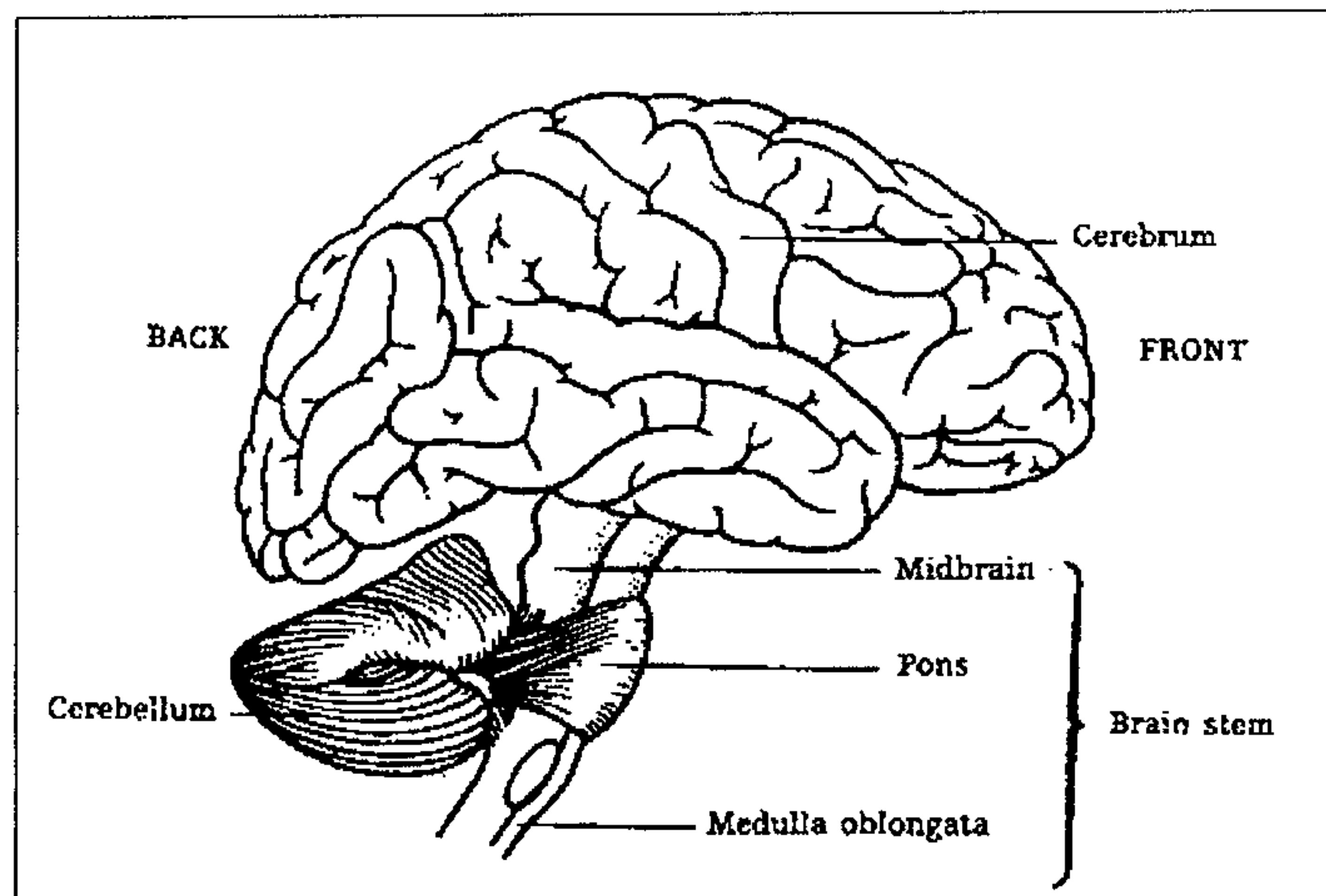


FIGURE 3.23 *The brainstem*

Source: Botha (1986:35)

The brainstem is the seat of all automatic behaviours necessary for survival as well as the pathway for fibre tracts running between higher and lower neural areas (Marieb 1995:396). Brainstem regions include:

- Midbrain, which connects the cerebrum with the pons and the cerebellum.
- Pons, which is formed by cross tissue on the front of the brain stem between the midbrain and the medulla oblongata. The pons makes possible the link between the cerebellum and the midbrain and medulla oblongata. The medulla oblongata is the crossover point for most neural pathways. Nerve fibres cross over in the medulla oblongata so that the left side of the brain controls the right side of the

body and vice versa. The crossover of the motor neural pathways (the neural pathways involved with movement) in the medulla oblongata also explains why an injury or lesion in the one side of the brain has an effect on the motor functioning on the other side of the body.

- Medulla Oblongata, which has nerve tracts connecting the brain to the spinal cord. The nerve tracts cross over to the opposite side of the brain.

### **3.7 THE CEREBELLUM**

This is the small brain situated under the occipital lobe (see figure 3.23). It has a central part – the vermis– connecting the two cerebellar hemispheres. The outer cortex is composed of grey matter and has a large number of parallel grooves. Nerve fibre tracts inside (the Arbor vitae or tree of life), connects the cerebellum with the mid-brain, pons and medulla oblongata.

The cerebellum receives impulses from the muscles, joints (proprioceptors) semicircular canals and maculae of the inner ear to maintain muscles tone and control balance and equilibrium. As well as co-ordinating voluntary muscular movements e.g., walking, dancing, running and making the movements smooth and precise (Marieb 1995:399).

The cerebellum continually compares the higher brain's intention with the body's performance and sends out messages to initiate relevant corrective measures. In this way, it helps promote smooth voluntary movements that are precise in terms of muscular effort. Cerebellar activity occurs subconsciously; we have no awareness of its functioning

Values and beliefs can be seen to form the basic foundation of one's personal philosophy of life --- a philosophy that assists the individual in behaving consistently and in accordance with his/her core beliefs in a complex and confusing world. An individual's code of behaviour is reflected in, and based on principles that are consistent with the individual's ideals and beliefs. The fact that behaviour is based on, and influenced by one's beliefs, can be explained in terms of the subconscious mind. Once the subconscious mind has accepted a belief, whether valid or not, it will continually influence and



strengthen one's thoughts to support that belief, in other words, our minds are capable of distorting our perceptions of reality, in order that these perceptions conform to, and confirm our beliefs (Kehoe 2000:78). This is explained to learners as outlined in 4.2.2.

In many problem areas of life, the solution will lie within the individual; resistance to finding a solution will often emanate from the individual's beliefs. When the subconscious mind accepts new beliefs, new realities will open up. The idea therefore is to challenge the individual to create new, more supportive beliefs and to replace the old ones through practice and affirmation. This, however, takes time and commitment as well as encouragement from significant others (Kehoe 2000:83). The LP aims at strengthening this commitment by encouraging and supporting the learners (see section 4.2.3).

### **3.8 IN CONCLUSION**

Studies linking the development of the brain with environmental experience support the concept that early stimulation is extremely important for the neural, motor and intellectual development of children. It is also possible that continuing environmental stimulation is needed to maintain the status of the cerebral cortex in later life. Brain development and mechanisms for higher cognitive processes are implicated in educational, remedial, diagnostic and therapeutic regimens and therefore can similarly be used to stimulate learning.

Recent research in educational and developmental psychology has revealed the importance of learning that is self-regulated, independent and flexible. The cognitive consequence of self-regulated learning is that learners become enabled to select and solve problems strategically. The motivational consequence is that they feel empowered to be successful and thereby invest effort in relevant and challenging tasks. One of the broad goals of education is to encourage the application and transfer of skills, rather than simple demonstrations of knowledge or competence in the classroom. Using knowledge to solve problems in everyday tasks is at the heart of strategic learning. But independent learning requires the effective management of time, effort and external resources. Self-

management uses all available resources, both internal and external, and is thus a balance of personal motivation and cognitive abilities. Self-management allows learners to make decisions about their academic tasks. Metacognitive beliefs, judgments and choices enable children to become independent learners. Thus, the enhancing of learners' understanding of academic tasks and learning processes is an important educational aim (Santrock 1997:324).

Equally important are the motivational consequences for learners, because self-regulated learning depends on a positive view of their self-competence and expectations for future achievements. The will or motivation to use one's skills has been examined from a variety of cognitive approaches. The selection of goals, the selection of tasks, and the persistence and vigour of learners' efforts all reflect a pattern of belief in one's learning potential.

There is growing consensus that educational reform should focus on the goal of creating a learning society. Van der Zee (1991:213-220) outlines strategic issues in order to develop a learning society:

- the need to broaden the definition of learning (education as a dimension of society)
- the need to redirect the goal of learning (growth towards completeness)
- the need to go beyond learning and instruction (increasing collective competence)
- the need to foster autonomy in learning (self-education)

The aim of the LP is to create awareness of one's unique purpose in life (see section 4.2.2). The need for motivation, commitment and determination must be realised (see section 4.2.3). Holistic thinking is an important concept throughout the LP, in that it is aimed at unlocking latent potential through the encouragement of lateral thinking (see section 4.2.6). Learner outcomes include belief in one's self and ability, enhanced self-concept, motivation and purpose, confidence and determination (see section 4.2.4). The awareness of underlying potential enhances the realisation of each person's uniqueness and individual contributions to society, and facilitates awareness of the need to accept responsibility for one's own future.

## **CHAPTER 4**

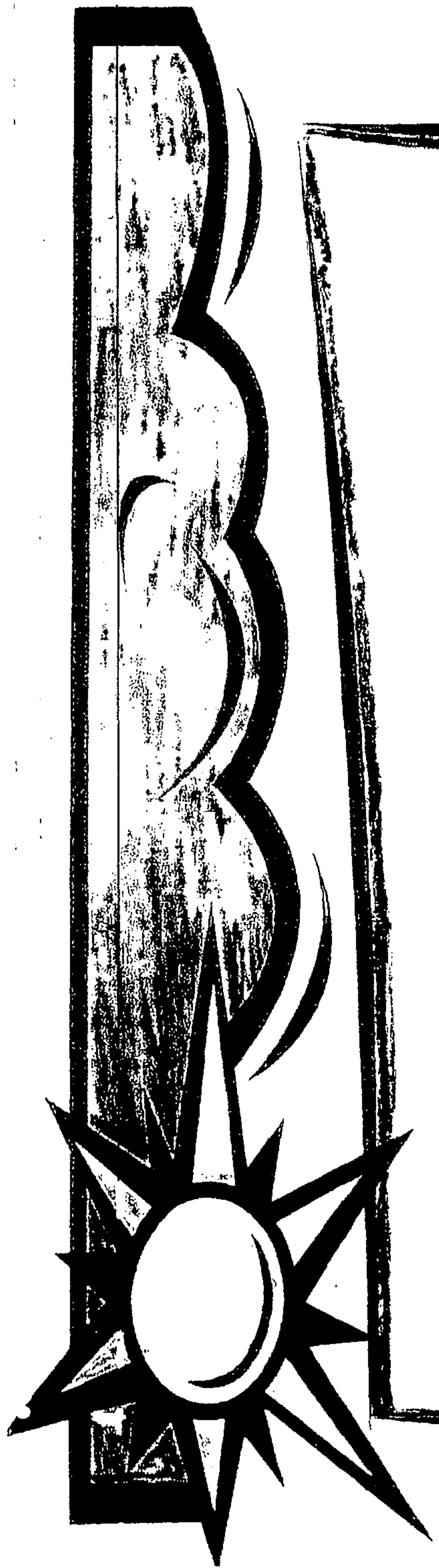
### **OVERVIEW OF LEARNING PROGRAMME**

#### **4.1 INTRODUCTION**

This chapter provides a learner's manual for a self-actualising learning programme with an educational neuropsychological perspective. Techniques used in this programme illustrate how visualisation, the use of one's senses, lateral thinking, mind-mapping as a unique note-making technique as well as basic neuropsychology are implemented. The programme, called "Unlock your Potential", begins with an overview. Each aspect of the overview is then explored in subsequent sections and contains learner outcomes as guidance for the teacher as well as recommended related activities for learners.

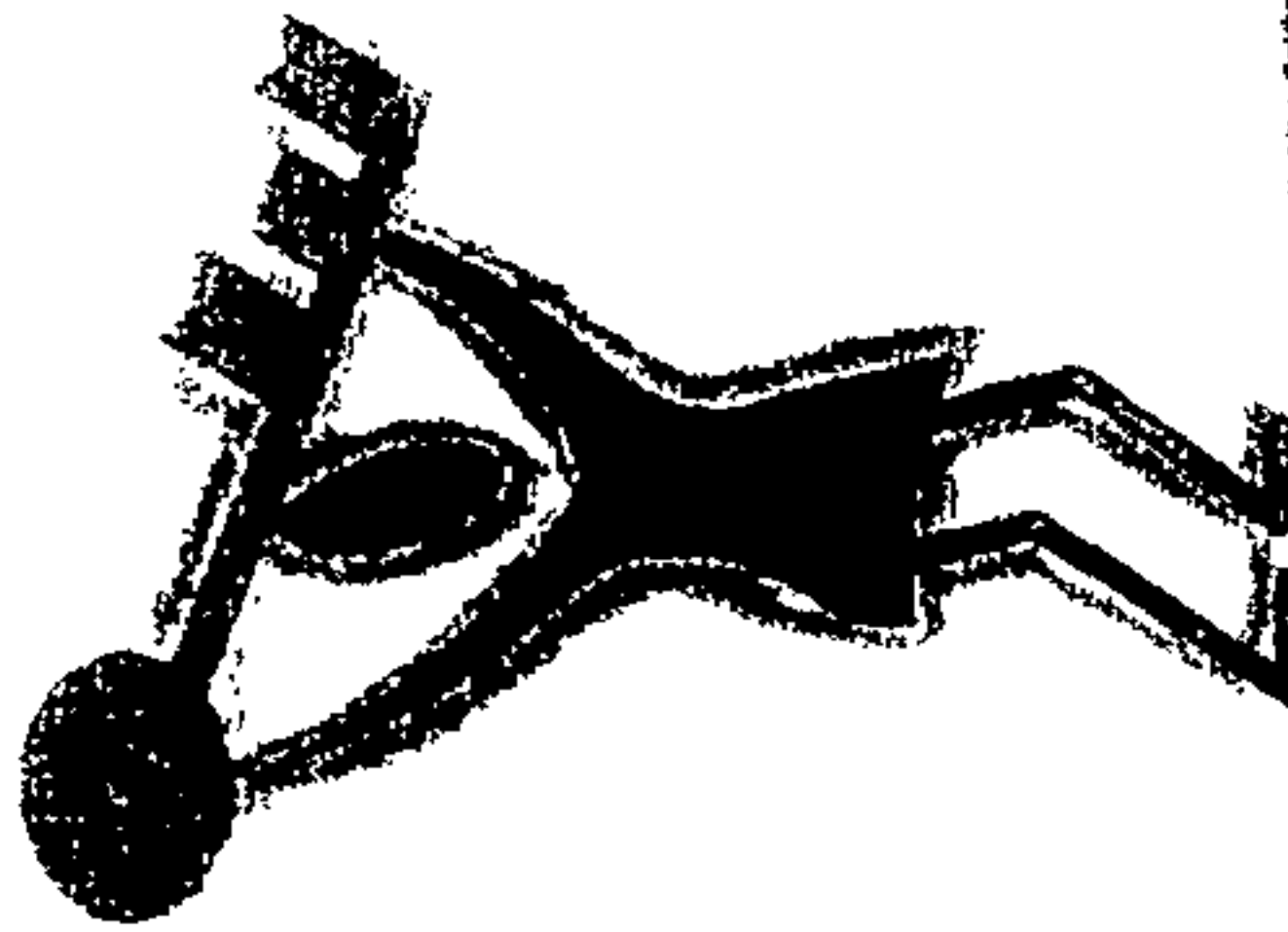
#### **4.2 LEARNER'S MANUAL --- AN OVERVIEW**



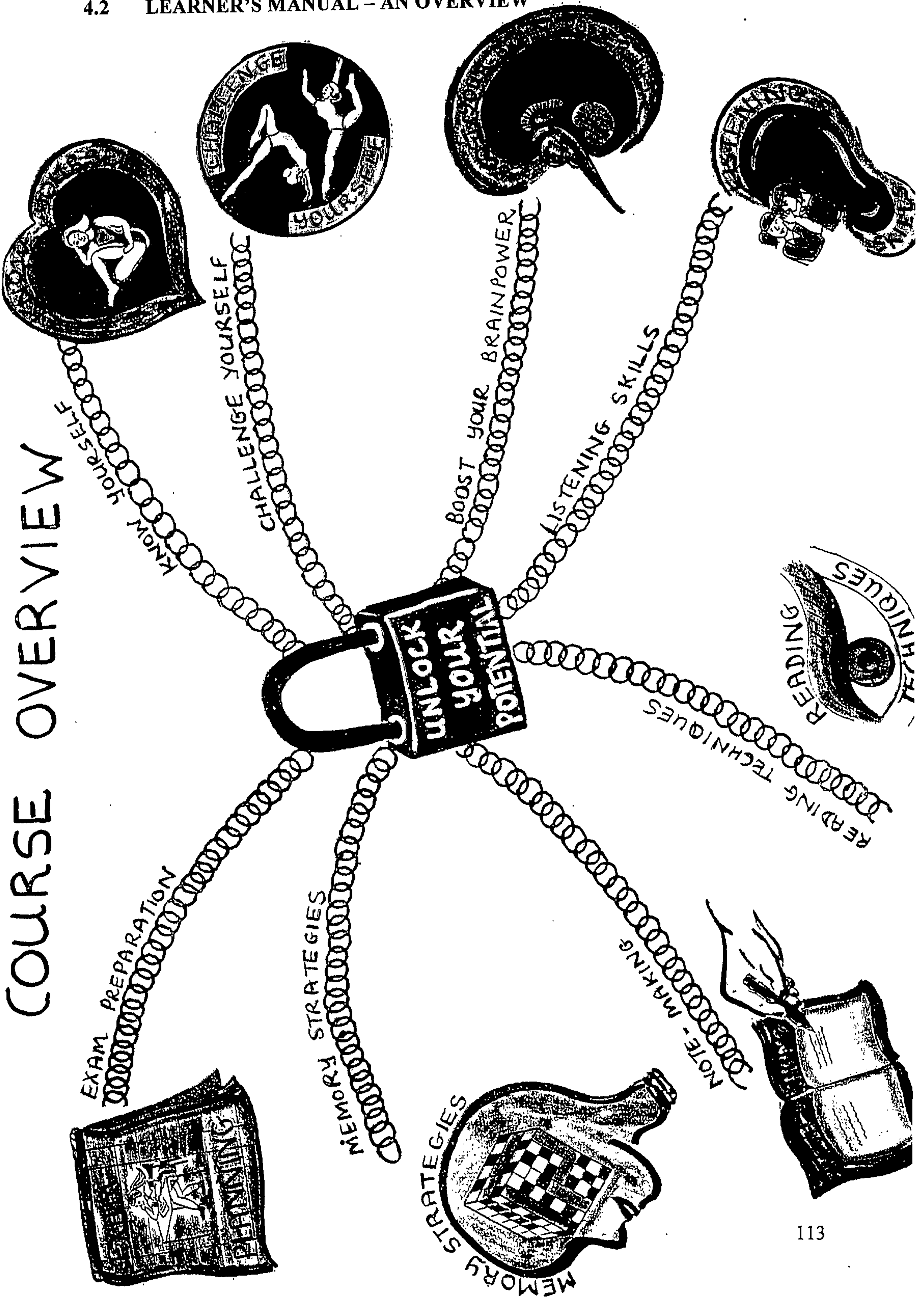


# Unlock Your Potential

By Rosalind Ferraro



# COURSE OVERVIEW





# Unlock Your Potential

## Learner Outcomes

- To create awareness of underlying potential in everyone.
- To enhance realization of each person's uniqueness and individual contributions to society.
- To facilitate awareness of the necessity to accept responsibility for one's own future.

## Activities

- Discussion of pupil's expectations of course.
- Overview of course, with a motivational emphasis on purpose and outcomes according to pupil's contributions and applications of concepts



# UNLOCK YOUR POTENTIAL



## KNOW YOURSELF

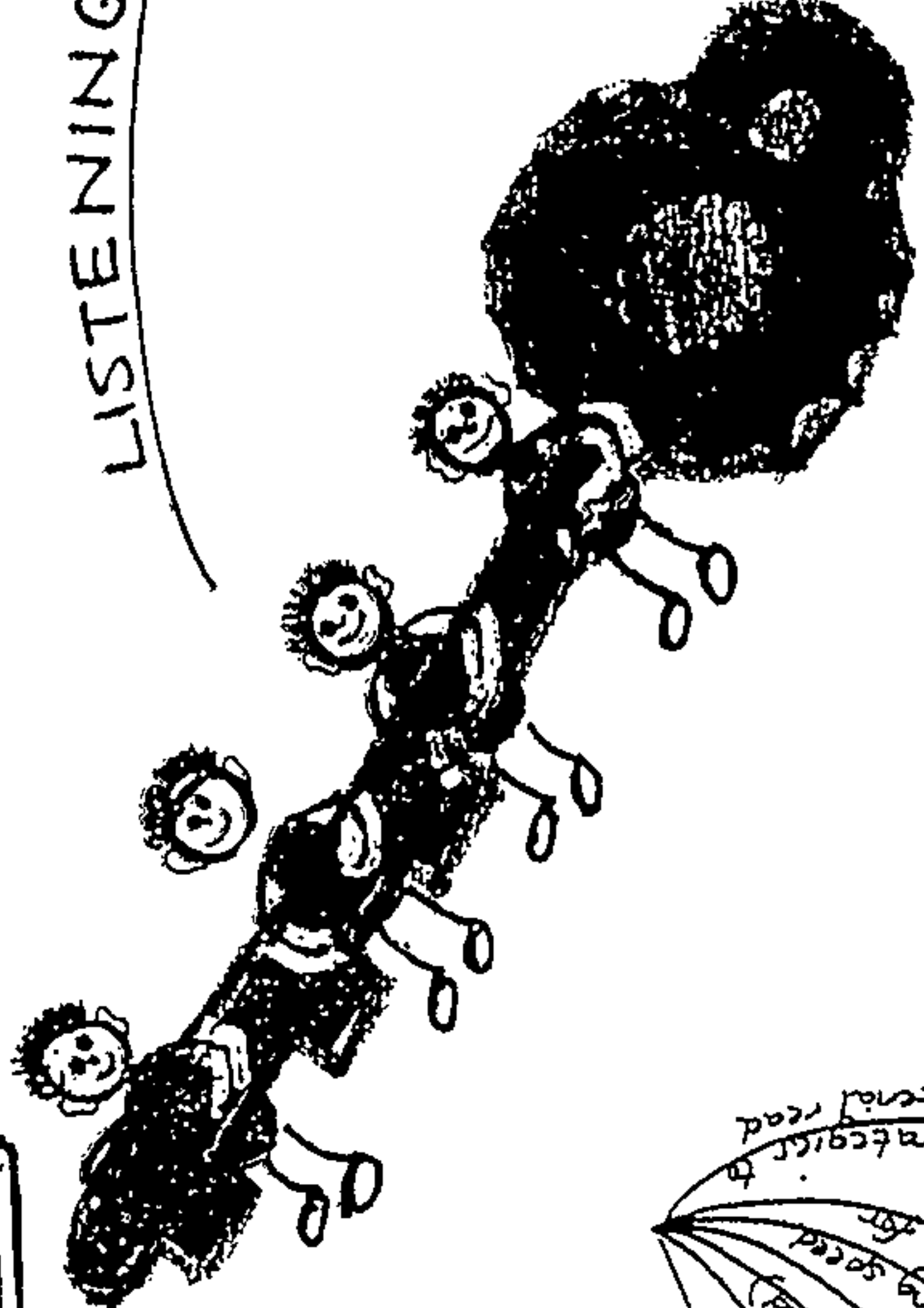
how you acquire info and knowing  
 your strengths  
 knowing your weaknesses  
 knowing your beliefs & strategies  
 knowing yourself  
 benefits of knowing yourself - concept  
 influence of knowing oneself on SELF

why is it necessary?  
 what are the benefits?  
 the rules for goal setting  
 7 steps to goal setting  
 setting your own goals

## CHALLENGE YOURSELF

the structure + functioning of the brain  
 the power of (and) thinking  
 stress and the brain  
 what is intelligence  
 what is memory  
 why a healthy lifestyle

## BOOST YOUR BRAINPOWER



## LISTENING SKILLS

what does it mean to focus?  
 obstacles to getting focused  
 the difference between hearing and listening  
 how to pay attention  
 links for effective listening strategies to ↓ listening

## EXAM PLANNING

time management  
 study plan  
 the role of attitude  
 techniques / skills for writing exams

## MEMORY STRATEGIES

definition of mnemonics  
 how do they help?  
 visualization  
 categorization  
 link systems  
 mnemonics (sound and other mnemonics)  
 diagrams (look alike)

## READING TECHNIQUES

skimming and scanning  
 SQ3R (survey, question, read, reflect, review)  
 SQ4R (survey, question, read, reflect, review, recite)  
 SQ5R (survey, question, read, reflect, review, recite, relate)  
 SQ6R (survey, question, read, reflect, review, recite, relate, respond)  
 SQ7R (survey, question, read, reflect, review, recite, relate, respond, repeat)  
 SQ8R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate)  
 SQ9R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine)  
 SQ10R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine)  
 SQ11R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine)  
 SQ12R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine)  
 SQ13R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ14R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ15R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ16R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ17R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ18R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ19R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)  
 SQ20R (survey, question, read, reflect, review, recite, relate, respond, repeat, re-evaluate, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine, re-examine)

## NOTE-MAKING

where to start - SQ3R  
 diff ways depending on time available  
 your preferences  
 which subject  
 categorization + classification  
 written summaries  
 line diagrams, time line  
 chain of events  
 labelling a diagram  
 use of mind-maps  
 tabular form  
 notes in a hurry

# *Know Yourself*

## ***Learner Outcomes***

- ***To create awareness of one's purpose in life.***
- ***Create awareness of the need to be motivated for one's own self-fulfillment.***
- ***To enhance realization of each person's uniqueness and individual's contribution to society.***
- ***To create awareness of the necessity to accept responsibility for one's own future.***
- ***Awareness of one's strengths and weaknesses.***

## ***Activities***

- ***Self-awareness inventory***
- ***Self-assessment questionnaires.***
- ***Abilities and interest questionnaires.***



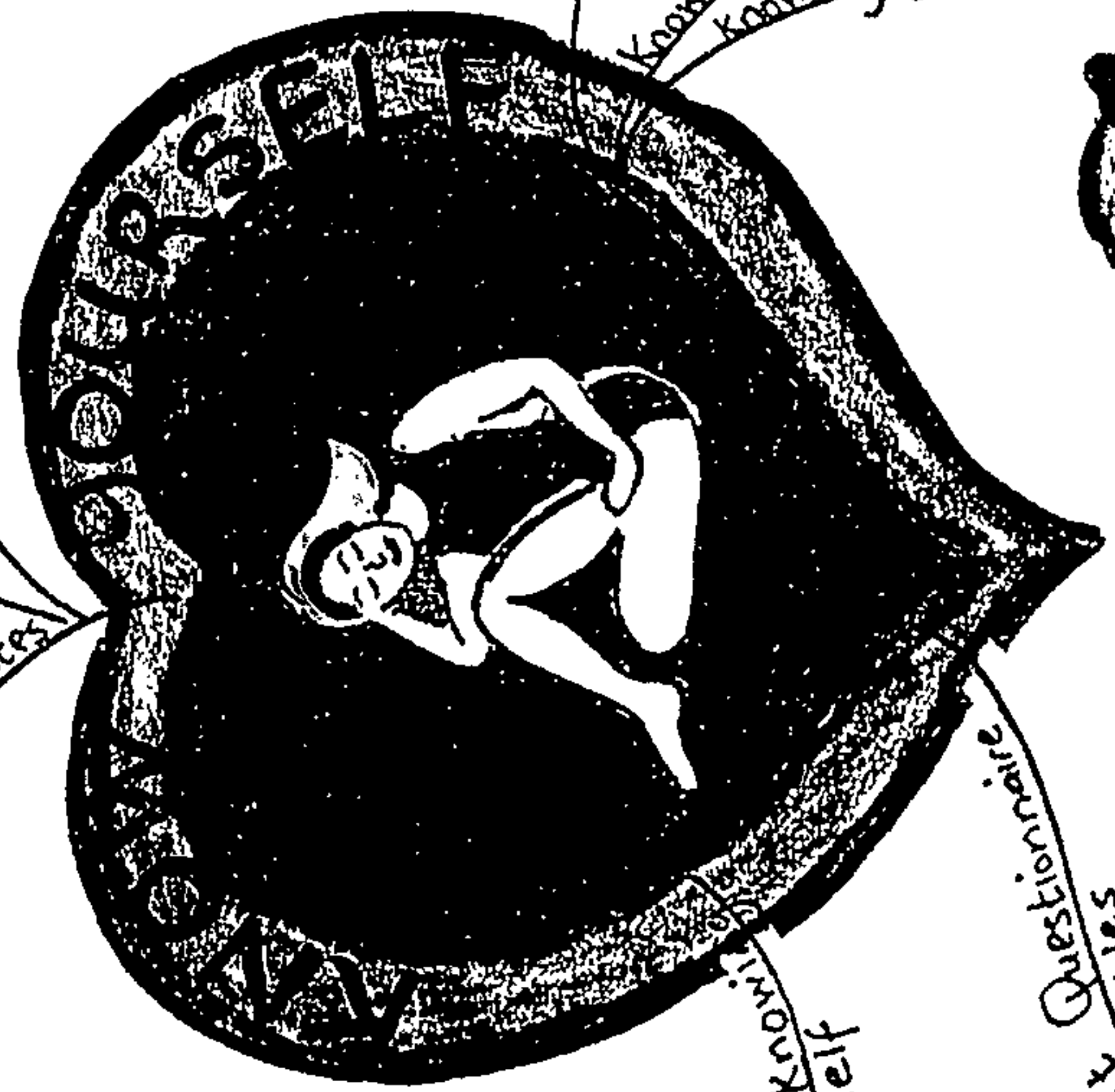
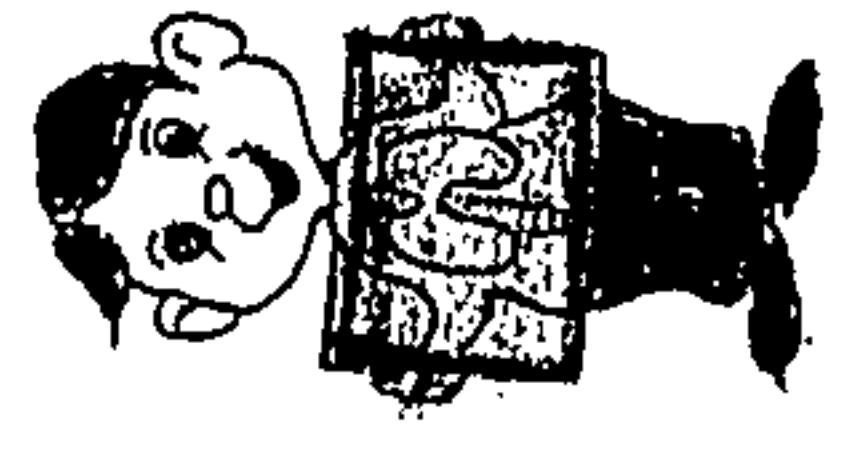
**If you don't know your purpose, someone will give you theirs**

emotions  
functions of human spirit  
Evolutionary (creation)

Why am I?  
Where do I come from? (ultimately)  
Where am I going? (ultimately)  
What are my real abilities?  
What is my purpose?  
What are you predestined to do?

knowing how to function optimally  
knowing what makes us human  
knowing yourself entails knowing your purpose

development  
guidelines for self-  
enables one to control one's behaviour (knowing strengths + weaknesses)  
contributes to ideals one has of self (helps one to function optimally)  
enables one to define one's self + the "I" more clearly  
influences one's reactions to events and circumstances



one's uniqueness  
one's potential  
provides knowledge of one's strengths + weaknesses, likes and dislikes  
provides clarification of self

self-motivation  
protection of self (assertion)  
respect for others  
sensitivity  
empathy towards

↑ awareness of others  
↑ fear of self  
↑ ability to make decisions  
↑ confidence and acceptance of self

↑ more assertive  
↑ self-aggressive  
↑ ability to make decisions for self-improvement  
↑ provides the basis and gives direction for self-evaluation

visual (primarily visually)  
auditory  
kinaesthetic  
"determine your VAK" Questionnaire



knowing how you acquire information

knowing your study related problems  
bad habits  
old habits  
study clock

knowing yourself means knowing your "belief system" (ideals, values etc)



Self-assessment Questionnaire  
Self-Esteem Questionnaire  
Behavioural Style Questionnaire  
Values Questionnaire

Self-Assessment Questionnaire  
personality evaluation  
Emotional stability

beliefs have powerful influence on basis  
behaviours in turn reinforce beliefs  
beliefs are inherited and mostly not thought out → conflict  
beliefs operate at level of consciousness  
beliefs must change as behaviours can

**Smile!**



# ***Challenge Yourself***

## ***Learner Outcomes***

- ***To create awareness of the need to challenge oneself in order to maximize one's potential.***
- ***To make pupils aware of the benefits of setting goals and how the fulfillment of these goals enhances self-esteem and motivation.***
- ***To show how goal setting helps one to prioritize and organize.***

## ***Activities***

- ***Discussion of rules for setting realistic goals.***
- ***Pupils to complete their own goal setting mind-map and chart.***

# CHALLENGE YOURSELF

**Why is it necessary to challenge yourself?**

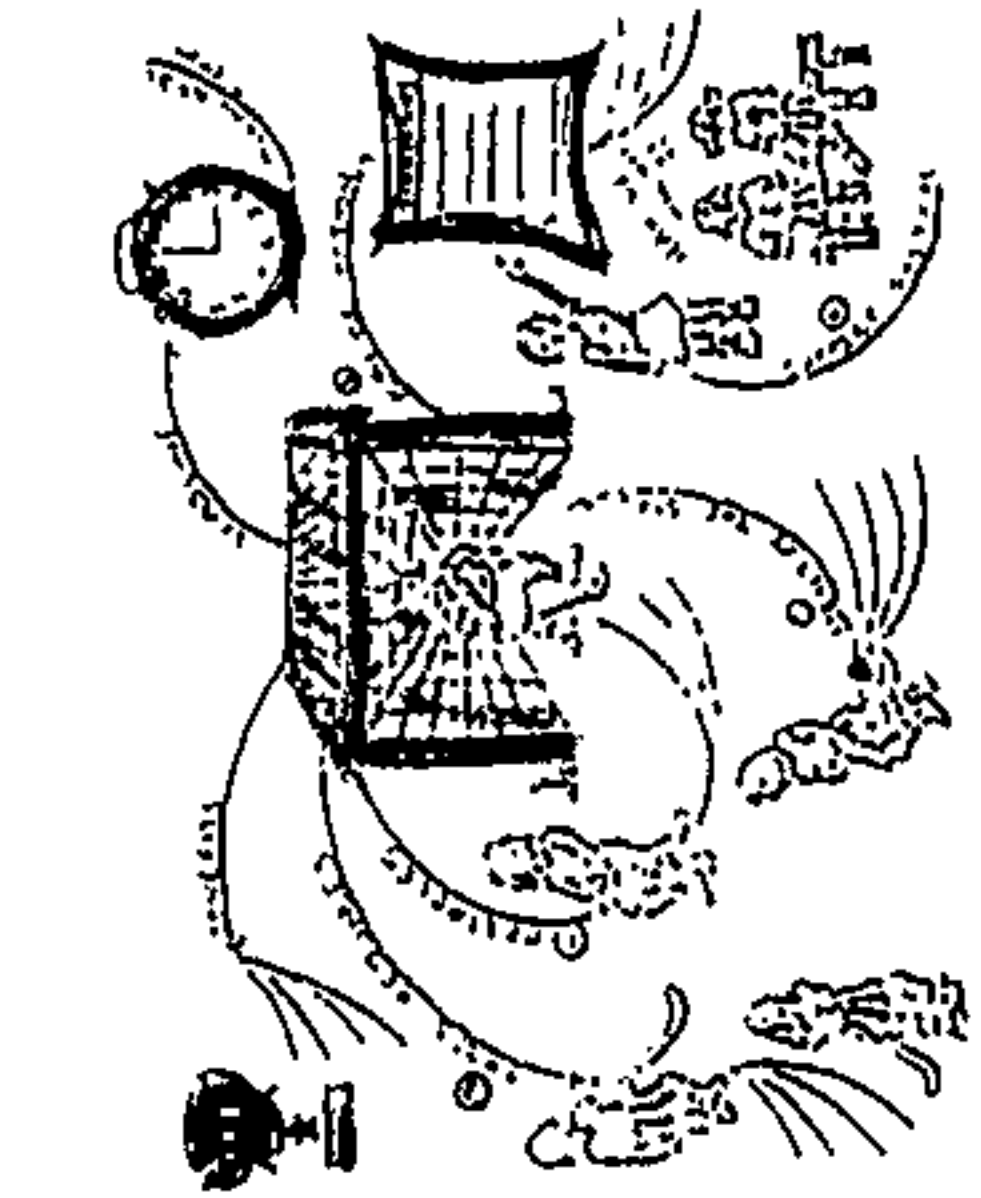
- growth of human spirit
- without a focus or direction one ends up doing nothing
- potential requires challenging oneself (goal-directed)
- humans are teleological beings and therefore function optimally
- not having purpose in one's life allows for you to dictate their purpose for you
- without predetermined goals our time and energy will be:
- used for pleasure
- used to please others
- largely wasted

**benefits of setting goals**

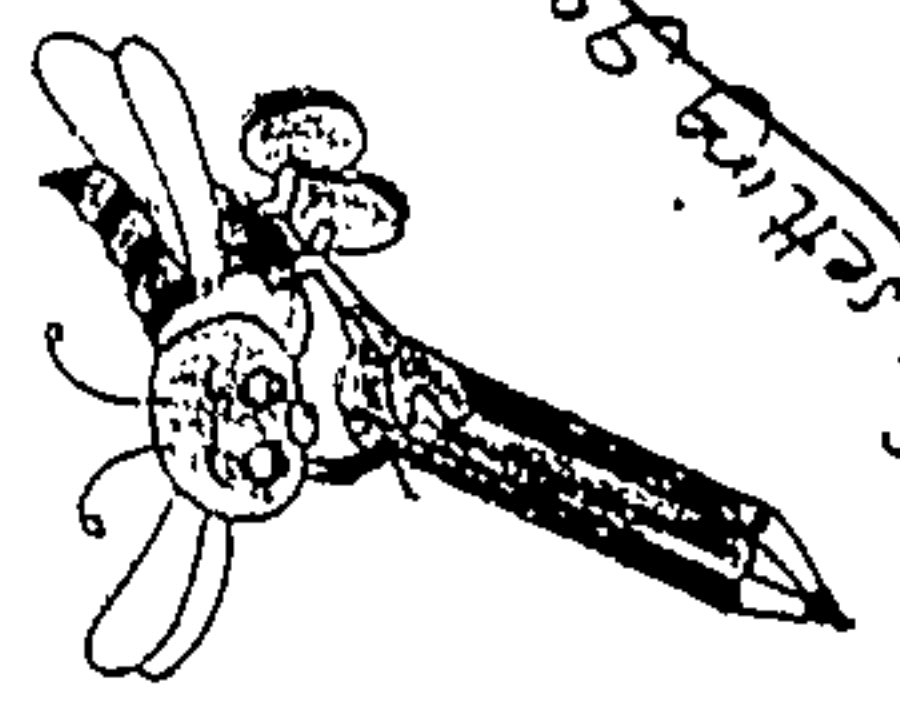
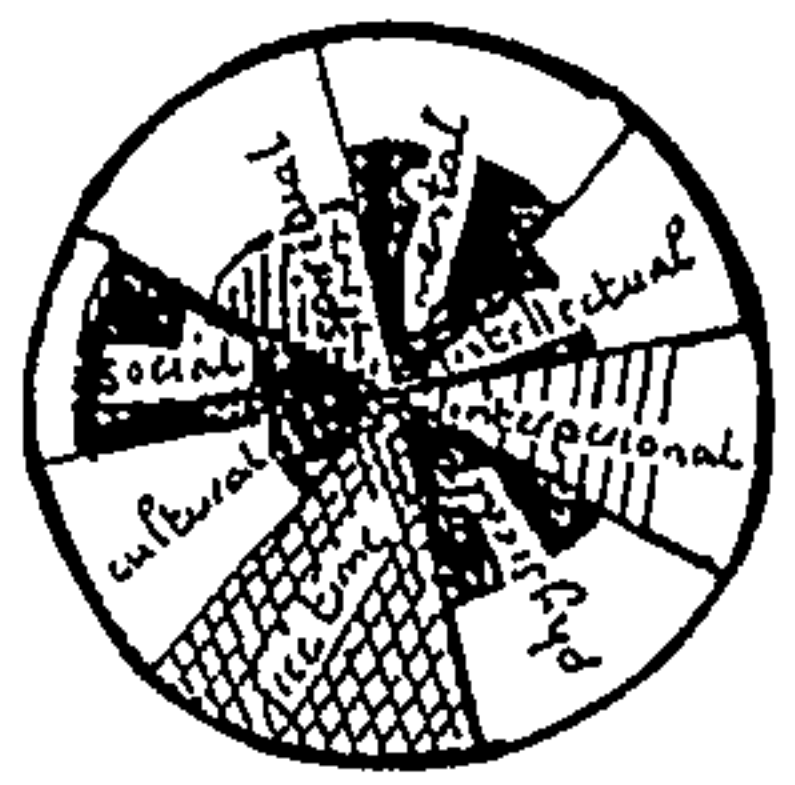
- give life meaning / purpose
- provide motivation (enthusiasm)
- help one prioritize (put most NB things 1st)
- help one manage oneself and ones time more efficiently
- organization & planning
- enables one to cope with change
- facilitates the actualization of ones potential
- provide a focus for time + energy
- when goals are achieved & confidence & feelings

**challenging oneself provides motivation and energy for successful living**

- if you don't aim you'll miss the target
- story of blindfolded archer: if pilot of Jumbo doesn't aim for N. York he'll end up in C. Town
- setting goals is a principle of life
- only 2% of population set goals
- majority (60% and over) don't set goals



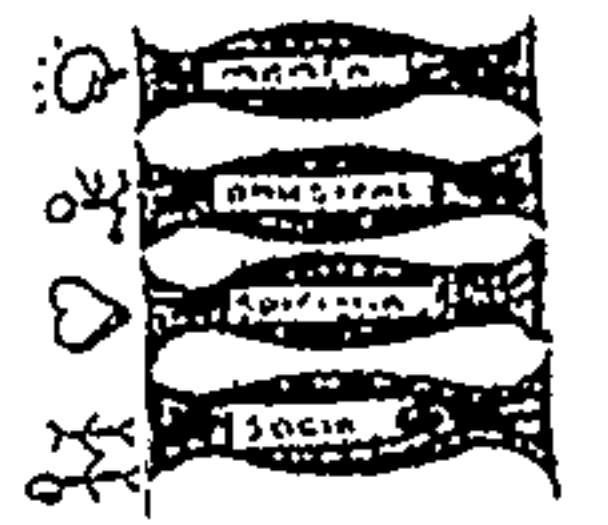
- 7 steps to goal setting**
- 1 identify the goal
  - 2 benefits / reward
  - 3 skills required
  - 4 supporting systems
  - 5 obstacles to reaching your goal
  - 6 plan of action / date by which goal must be reached
  - 7 deadline / date by which goal must be reached



**rules for setting goals**

- turn previous failures into successes (use them as stepping stones)
- make sub goals provide balance in all areas of ones life
- visualize the outcome (begin with the end in mind)
- anchor your successes
- commit yourself to paper and record your progress
- concentrate on where you can improve
- set time limit
- know yourself (abilities) & be realistic (reachable goals)
- keep track of your progress and record yourself
- commit yourself to paper and record your progress
- concentrate on where you can improve
- set time limit
- know yourself (abilities) & be realistic (reachable goals)

**"EFFORT PAYS OFF"**

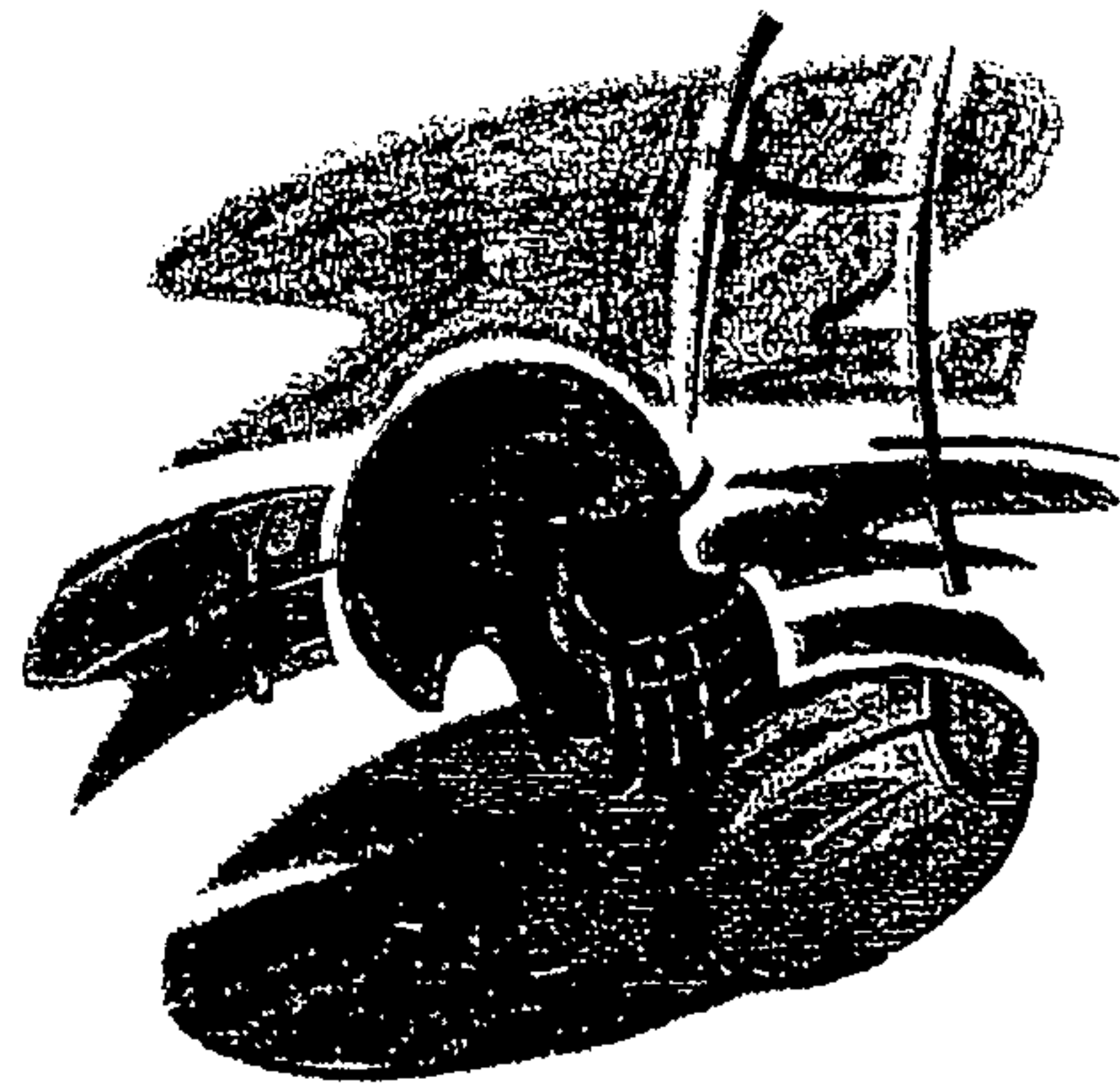




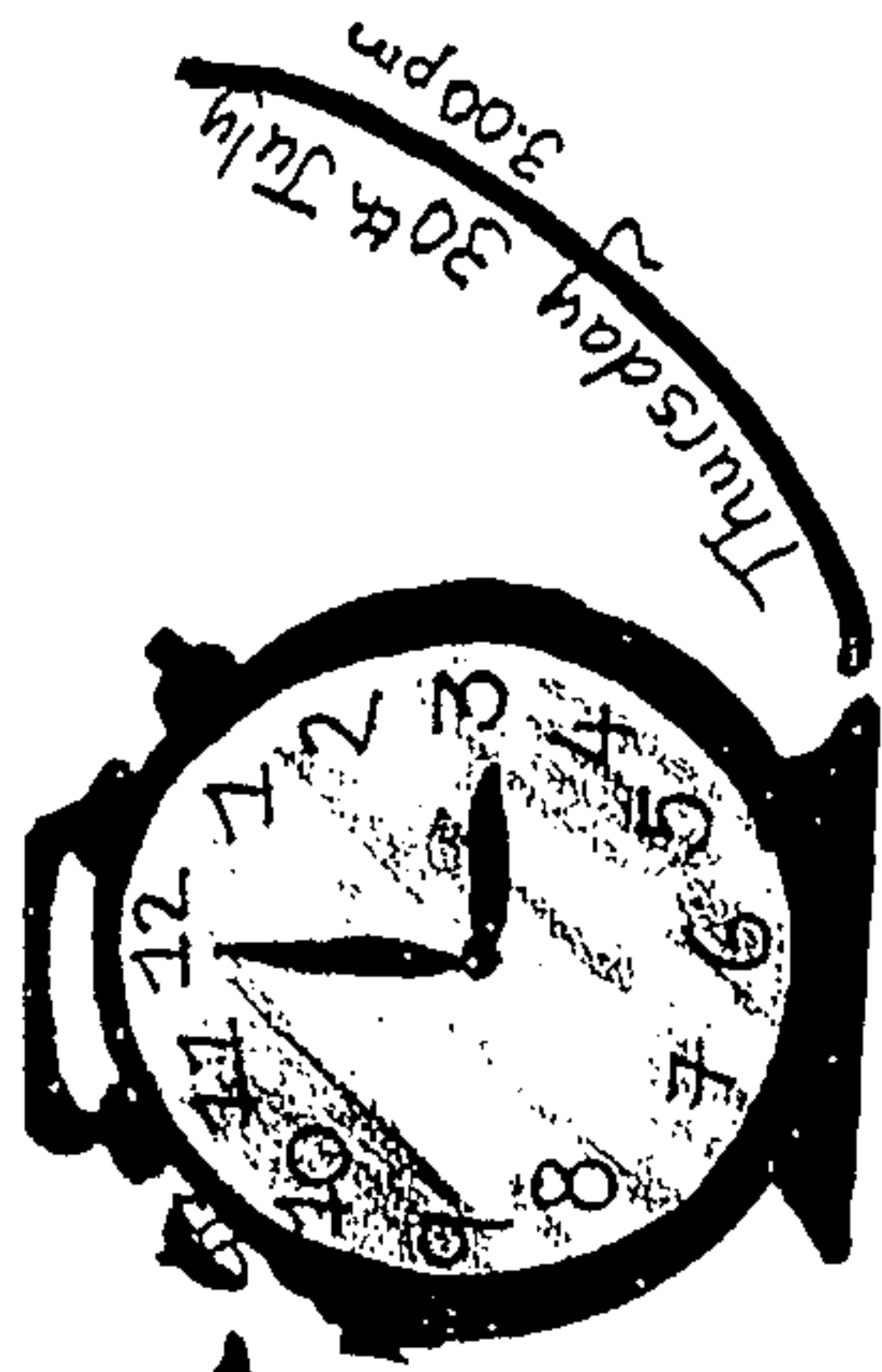
# Setting Goals

1. *Be realistic. Tasks you set yourself need to be both challenging and achievable.*
2. *Set sub-goals on the way to achieving larger goals.*
3. *Find the path that is right for you.*
4. *Concentrate on areas that offer the best chance for improvement.*
5. *Compare your progress to where you would like to be.*
6. *Monitor achievements and keep resetting goals.*
7. *Use positive thoughts to motivate your self.*
8. *Reward yourself.*

*Goals motivate us, give direction, help us to focus and be in control.*

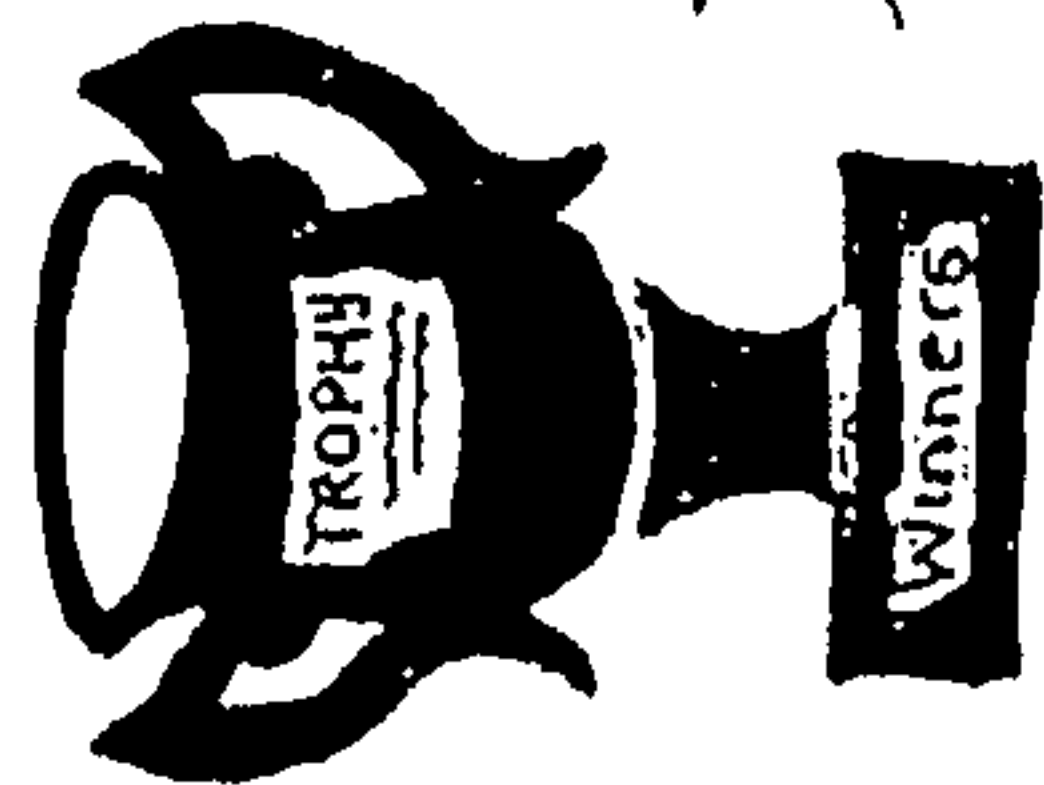






DEADLINE

2 BENEFITS



REQUIRE

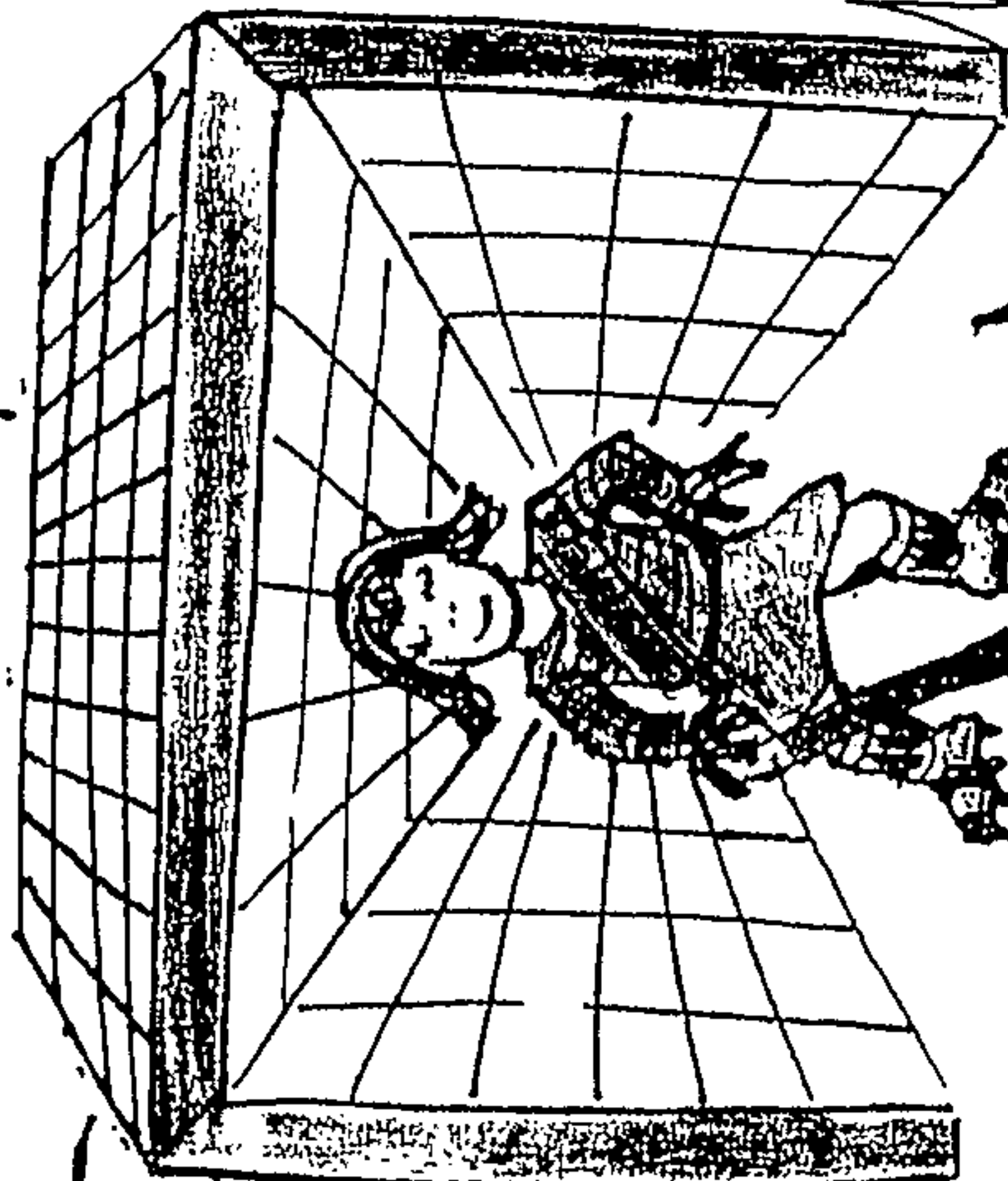
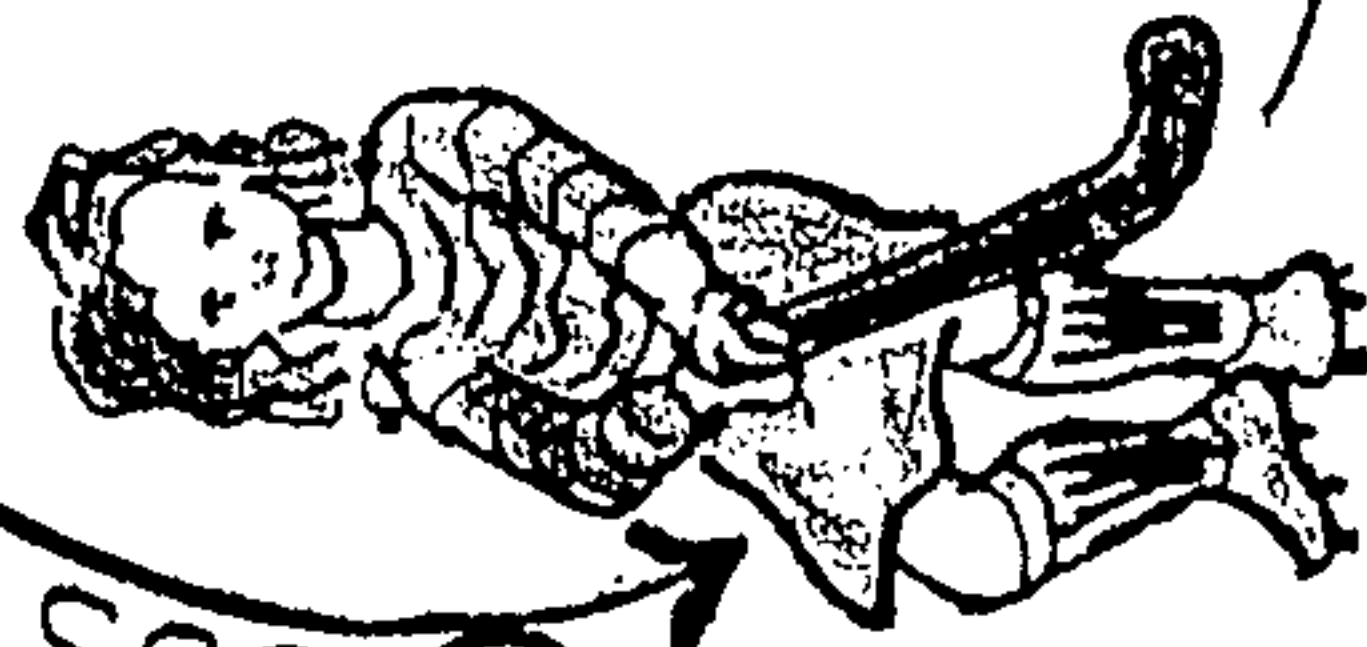
4

SKILLS



5

OBSTACLES



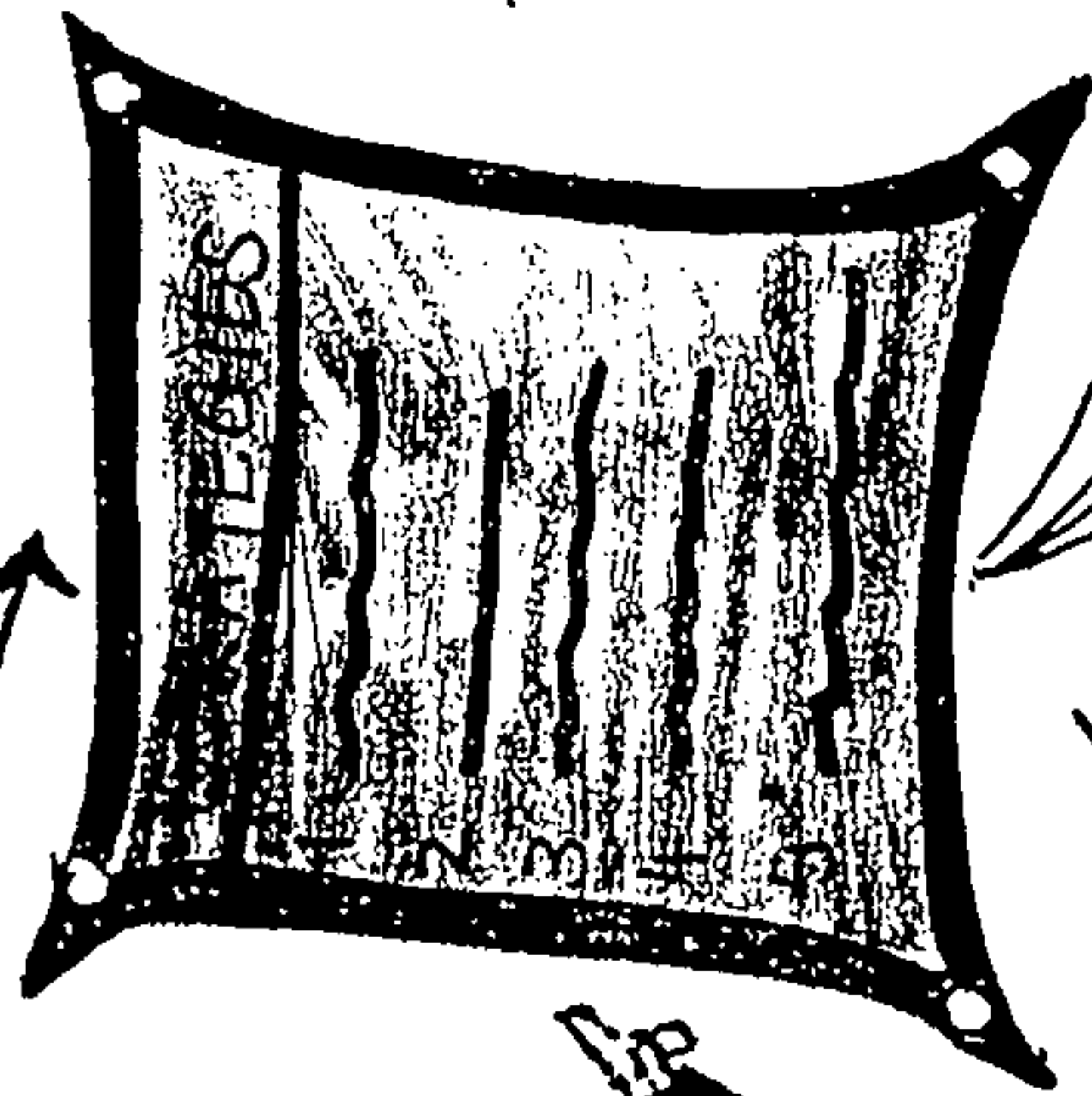
IDENTIFY THE GOAL

1



6

PLAN OF ACTION

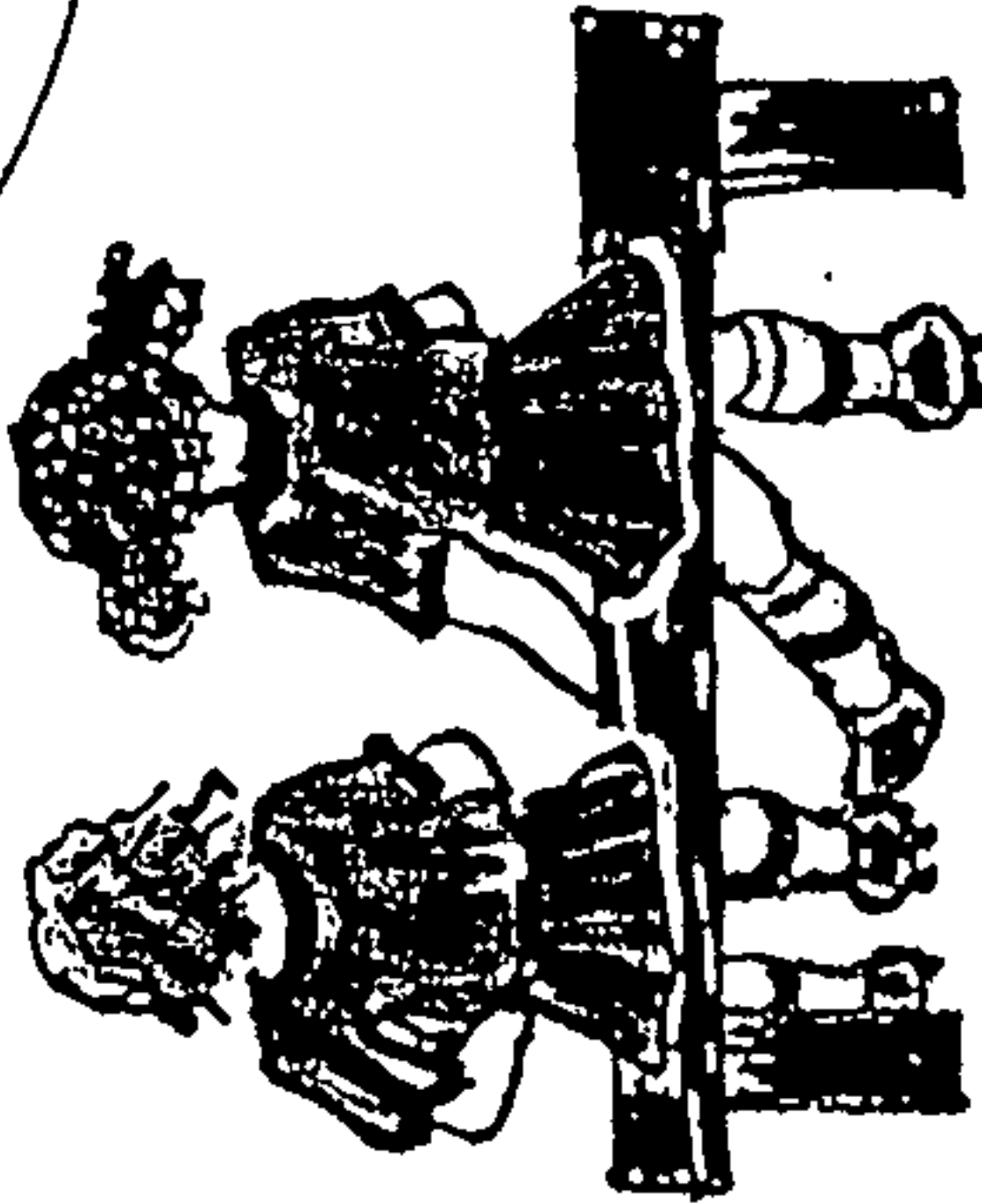


WE WILL WIN!

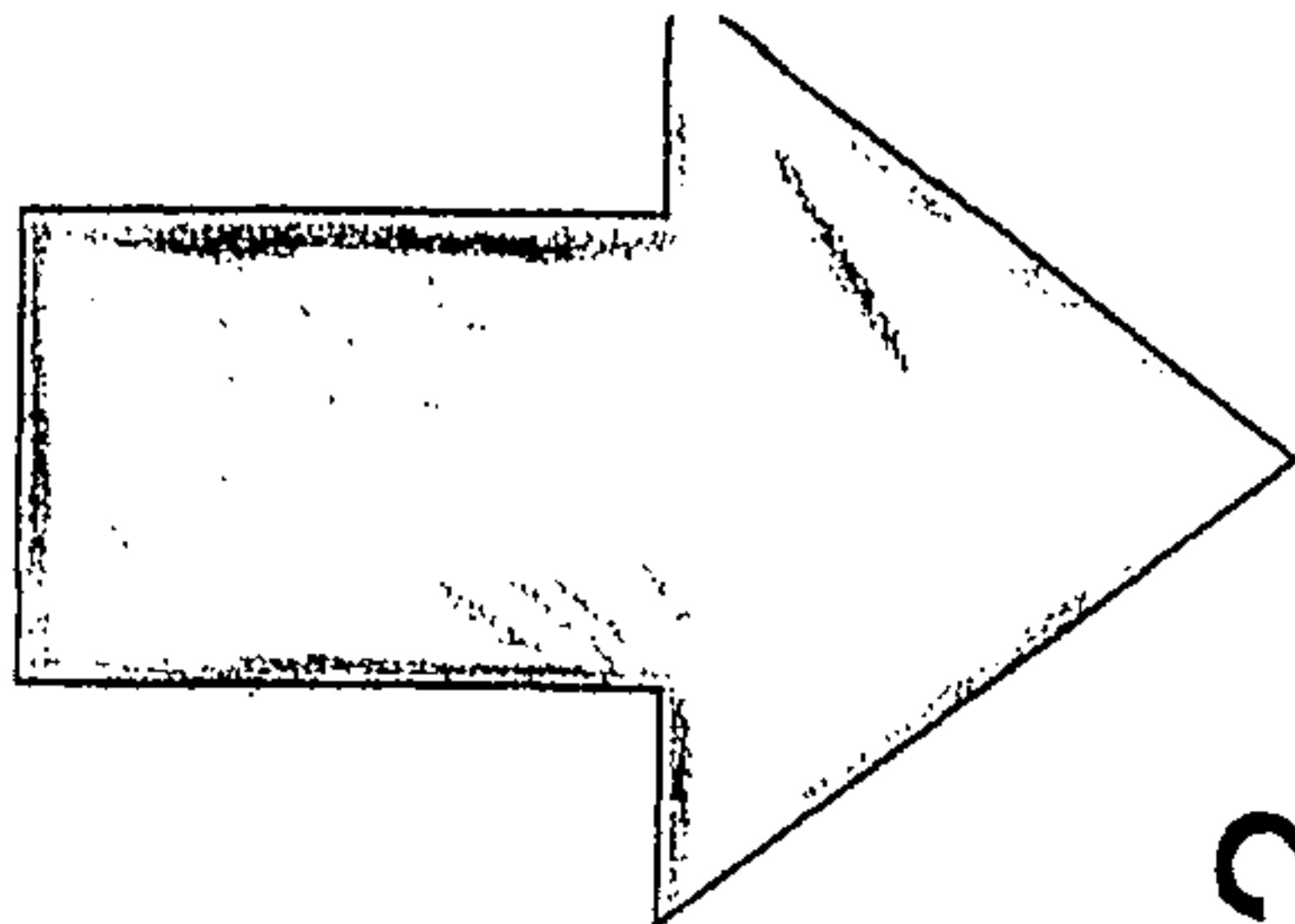
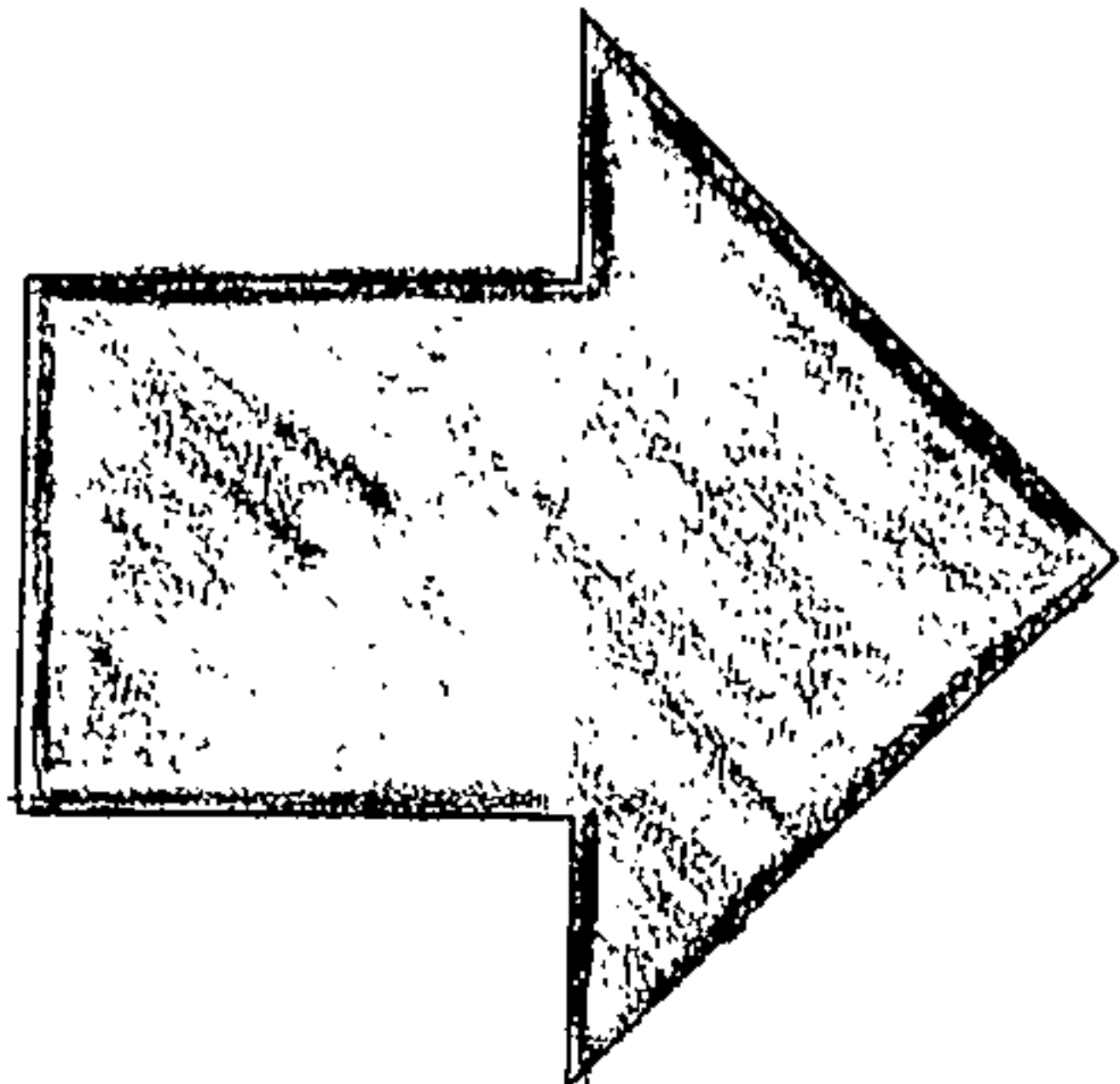
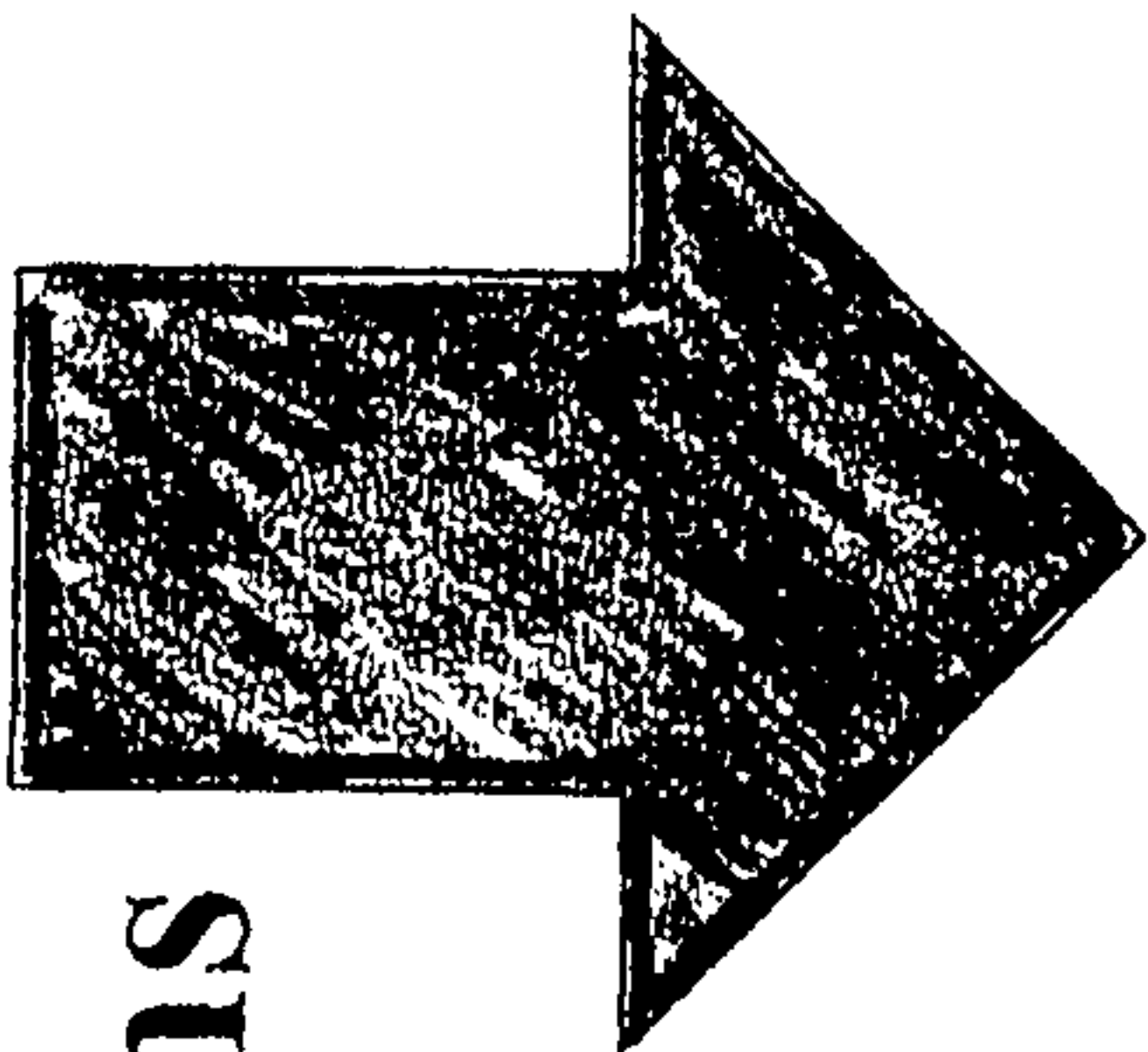
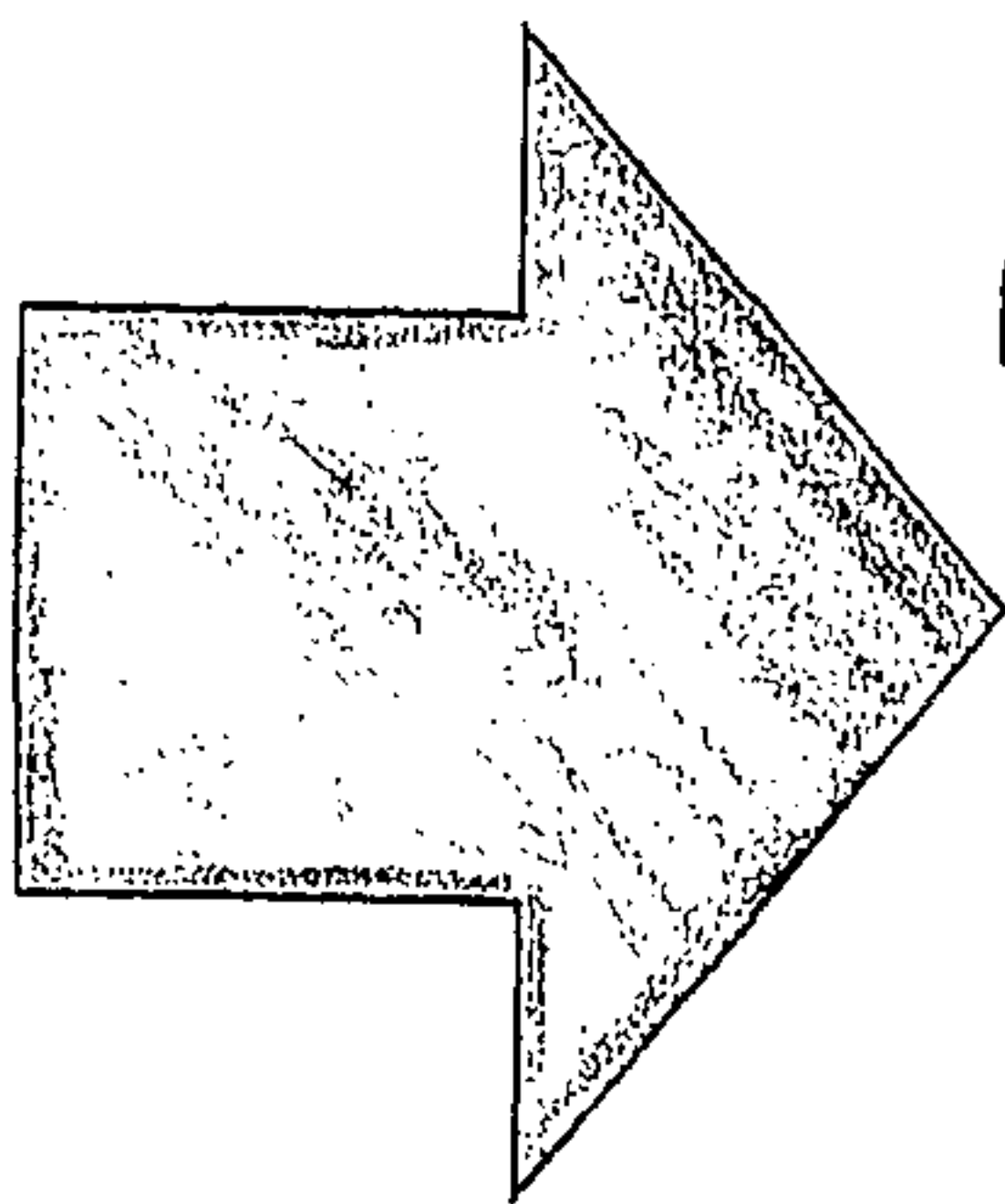


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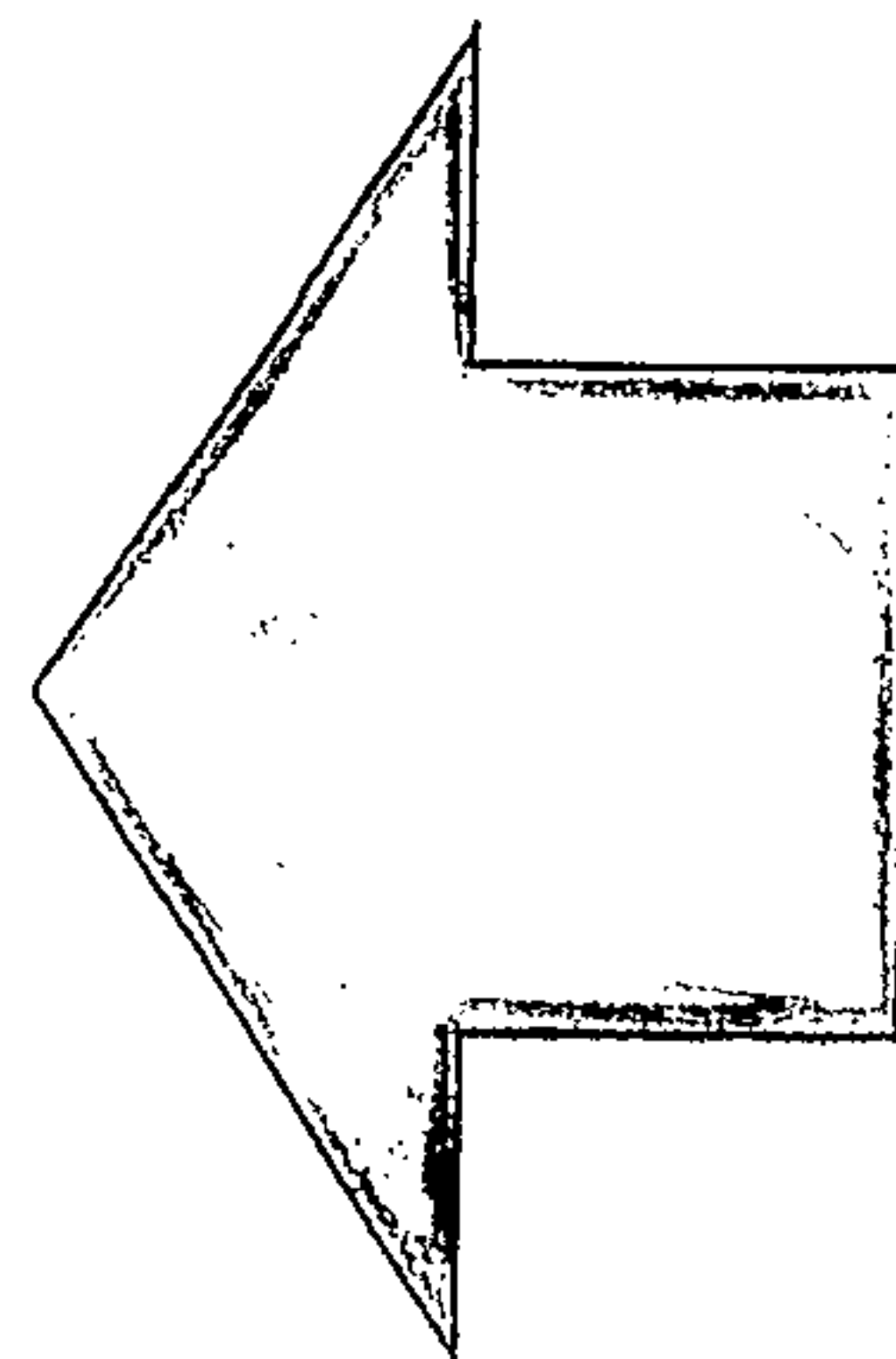
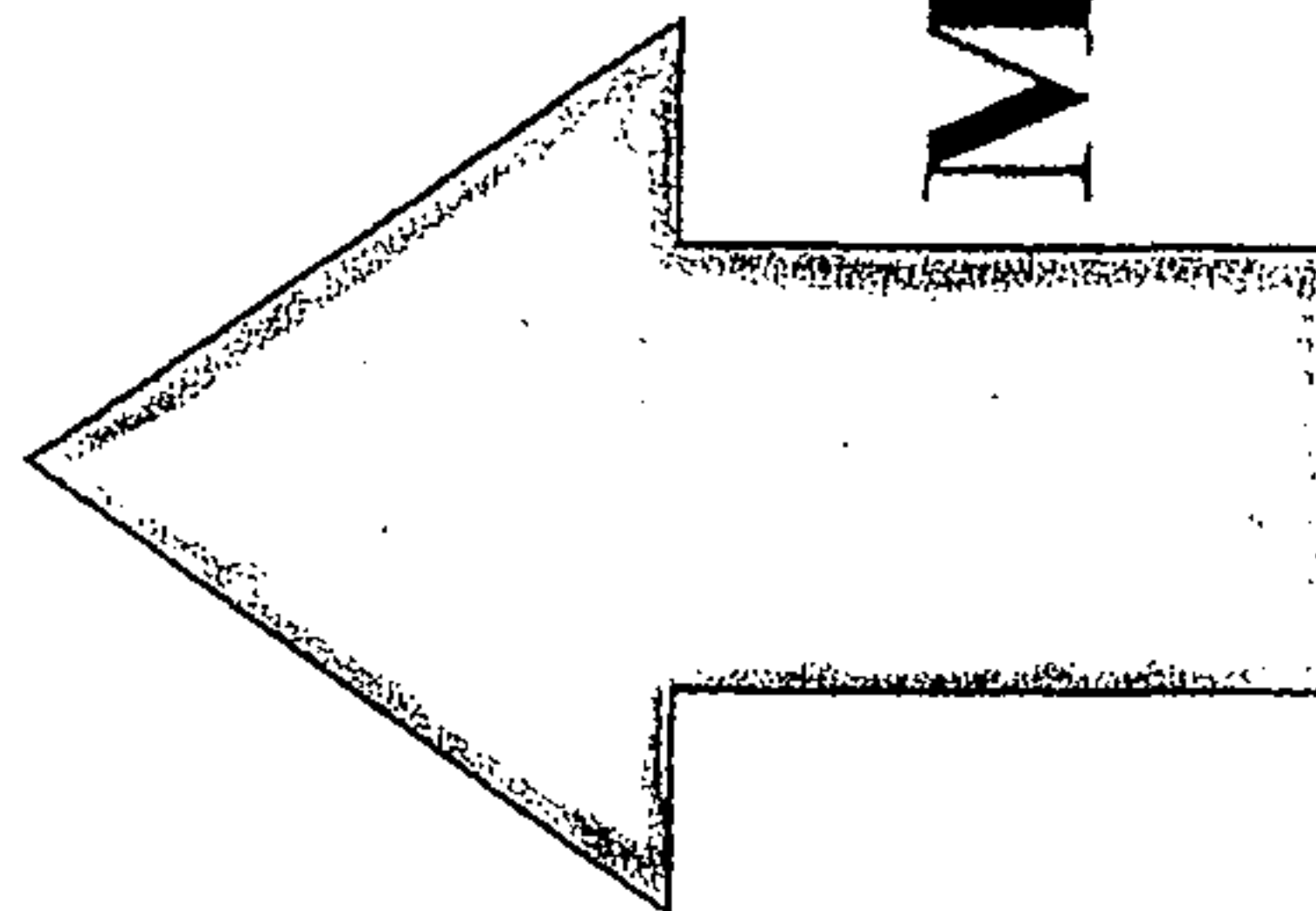
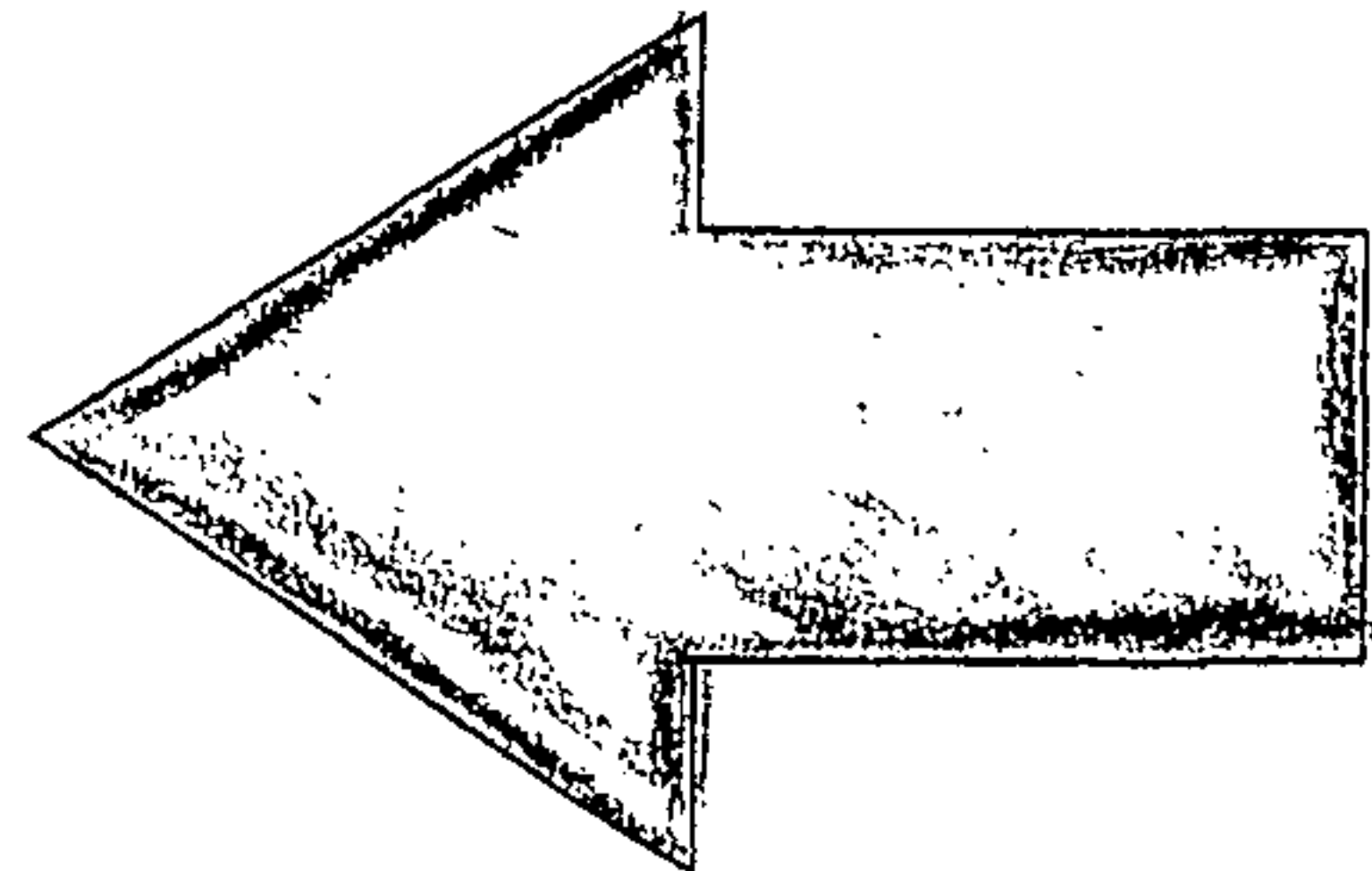
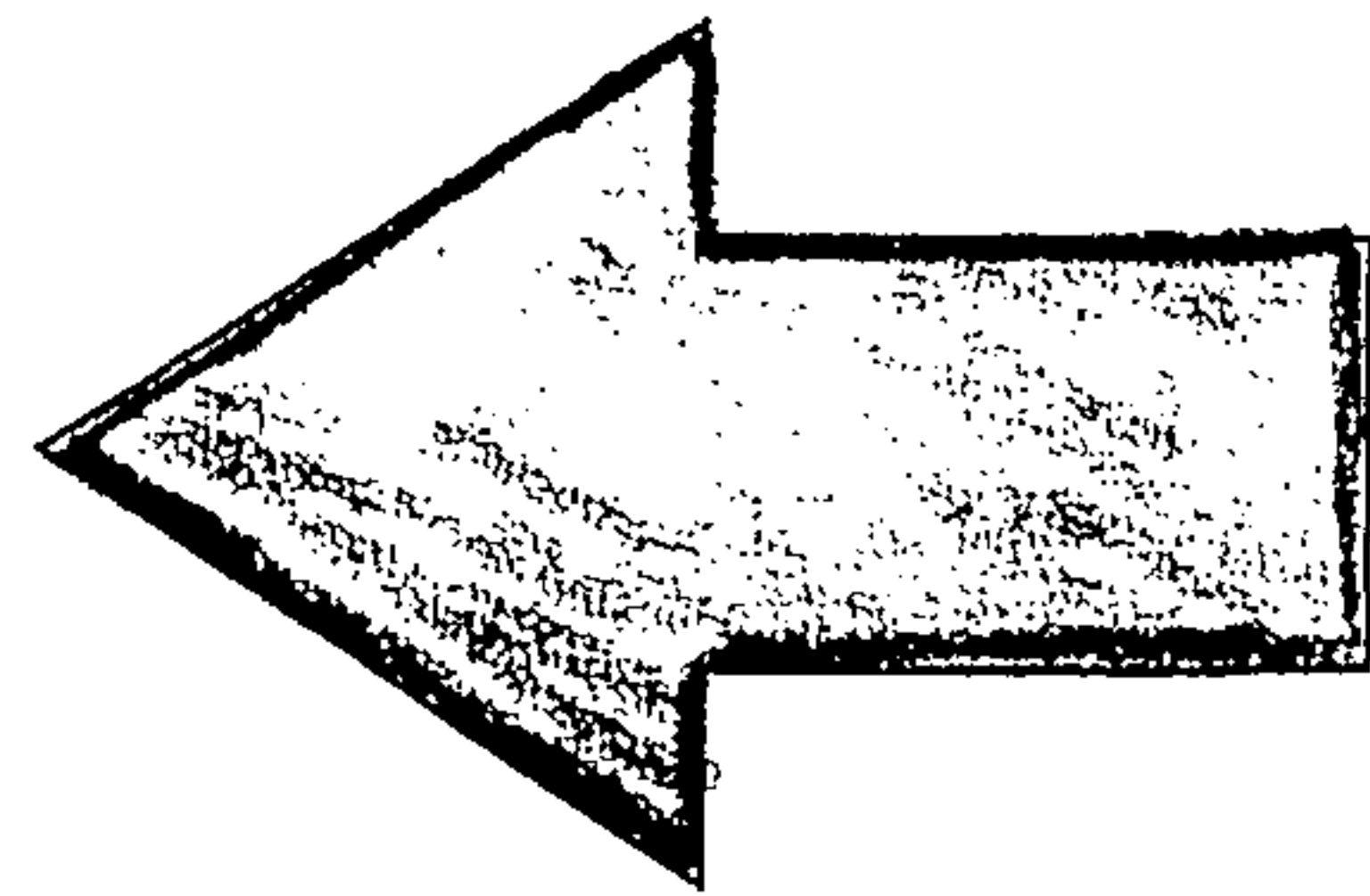
SUPPORT SYSTEM



**My Expectations**



**Do people get what they expect?**



**My contributions**

# ***Manage Yourself***

## ***Learner Outcomes***

- ***To create awareness that motivation must be intrinsic to establish meaningful learning and purpose in life.***
- ***To provide an exposition of attitude differences and their effect on learning.***
- ***To encourage stress management techniques.***

## ***Activities***

- ***Discussion of stress reduction methods.***
- ***Personal self-management chart.***



# MANAGE YOURSELF

losing  
I'm going  
so I'm stop

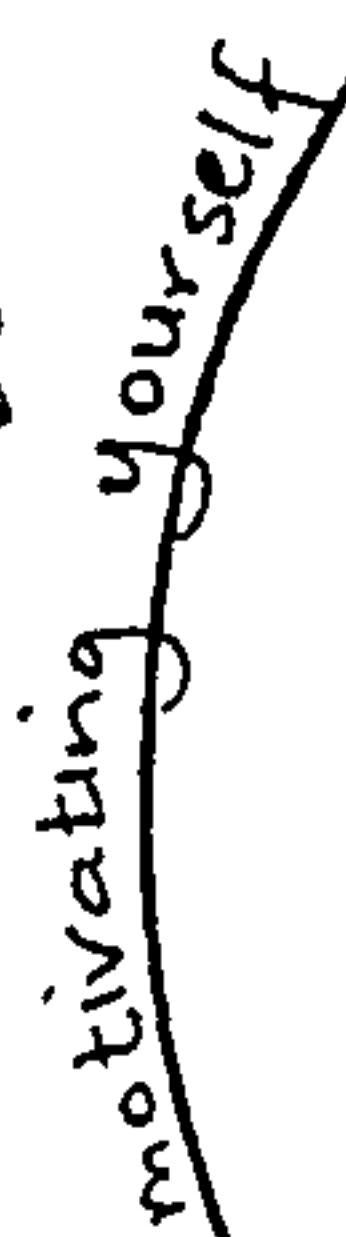


managing your attitudes



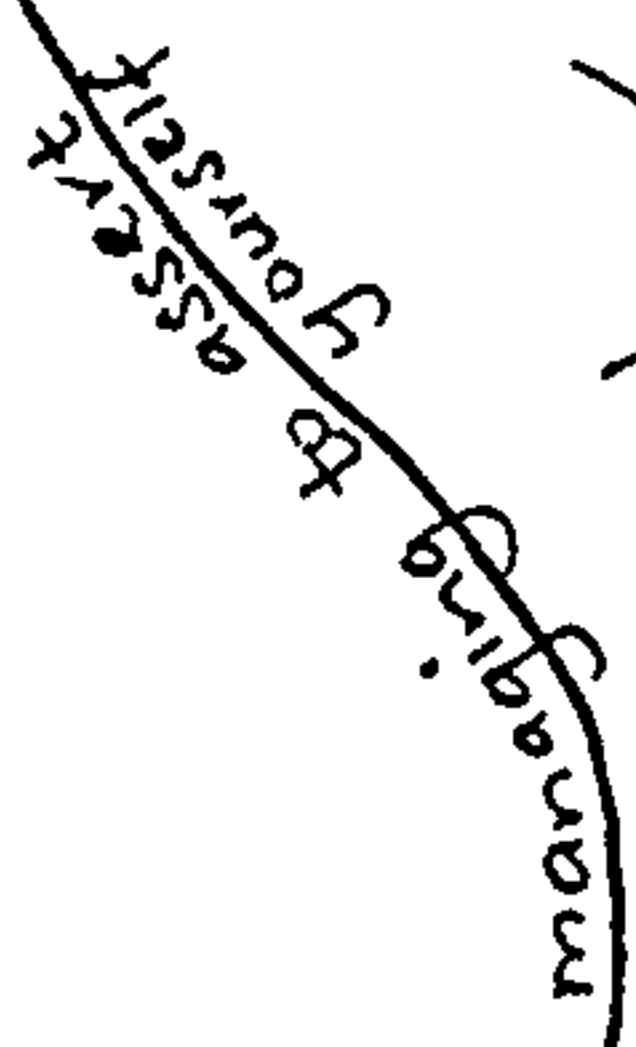
prejudice  
discrimination  
criticism of others  
how attitudes are formed  
how to change bad attitudes  
how attitudes are linked to beliefs  
how thoughts

motivating yourself



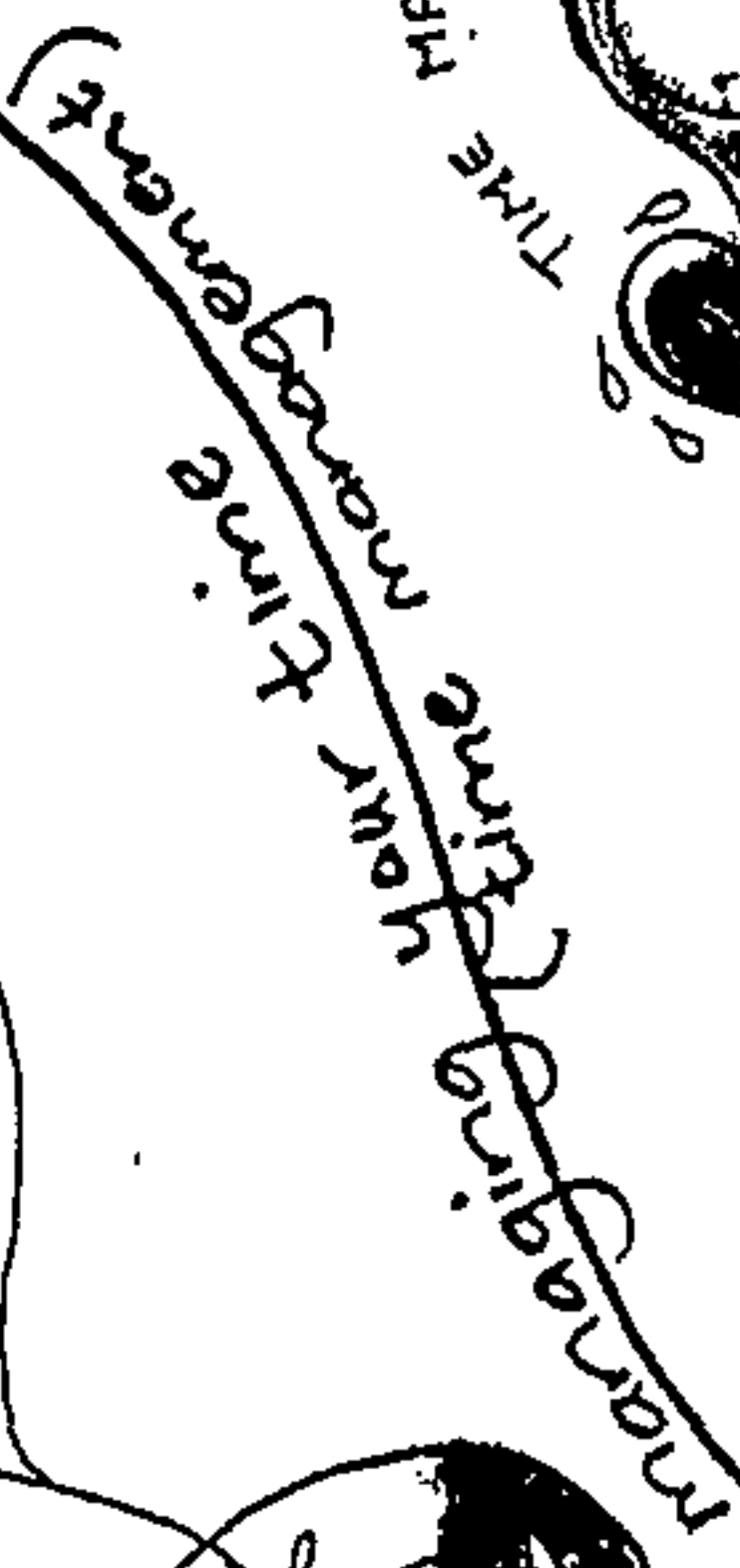
on internal locus of control  
requires self discipline and  
motivation  
extrinsic vs intrinsic  
a balance between both  
involve others  
reward yourself  
self-efficacy  
the thought and  
confessions

managing to assert



asserting oneself = resisting peer pressure  
one's goals + one's belief  
fear of rejection and desire to  
be accepted  
Having goals helps one to say NO  
Pleasing others  
Having goals helps one to say NO  
Pleasing others  
Having goals helps one to say NO  
Pleasing others

managing your time



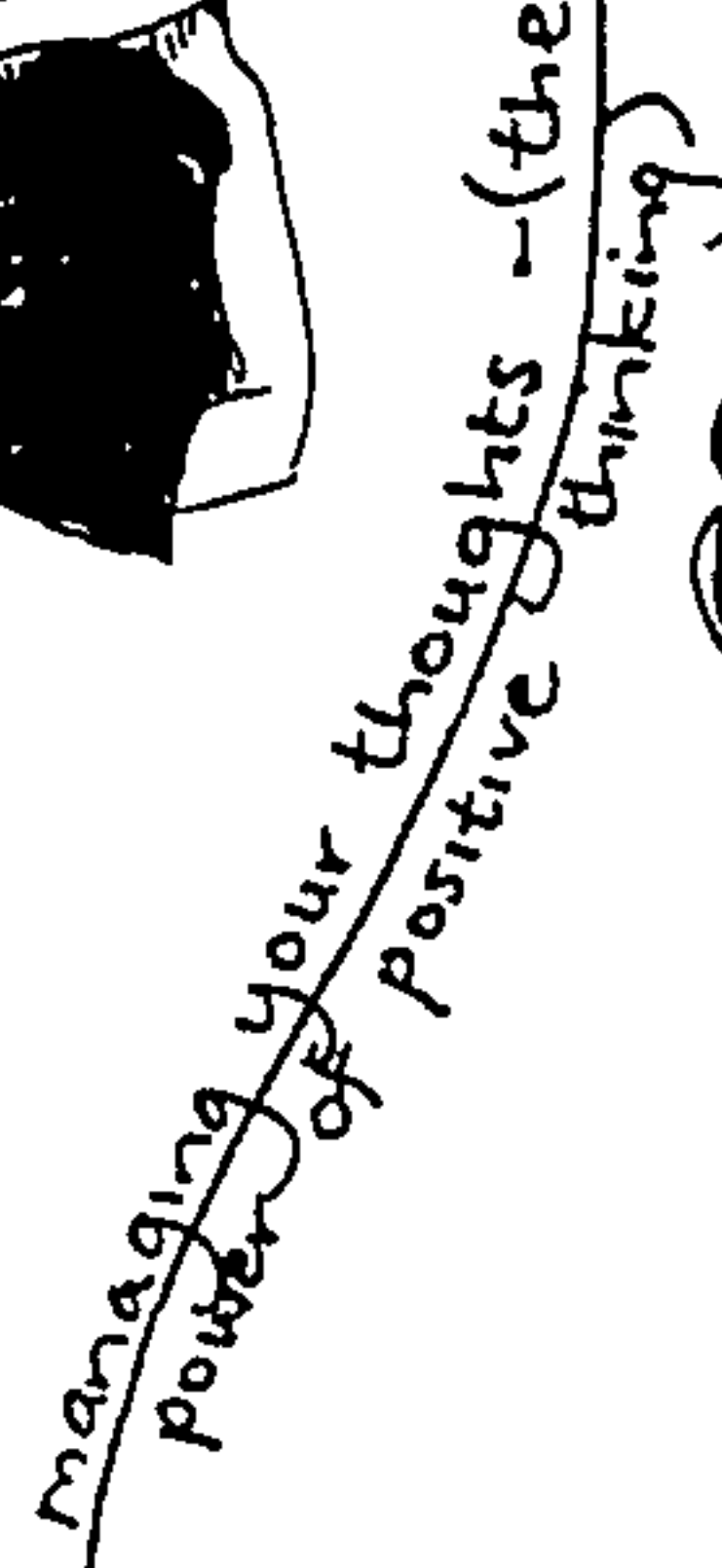
managing self = managing time  
valuing self = valuing your time  
time = a valuable commodity  
good time management involves  
planning + prioritizing  
(doing most things first)

managing your emotions (EQ vs IQ)



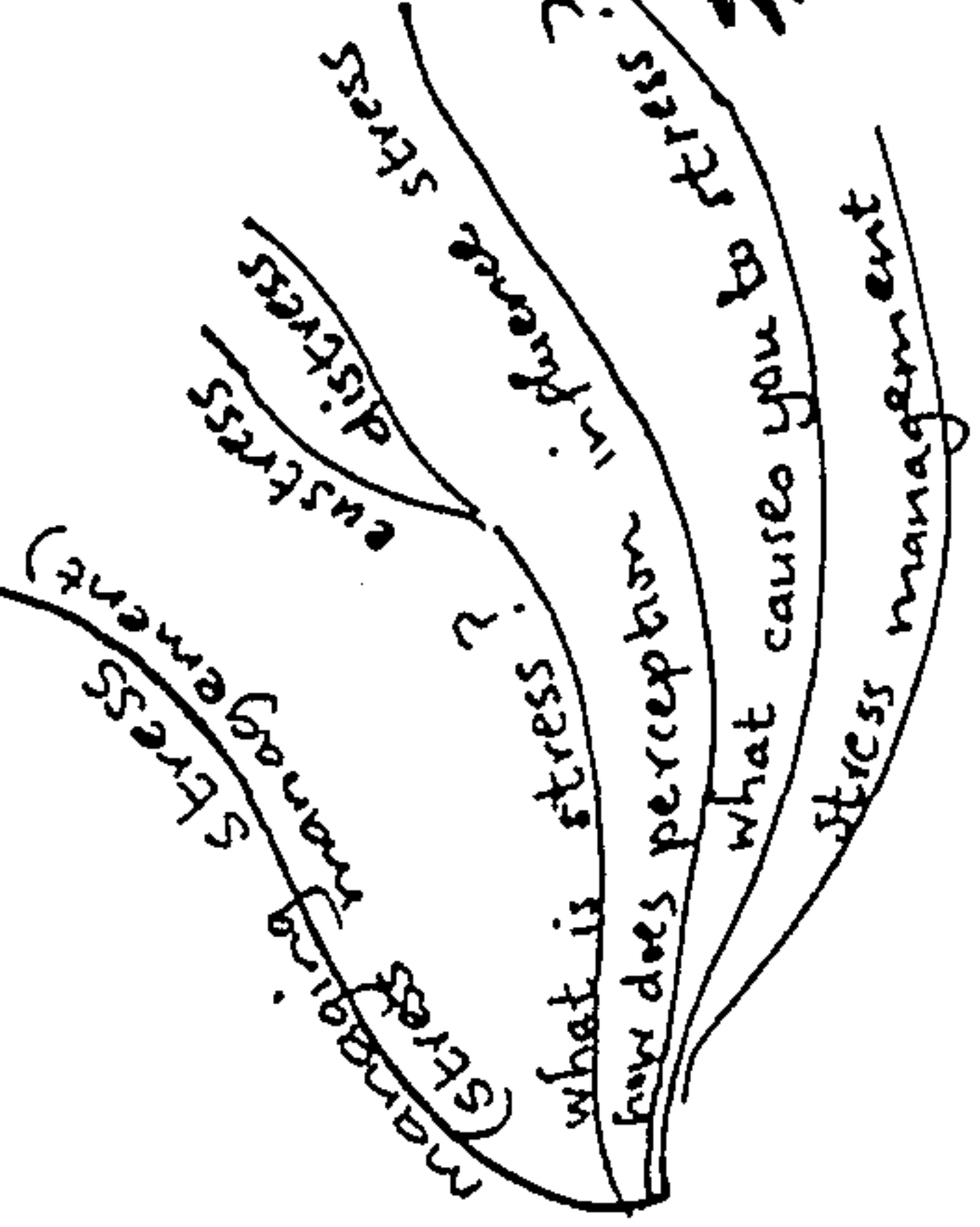
What is EQ?  
how to develop EQ?  
emotional brain is  
instinctive  
thinking brain =  
rational  
your emotions  
delay gratification  
thinking comp  
of reason

managing your thoughts - (the power of positive thinking)



we confessors influence brain's functioning  
and set the feelings in motion  
thoughts form basis of all behavior  
thoughts + beliefs are recurring  
thoughts influence behavior  
(-ve) E → (+ve) E  
changing oneself of destructive  
thought patterns

managing stress  
what is stress?  
what does perception influence stress?  
what causes you stress?  
stress management









visualize success and not pressure/stress  
 deconstruct task into smaller parts  
 set small goals to avoid becoming demoralized / intimidated by a huge and daunting task  
 visualize success and not pressure/stress  
 set small goals to avoid becoming demoralized / intimidated by a huge and daunting task  
 visualize success and not pressure/stress  
 set small goals to avoid becoming demoralized / intimidated by a huge and daunting task

lead a balanced life, focusing on nature spirit, strengthen soul, care body  
 we confessors / believing in oneself  
 food, sleep and exercise

which is distressing you?

DATE?  
 TIME?  
 ORAL?  
 VOOM!

unrealistic expectations  
 conflict between beliefs and behaviours  
 distorted perceptions  
 failing to deconstruct the whole into manageable parts  
 bad time management  
 lack of assertiveness  
 lack of discipline / procrastination  
 fear of the unknown - fear

distress

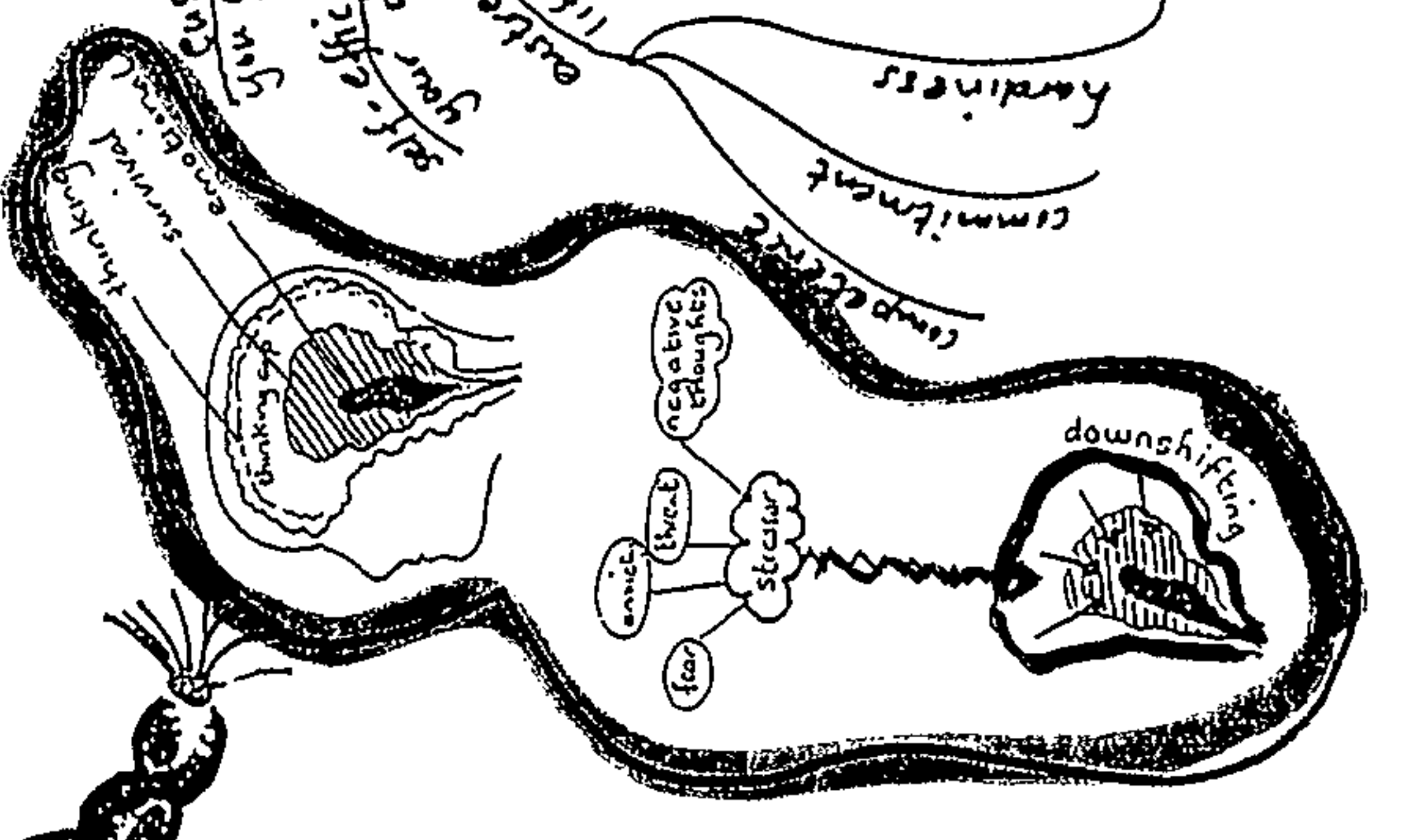
self-fulfilled prophecy  
 stress = when people feel your choice / perception  
 you give to stress  
 you give to stress  
 you give to stress

hardiness  
 commitment  
 competence  
 challenge  
 control  
 confidence  
 coping  
 courage  
 calmness  
 calmness  
 calmness

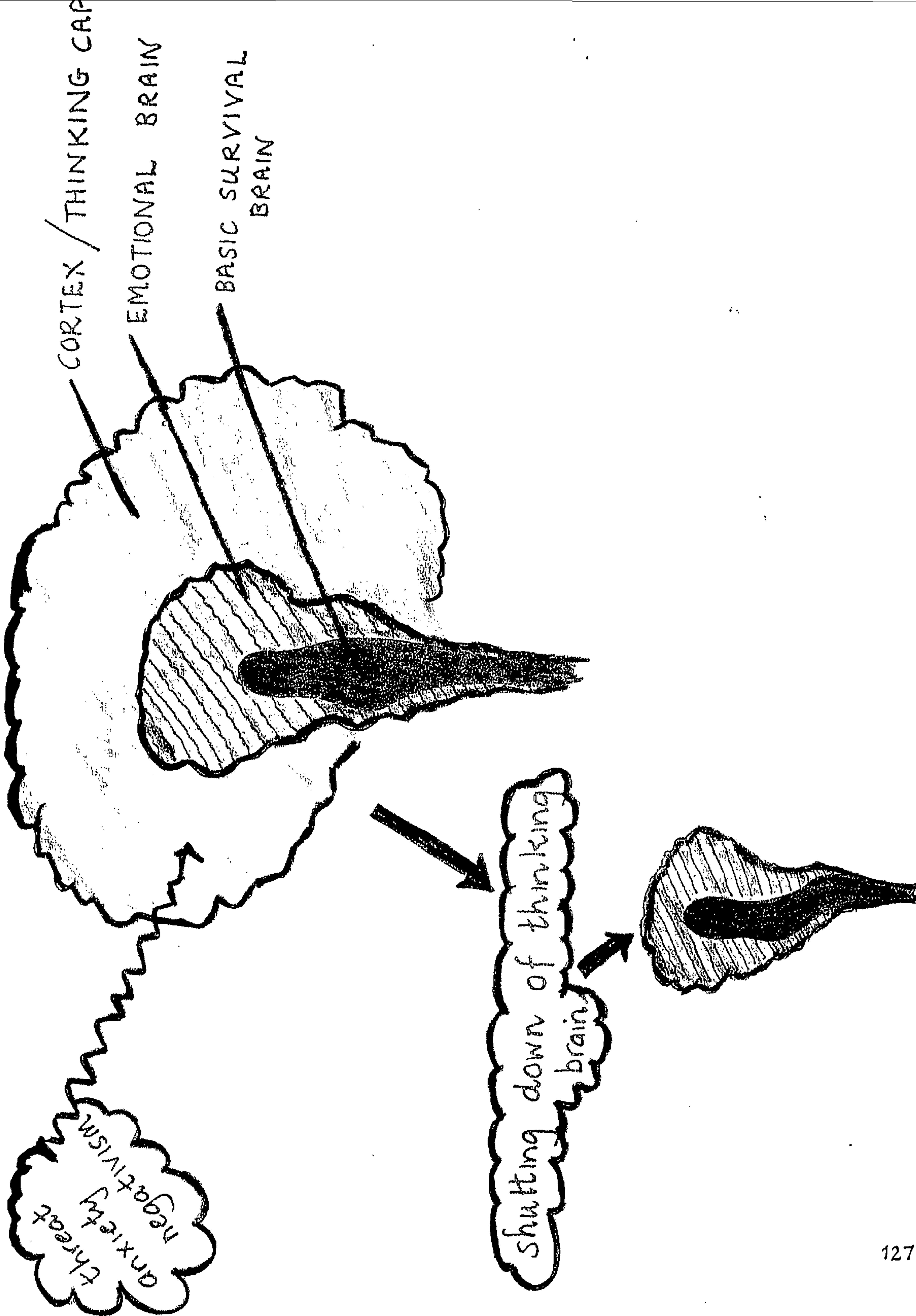


STRESSOR  
 Appraisal  
 Cognitive  
 RESPONSE

breaking visualization  
 meditation / quieting mind  
 spirit relaxation techniques - exercise  
 cognitive control  
 systematic desensitization  
 time management + goal setting  
 gaining necessary knowledge and developing the necessary skills







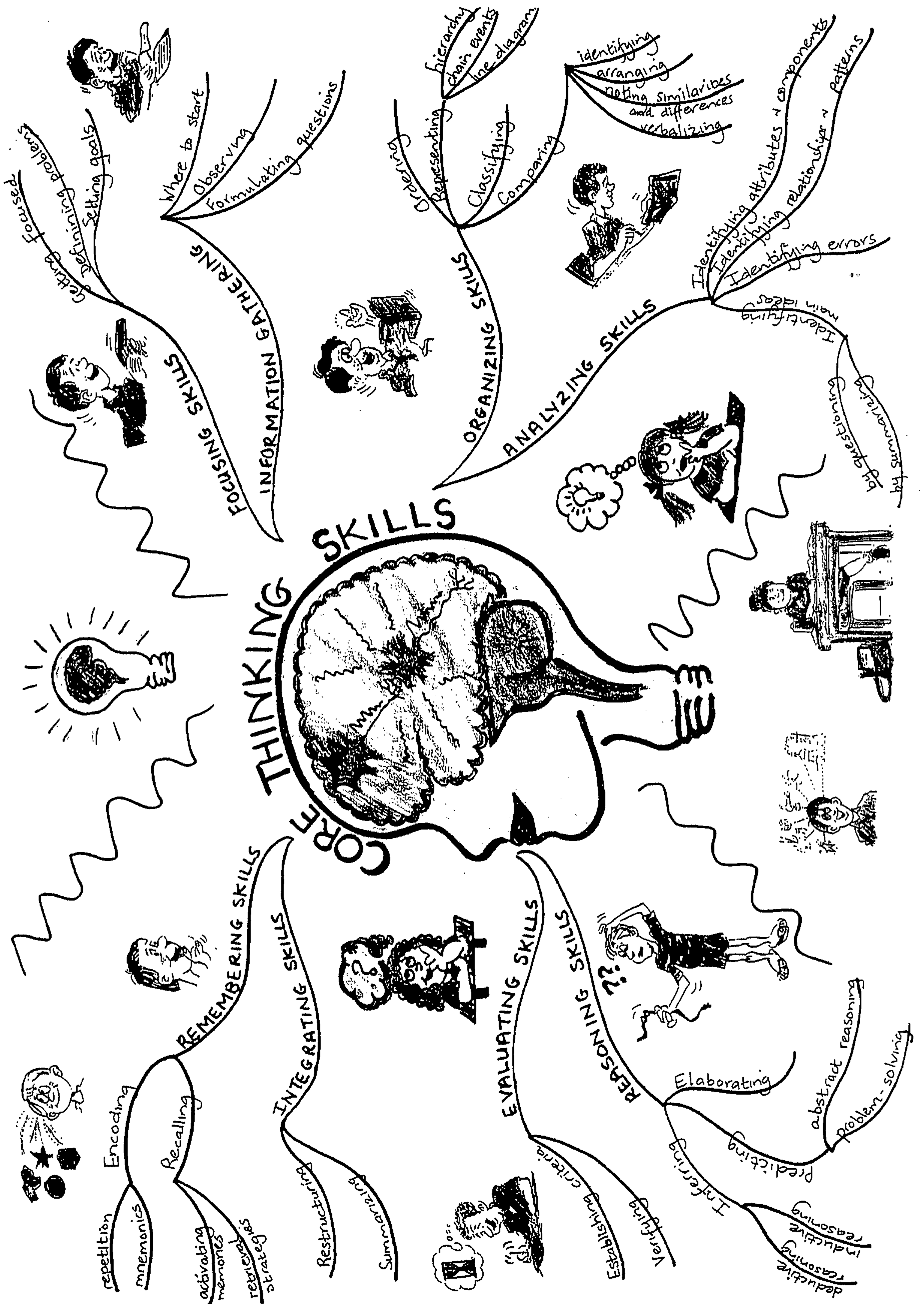
# ***Core Thinking Skills***

## ***Learner Outcomes***

- ***To create awareness of the different thinking skills.***
- ***To facilitate understanding of how the different thinking skills are used and when they are used.***
- ***To encourage the use of these skills.***

## ***Activities***

- ***Learners given organizing skill activities to implement.***
- ***Learners provided with an analyzing and integrating exercise.***





*Thoughts can make us happy or sad,  
healthy or sick.*

*Thoughts charge our body and mind  
just like electricity  
charges a light bulb*

*Bad thoughts make  
us feel bad inside.*

*Every thought we have  
affects the way we feel  
and see things.*

*Change bad thoughts to good thoughts  
and you change the way you feel.*

## Thoughts are Things

*Good thoughts make  
us feel good inside*

*A thought only has the power you give it.  
The more you think a thought,  
the more power you give it.*

*Thought mixed with feeling is a powerful force.  
Think it and feel it as if it is happening now -  
to help make your dreams come true!*

*Thought is a powerful force!*

*We have the power to choose the thoughts we think!*

## **Pete's Problem Solving Plan**

- ◆ **Look from left to right**
- ◆ **Look from top to bottom**
- ◆ **Try to find a pattern**
- ◆ **Figure out a rule that you could apply**
- ◆ **Remember first analyze then synthesize**
- ◆ **Deconstruct then reconstruct**

## **Rene's Reasoning Skills**

- ◆ **Remember, there has to be a logical explanation**
- ◆ **If you can't figure it out try a completely different approach**
- ◆ **Start at a different point or look from a different angle.**
- ◆ **Think laterally not linearly!**

# Ollie's Organizing Orchestra



- ◆ Kenneth's Keyword Extraction
  - ◆ Harry's Helpful Headings
  - ◆ Classy Clarissa's Classification
  - ◆ Smart Smurf's Super Summaries
  - ◆ Mighty Mel's Meta-Memory
- Mindmaps
- ◆ Peter's Problem – Solving Plan  
and Rene's Reasoning Skills



# Catching Kenneth's Keywords

## Guidelines for Keyword Extraction

- ◆ *Take keywords from important information.*
- ◆ *Choose words that can easily be visualized.*
- ◆ *Choose a noun rather than a verb.*
- ◆ *Choose a word that best describes the facts.*
- ◆ *Underline keywords or write in keyword column.*
- ◆ *Keywords must communicate" (align) with the information from which they have been extracted.*

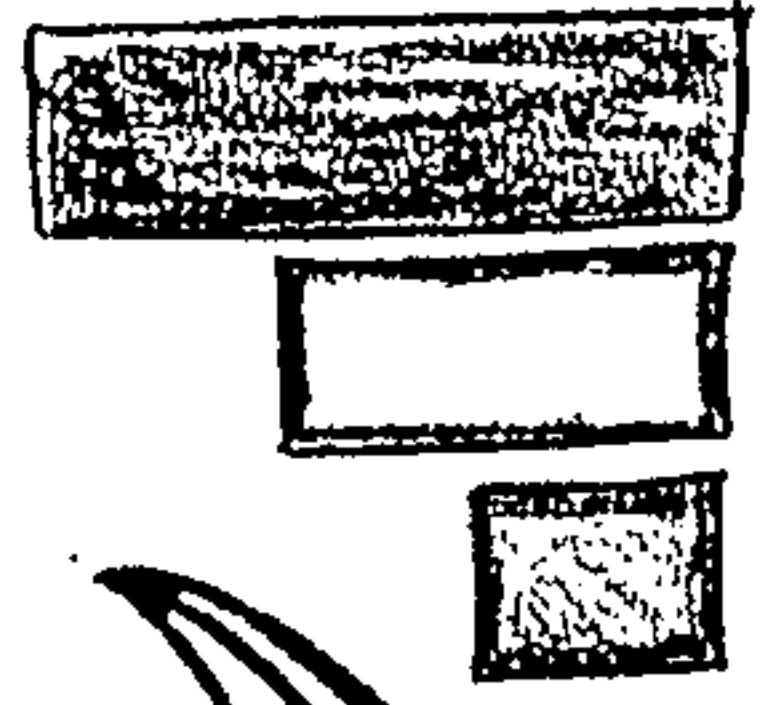
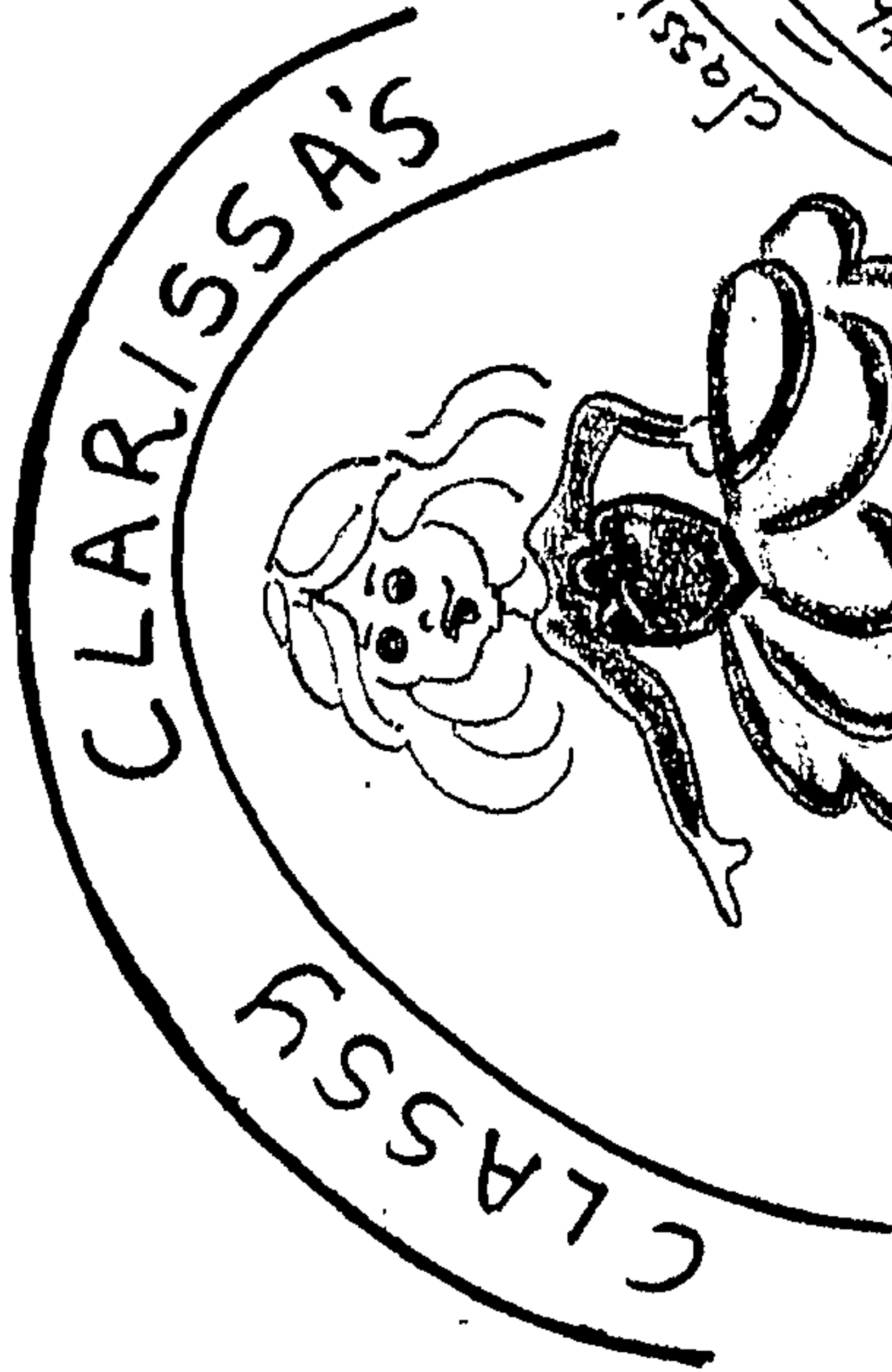


# Harry's Helpful Headings

*Headings help to structure your work. If no headings are provided, Harry will show you how to make your own headings.*

- ◆ Look for the topic sentence in each paragraph.
- ◆ In one short sentence, summarize the paragraph.
- ◆ Use descriptive words in providing headings and subheadings to main theme areas.
- ◆ Use all these headings to form the basic structure of your own notes.





# CLASSIFICATION

the brain likes structure and order

therefore group info and organize your learning time

and increase your recall of the facts

reduce your learning time

clarifying / categorizing helps the brain do

one's working memory can only manage 7 pieces of info at one time

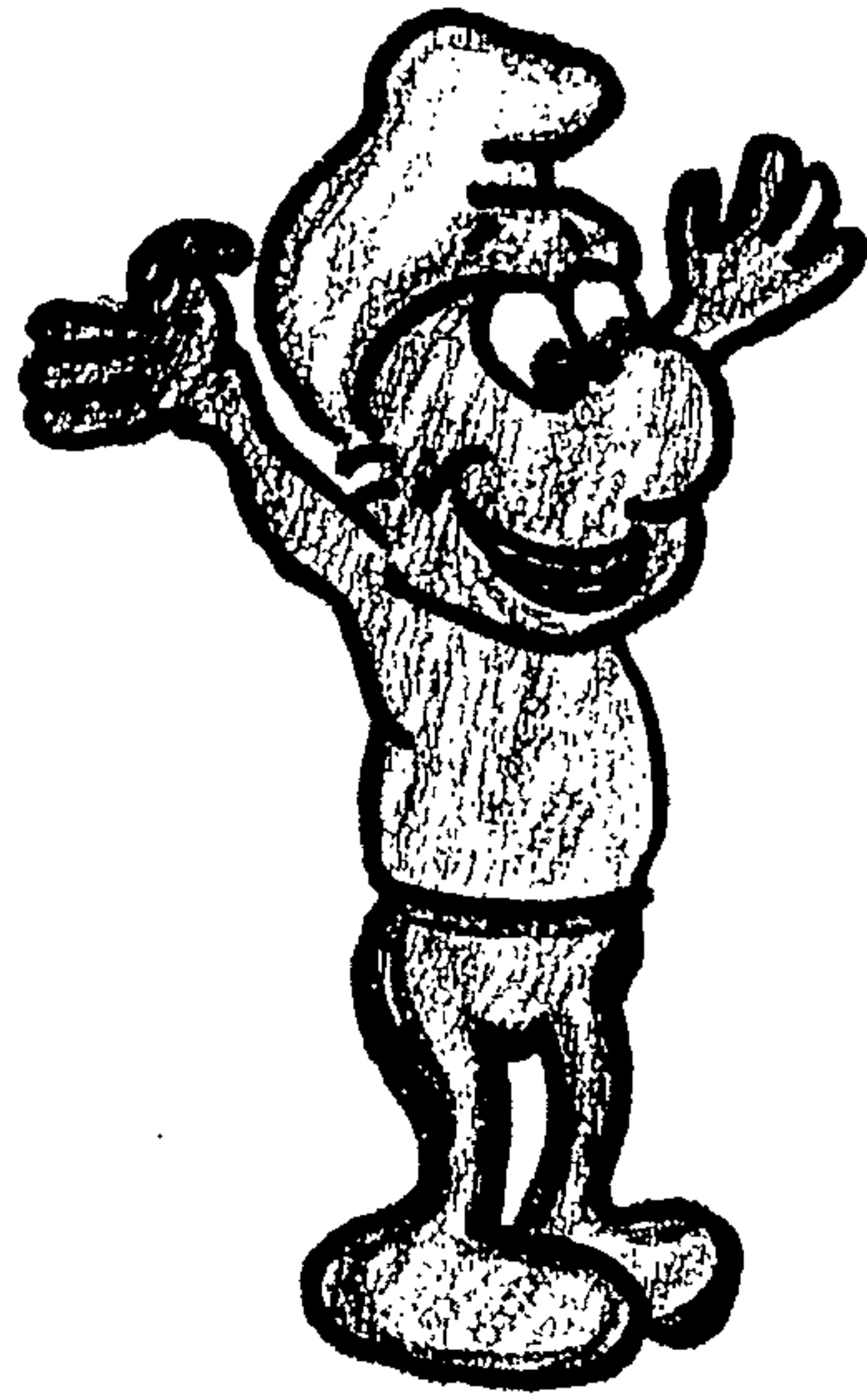
therefore by choosing 7 category headings

one can remember far more of info than simply because 7 pieces

acts as a trigger for the contents within that category



Survey



Skim  
Scan

My impression



Ask questions



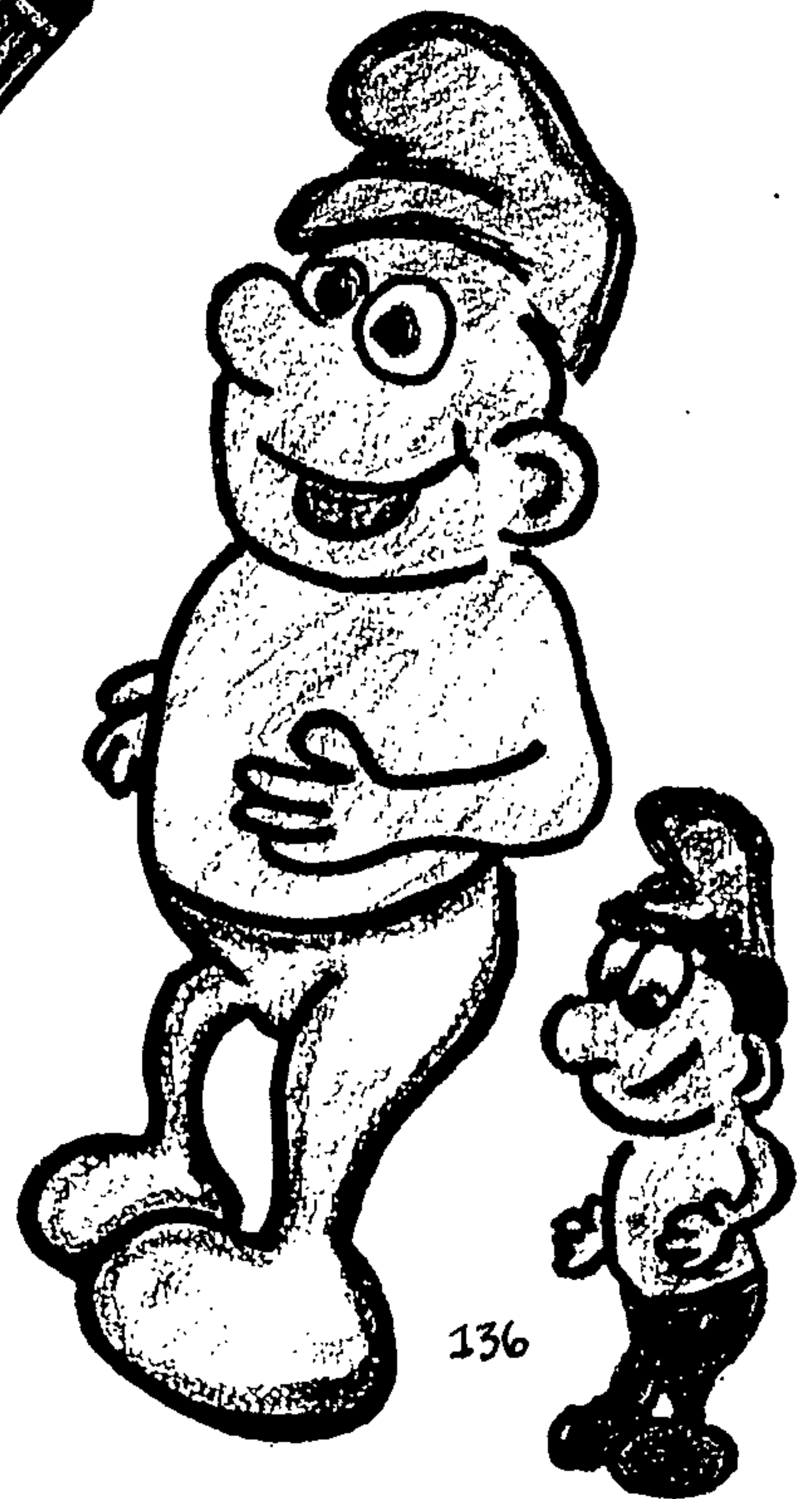
Write your summary



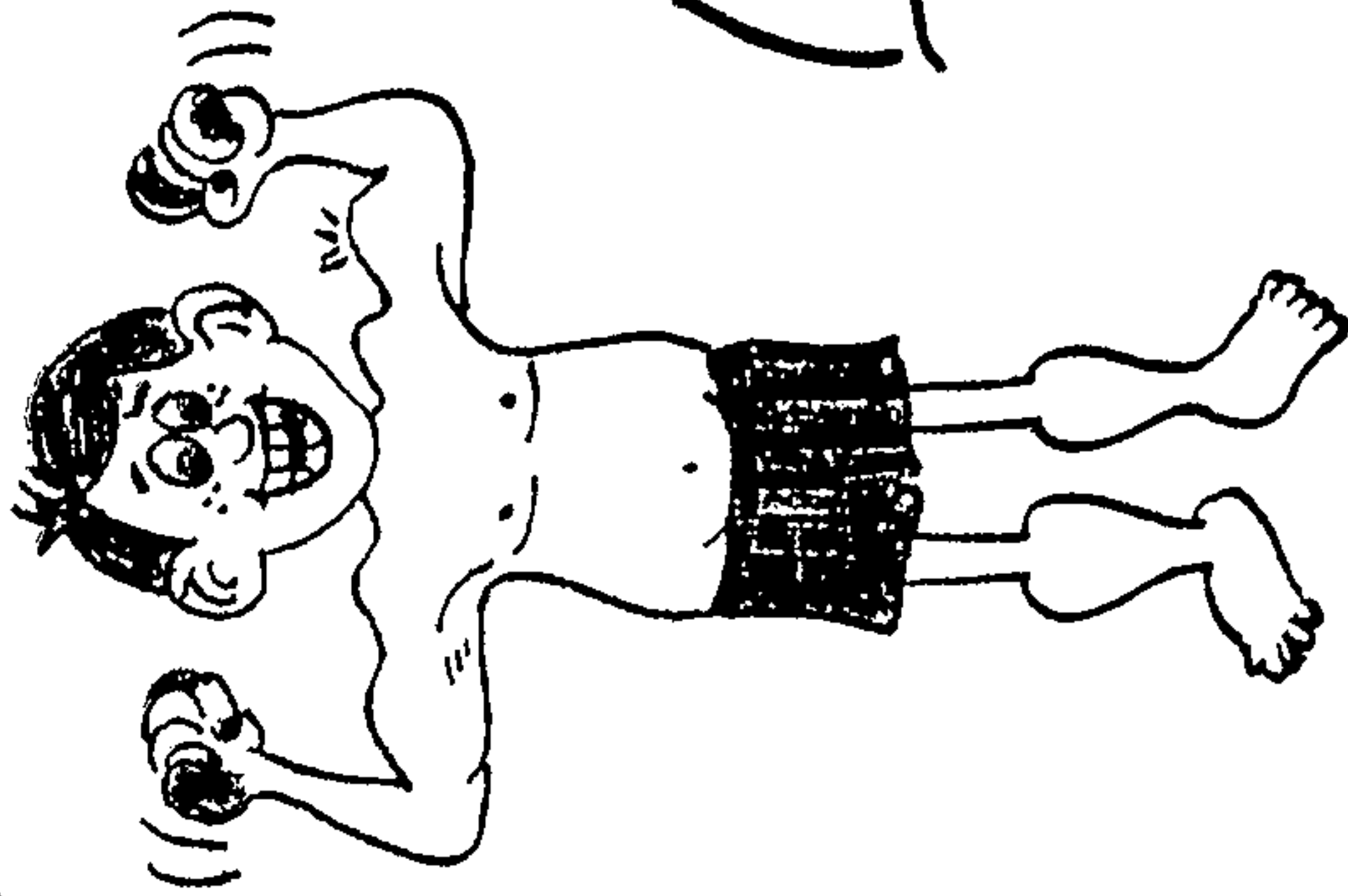
Read for understanding



Test yourself



# META-MEMORY MINDMAP



## METHODS

- ① apply the SMART to your chapters or section of work
- ② now convert your linear summary into a mind map
- ③ place the chapter theme in the centre and branch sub-theme branching outwards from the centre
- ④ write each sub-theme out from the sub-theme key word
- ⑤ colour code your mindmap and add pictures to make it visual
- ⑥ don't forget to apply memory strategies where possible
- ⑦ finally, shut your eyes and visualize (i.e. try and recall your mind map)

# ***Boost Your Brainpower***

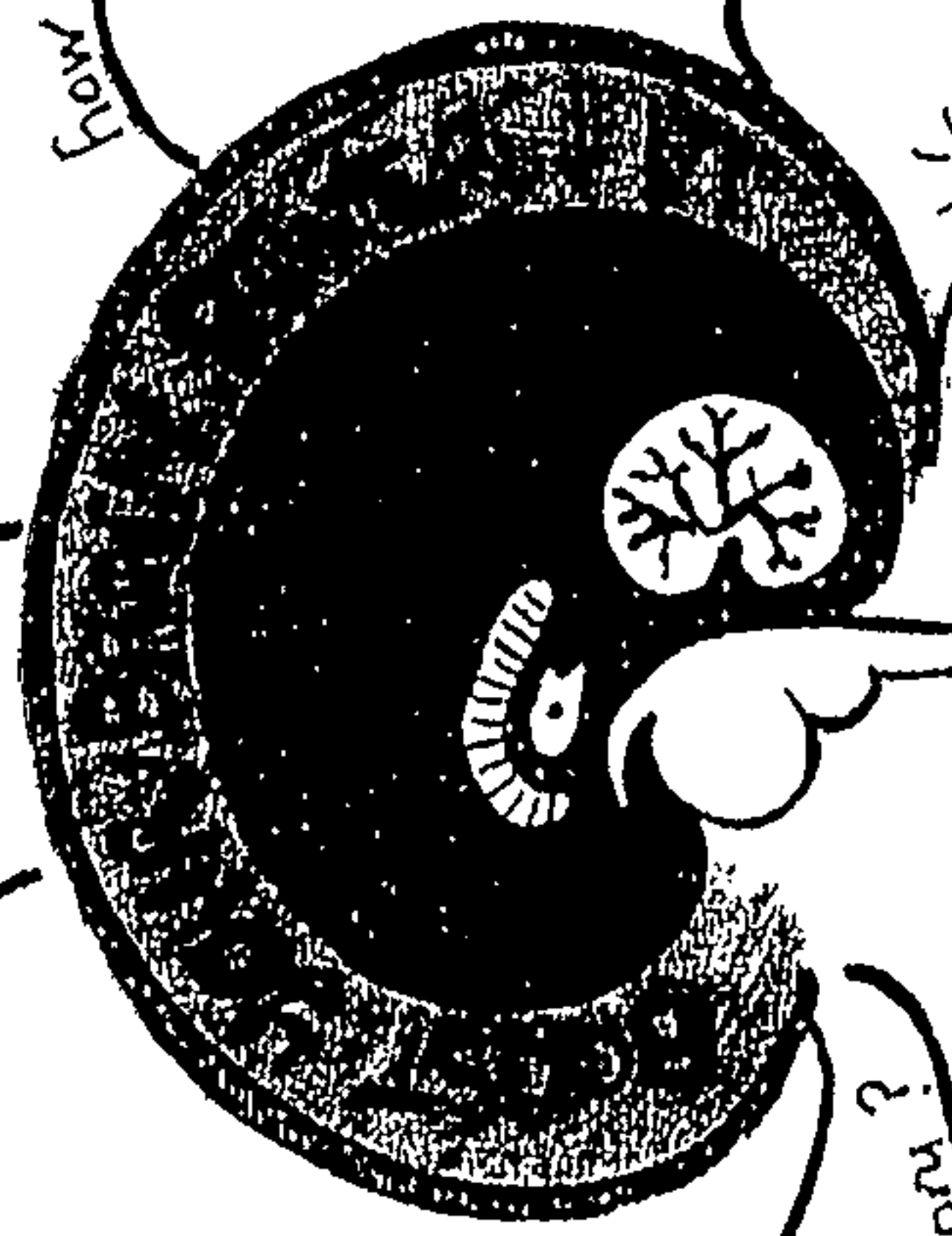
## ***Learner Outcomes***

- ***To create awareness of the importance of brain structures and functions during learning.***
- ***Create awareness of the need to effectively store information for future retrieval through specific brain processes.***
- ***To teach effective creative techniques for 'long term memory' storage.***
- ***To create awareness of brain capacity and the importance of stress management.***

## ***Activities***

- ***Creative exercises, using visualization, to facilitate effective memory strategies.***



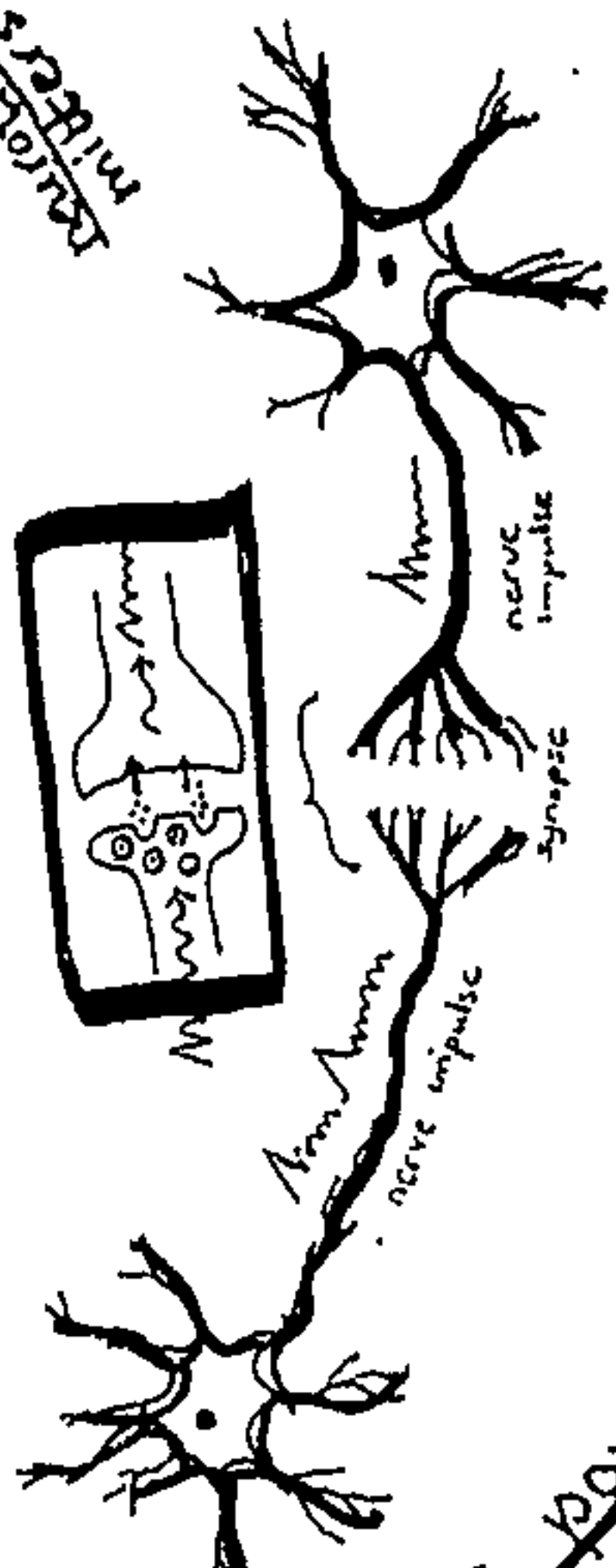


**the structure of the brain**

- brain = body's control centre
- 4 lobes
  - frontal
  - temporal
  - parietal
  - occipital
- 3 hemi-spheres
- 3 structural divisions
  - emotional brain
  - thinking brain
  - dominant speech control logic

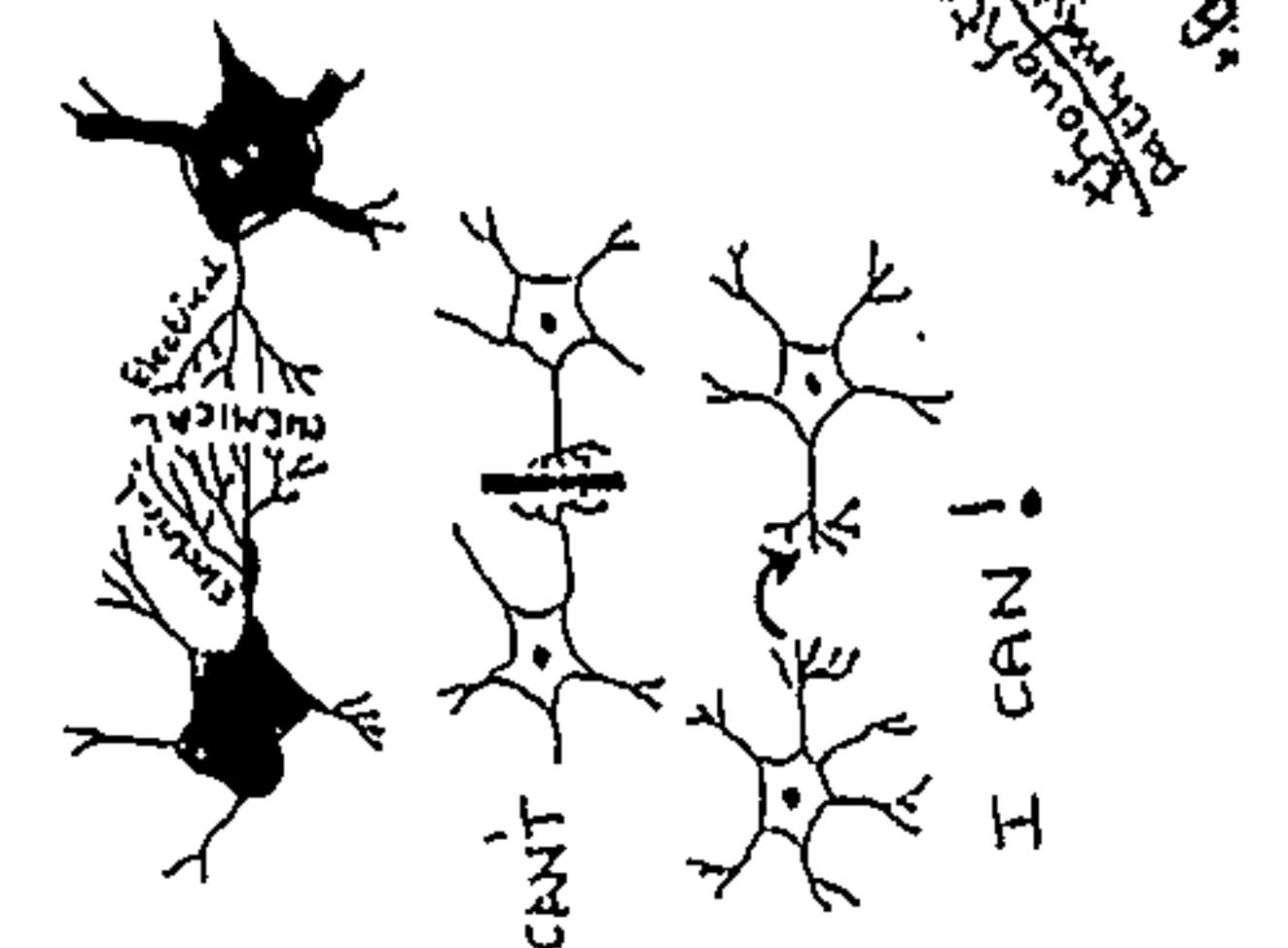
**how the brain functions**

- specialized cells = neurons
- electrical impulses
- chemical messengers
- conductors of info = myelin sheaths



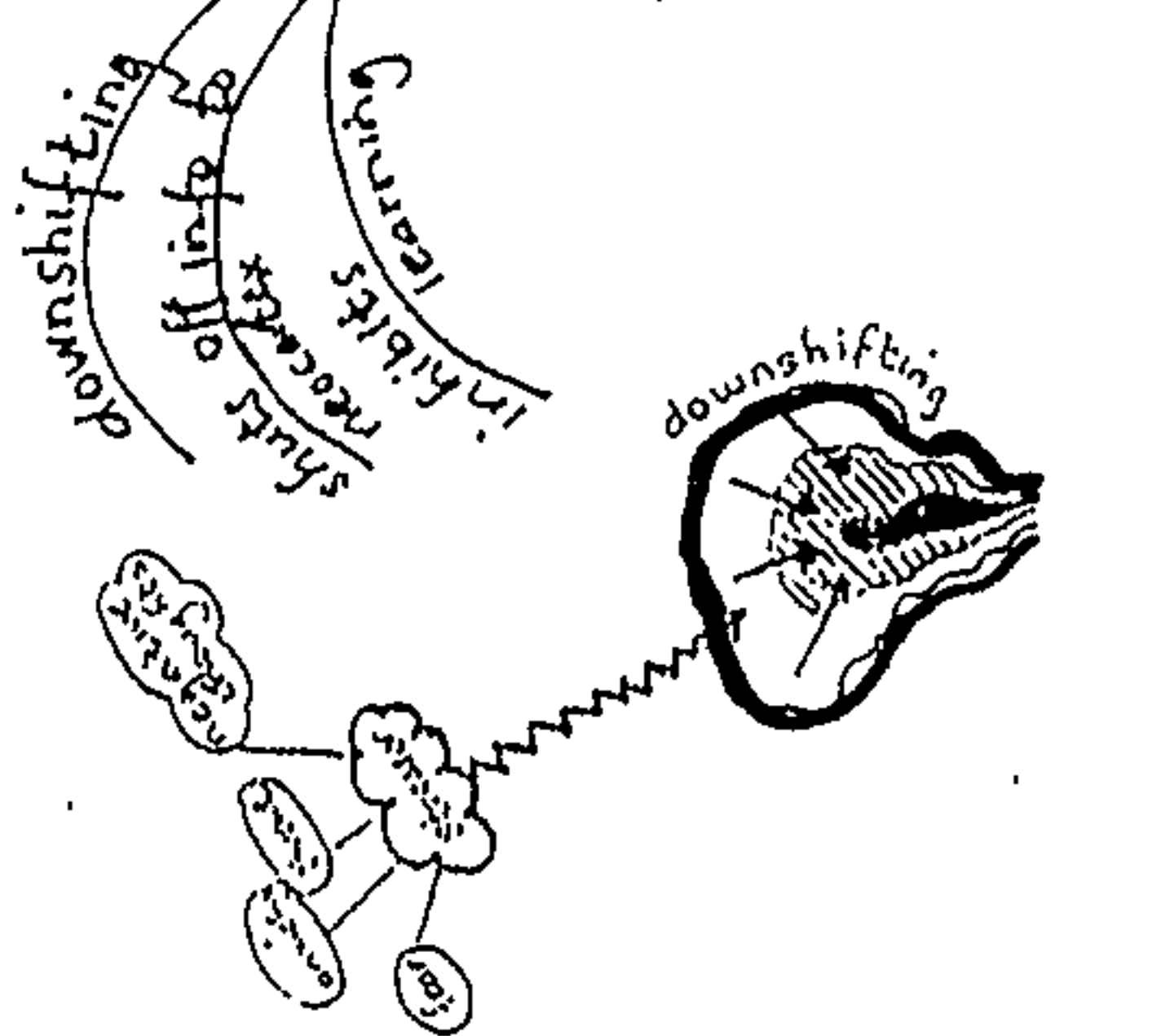
**the power of positive thinking**

- what power do thoughts have?
- what is a thought?
- thoughts are actions in the brain
- thoughts in the brain act on factors
- thoughts → feelings → mental functioning → thoughts → blood → active mental functioning
- so a man thinks so he is



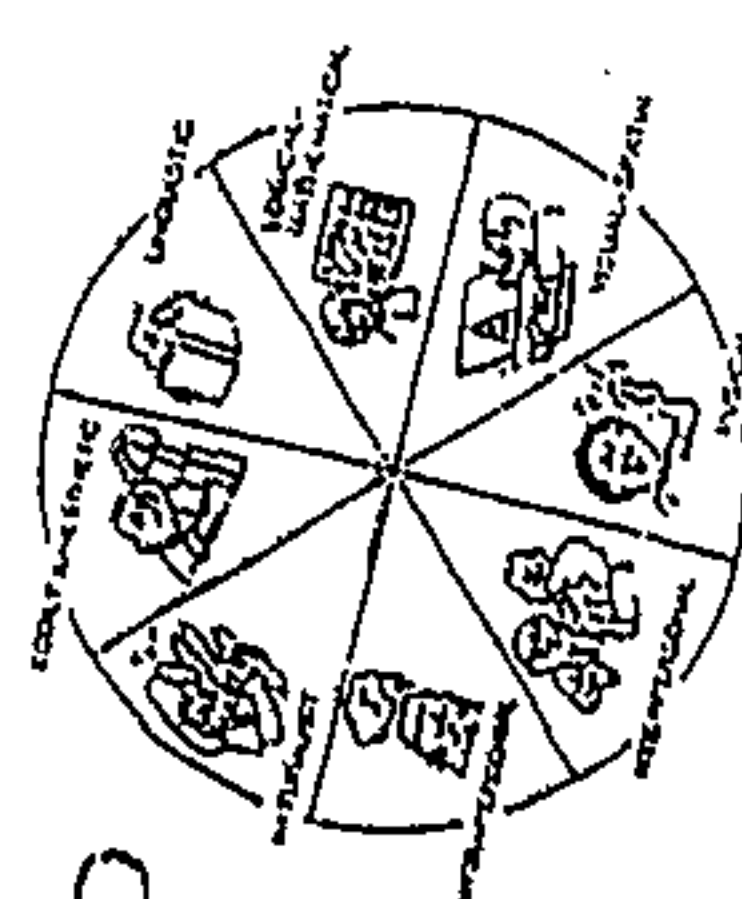
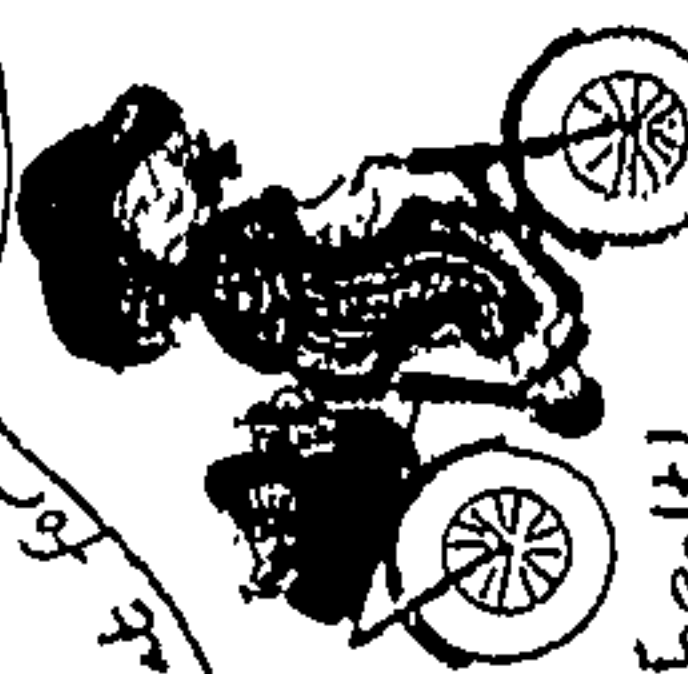
**stress and the brain**

- result of stress on mental functioning
- results in more primitive behaviour
- instinctual
- rational



**why a healthy lifestyle for optimal brain power?**

- the necessity of nutrients
- the effect of alcohol and drugs on the brain
- how does exercise improve mental functioning?
- what about sleep?
- what do nutrients do?
- which nutrients enhance mental functioning?
- optimal brain power?
- what should I eat?



**what is intelligence?**

- definition
- can it be measured?
- what do IQ tests measure?
- what about EQ?
- are there different types of intelligence?



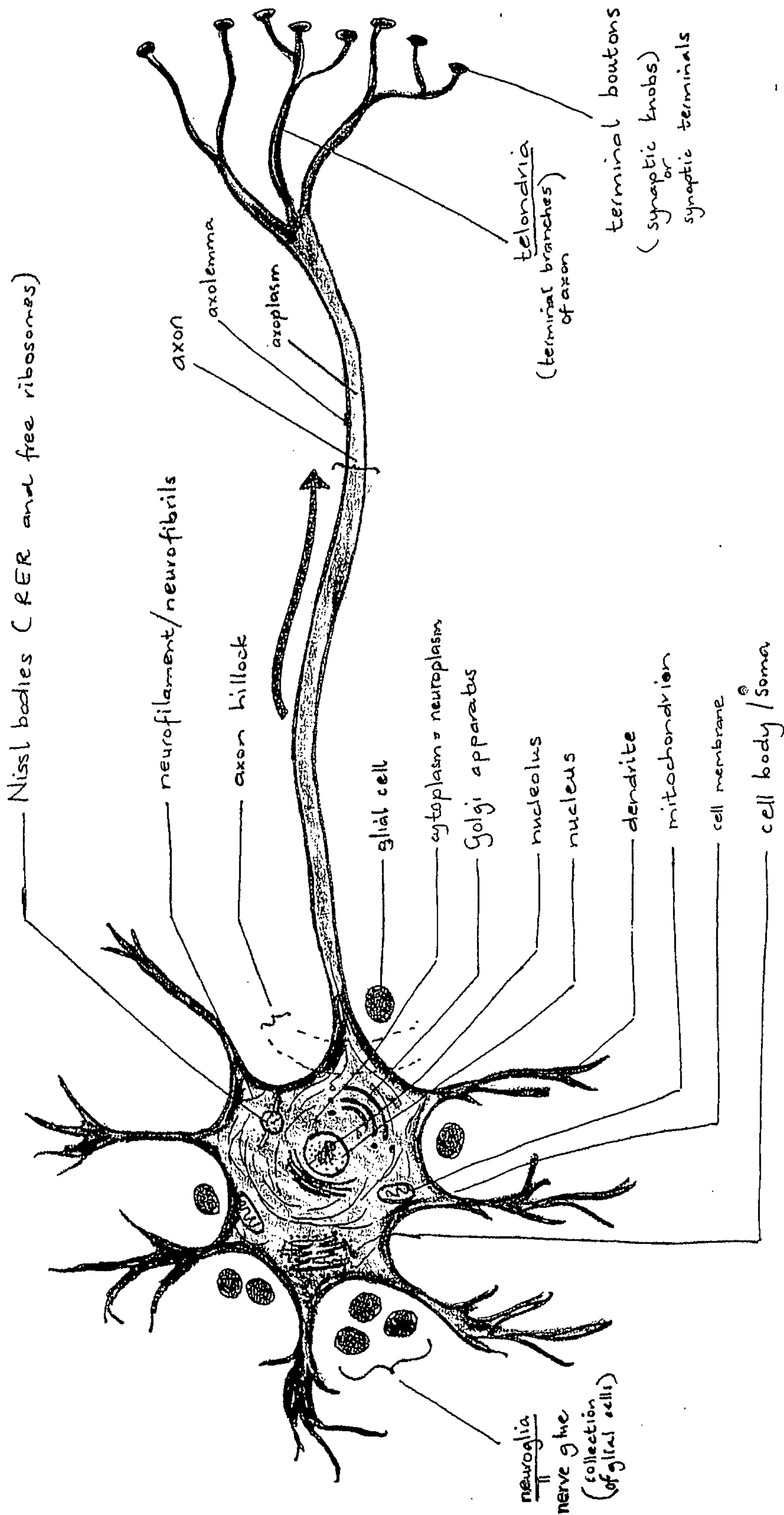
**what is memory?**

- definition
- how info is recalled or retrieved
- how info is stored or encoded
- which areas are involved
- diff. classifications
- hippocampus
- cerebellum
- frontal cortex
- amygdala
- ST
- ST
- amygdala
- hippocampus
- amygdala
- hippocampus



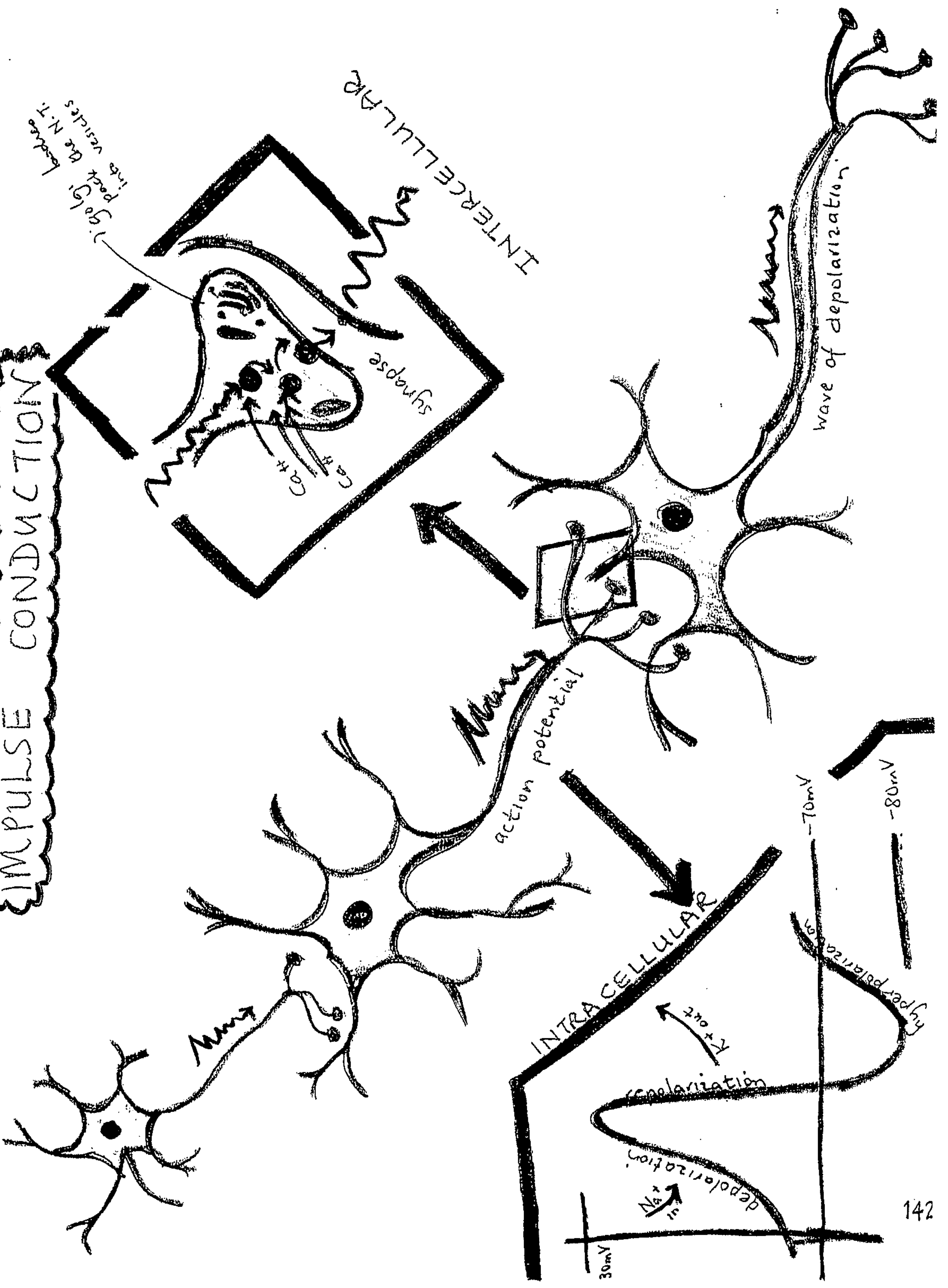


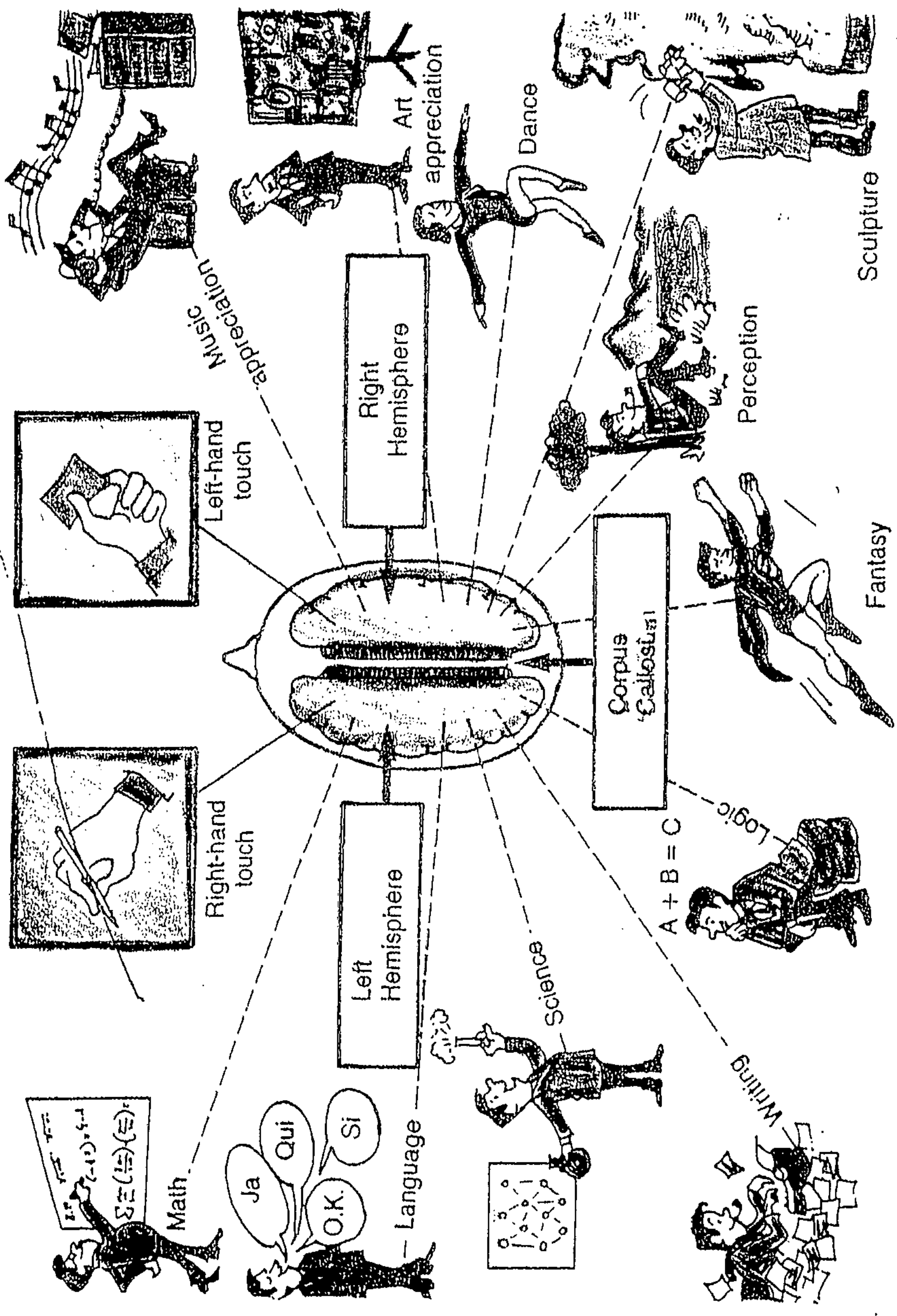
# STRUCTURE OF A NEURON



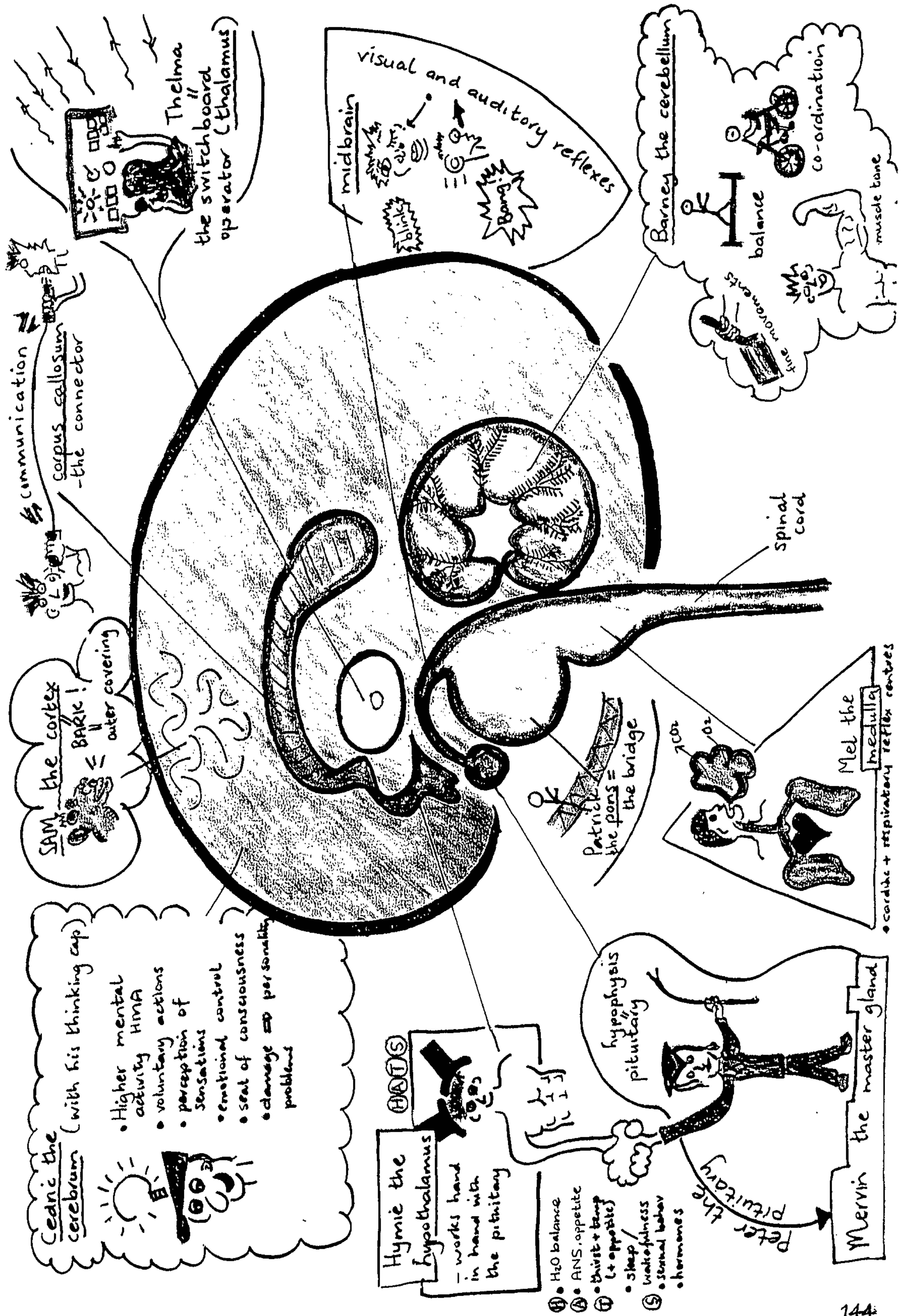


# IMPULSE CONDUCTION









communication  
 corpus callosum  
 - the connector

Thelma  
 "the switchboard operator (thalamus)

midbrain  
 visual and auditory reflexes  
 blinks  
 Bang!

Barney the cerebellum  
 balance  
 co-ordination  
 the movements  
 muscle tone

Spinal cord

SAM the cortex  
 BARK!  
 outer covering

Patrick the pons = the bridge

Mel the medulla  
 cardiac + respiratory reflex centres

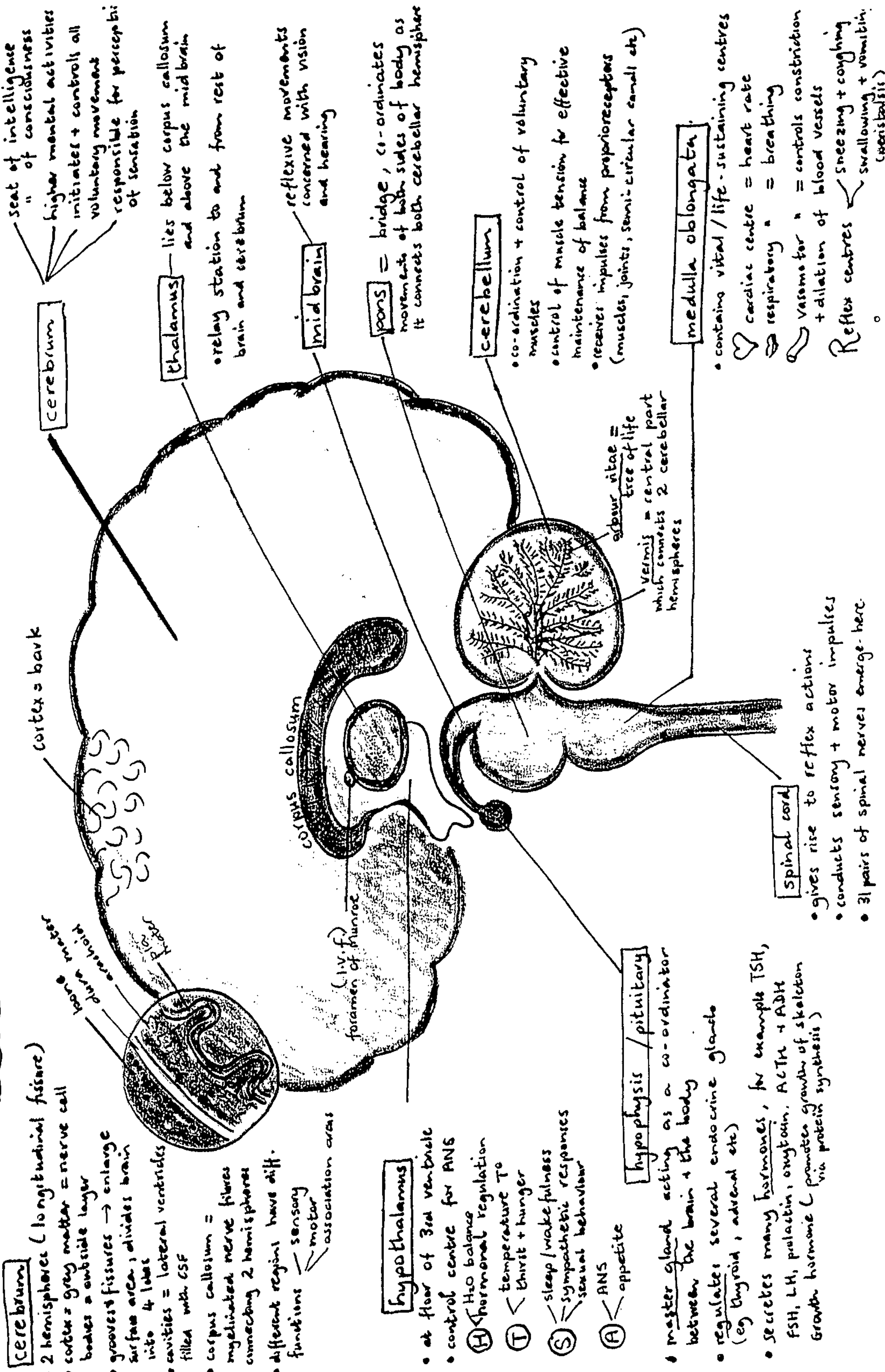
Cedric the cerebrum (with his thinking cap)  
 • Higher mental activity HMA  
 • voluntary actions  
 • perception of sensations  
 • emotional control  
 • seat of consciousness  
 • change in personality problems

HAT(S)  
 Hymie the hypothalamus  
 - works hand in hand with the pituitary

hypophysis pituitary  
 Peter the pituitary  
 Mervin the master gland  
 • H<sub>2</sub>O balance  
 • ANS, appetite  
 • thirst + temp (+ appetite)  
 • sleep / wakefulness  
 • sexual behavior  
 • hormones



# BRAIN - STRUCTURE and FUNCTIONS



## Cerebrum

- 2 hemispheres (longitudinal fissure)
- cortex = grey matter = nerve cell bodies + outside layer
- grooves & fissures → enlarge surface area; divides brain into 4 lobes
- cavities = lateral ventricles filled with CSF
- corpus callosum = myelinated nerve fibres connecting 2 hemispheres
- different regions have diff. functions
  - ↳ sensory
  - ↳ motor
  - ↳ association areas

## Hypothalamus

- at floor of 3rd ventricle
- control centre for ANS
  - H** H<sub>2</sub>O balance
  - H** Hormonal regulation
  - T** temperature T<sub>0</sub>
  - T** thirst + hunger
  - S** sleep/wakefulness
  - S** sympathetic responses
  - S** sexual behaviour
  - A** ANS
  - A** appetite

## Hypophysis / pituitary

- master gland acting as a co-ordinator between the brain + the body
- regulates several endocrine glands (eg thyroid, adrenal etc)
- secretes many hormones, for example TSH, FSH, LH, prolactin, oxytocin, ACTH + ADH
- Growth hormone (promotes growth of skeleton via protein synthesis)

## Spinal cord

- gives rise to reflex actions
- conducts sensory + motor impulses
- 31 pairs of spinal nerves emerge here.

## functions

- seat of intelligence
- " of consciousness
- higher mental activities
- initiates + controls all voluntary movement
- responsible for perceptibility of sensation

## Thalamus

- lies below corpus callosum and above the midbrain
- relay station to and from rest of brain and cerebrum

## Mid brain

- reflexive movements concerned with vision and hearing

## Pons

- = bridge, co-ordinates movements of both sides of body as it connects both cerebellar hemispheres

## Cerebellum

- co-ordination + control of voluntary muscles
- control of muscle tension for effective maintenance of balance
- receives impulses from proprioceptors (muscles, joints, semi-circular canals etc)

## Medulla oblongata

- contains vital / life-sustaining centres
  - ♥ cardiac centre = heart rate
  - 👃 respiratory " = breathing
  - 👃 vasomotor " = controls constriction + dilation of blood vessels
- Reflex centres
  - ↳ sneezing + coughing
  - ↳ swallowing + vomiting (peristalsis)

Arbour vitae = tree of life  
 Vermis = central part which connects 2 cerebellar hemispheres



**NEOCORTEX**



# ***Memory Strategies***

## ***Learner Outcomes***

- ***To teach effective memory strategies.***
- ***Create awareness of importance of use of senses.***
- ***Create awareness of the need to associate.***
- ***To teach different memory strategies for different work sections.***

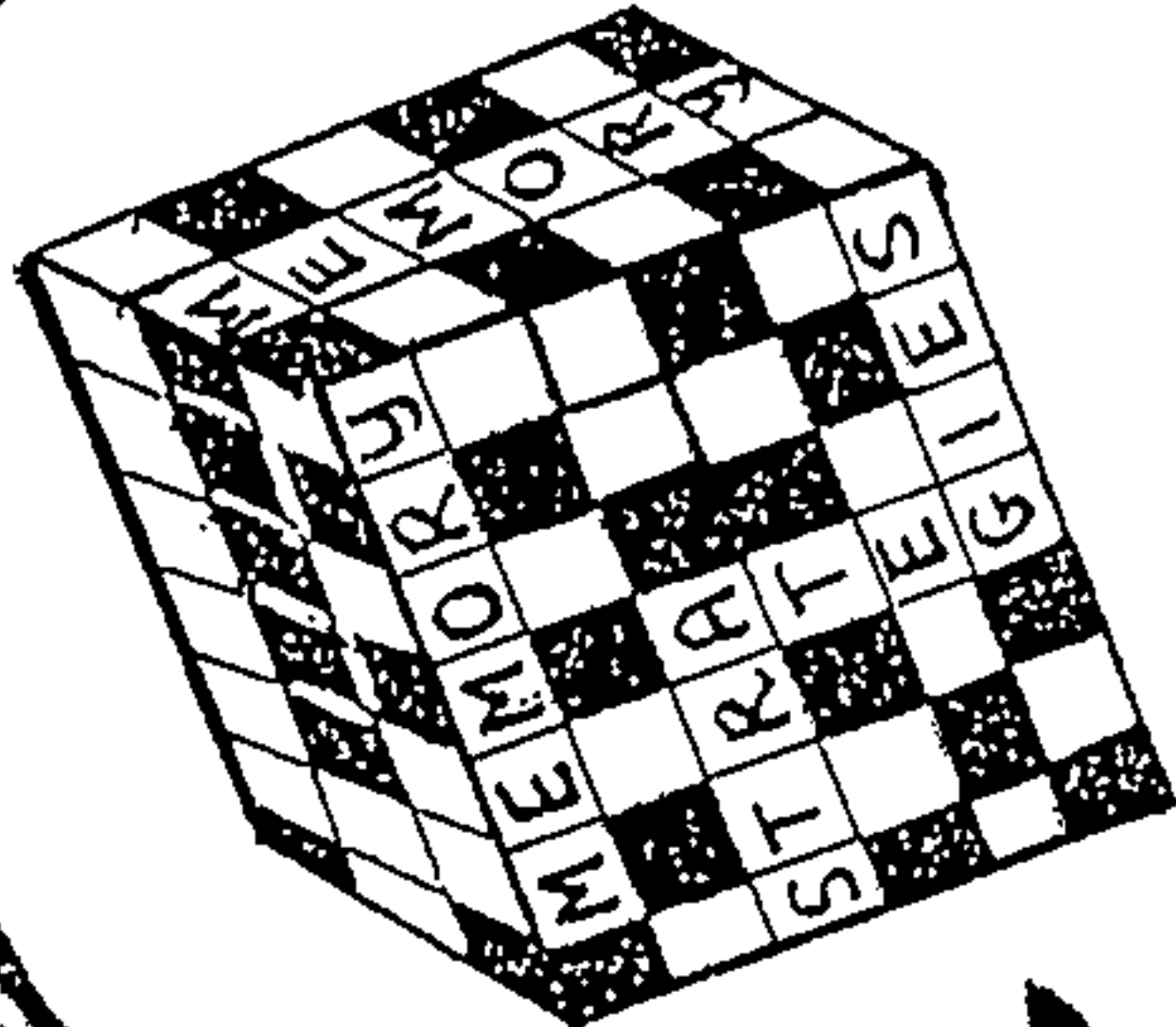
## ***Activities***

- ***Pupils to apply various memory strategies to their own work.***
- ***Pupils to make note of the uses of the different strategies in everyday life.***



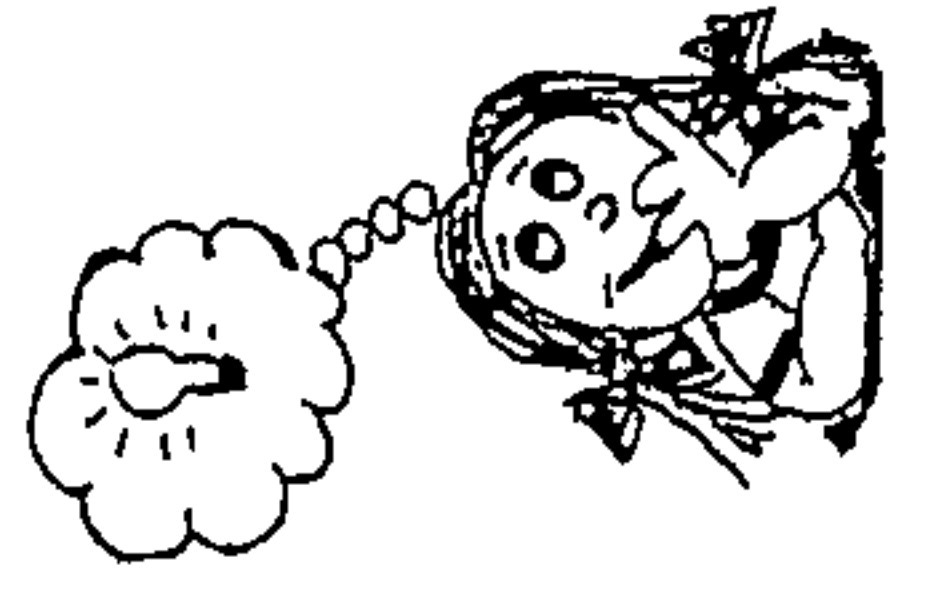
**Story-mnemonics**  
 At the oil factory (olfactory nerve) the optician (optic) was looking for the occupant of the motorcar (oculomotor) parked near a truck (trachicari). He was looking for him because these gems (ligerimall) had been abridged (lulachiculi) by a man who was wearing a mask to hide his face (facial) and ears (auricular). Although a glossy photograph (glossophotograph) had been taken of him, this could not be used because it was too vague (vague). It was known that this man was fond of spinach (spinach accessory) and that he was a hypochondriac (hypo-glossall).

# MEMORY STRATEGIES

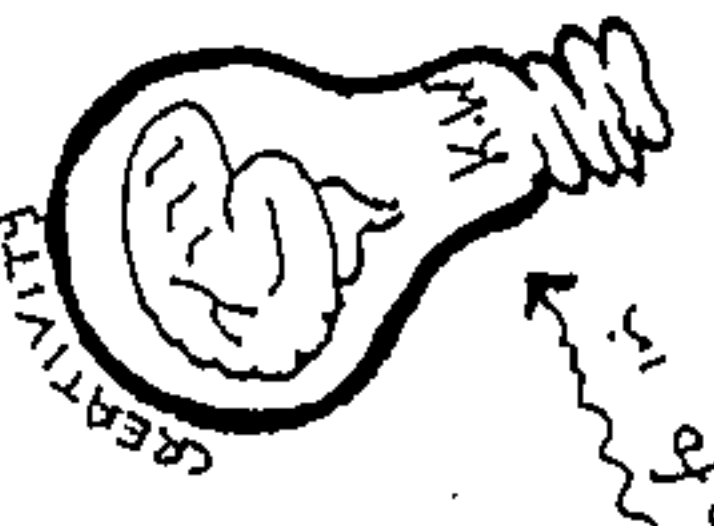


**rules**  
 how do they help?  
 definition  
 what are memory strategies?  
 visualization  
 categorization  
 helps to restructure notes  
 helps to organize material  
 promotes better understanding  
 good notes =  
 = good marks  
 = easy studying

**advantages**  
 example  
 definition  
 the link system (chain method)  
 2 keywords only  
 stick/crash/wrap  
 colour  
 exaggerate  
 use nouns



**mnemonics**  
 what are memory strategies?  
 visualization  
 categorization  
 helps to restructure notes  
 helps to organize material  
 promotes better understanding  
 good notes =  
 = good marks  
 = easy studying



keyword triggered  
 info out

**mnemonics**

**number systems**

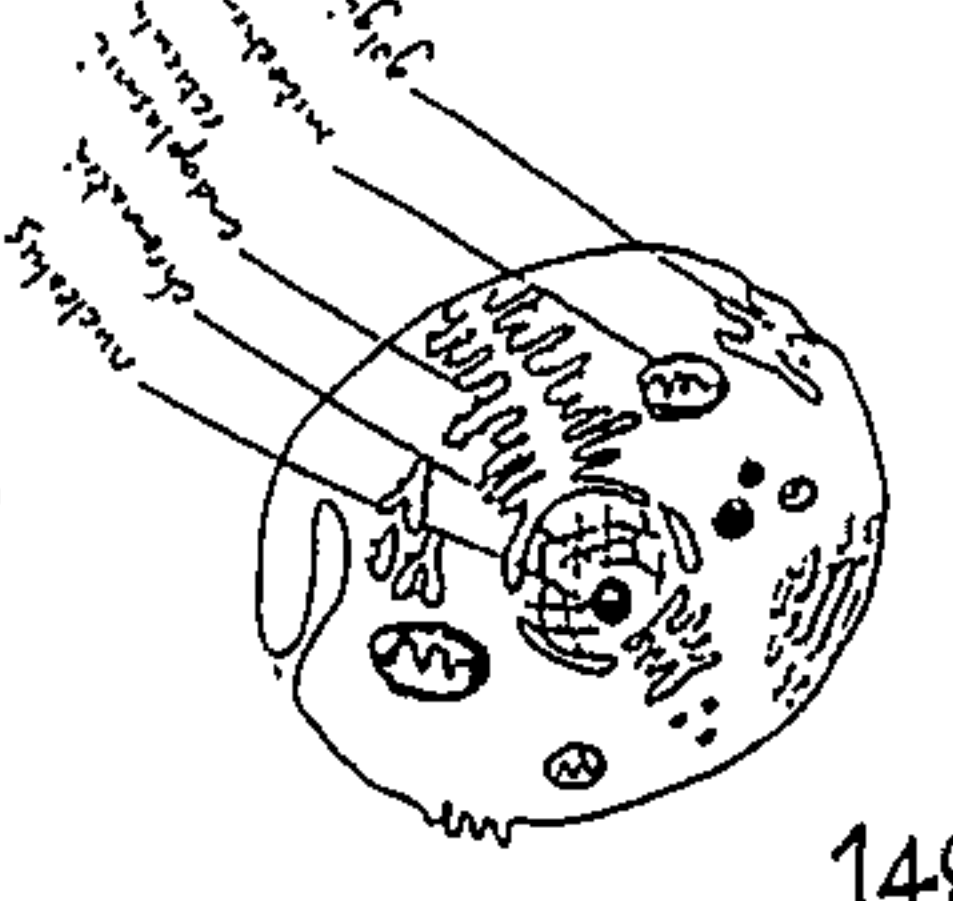
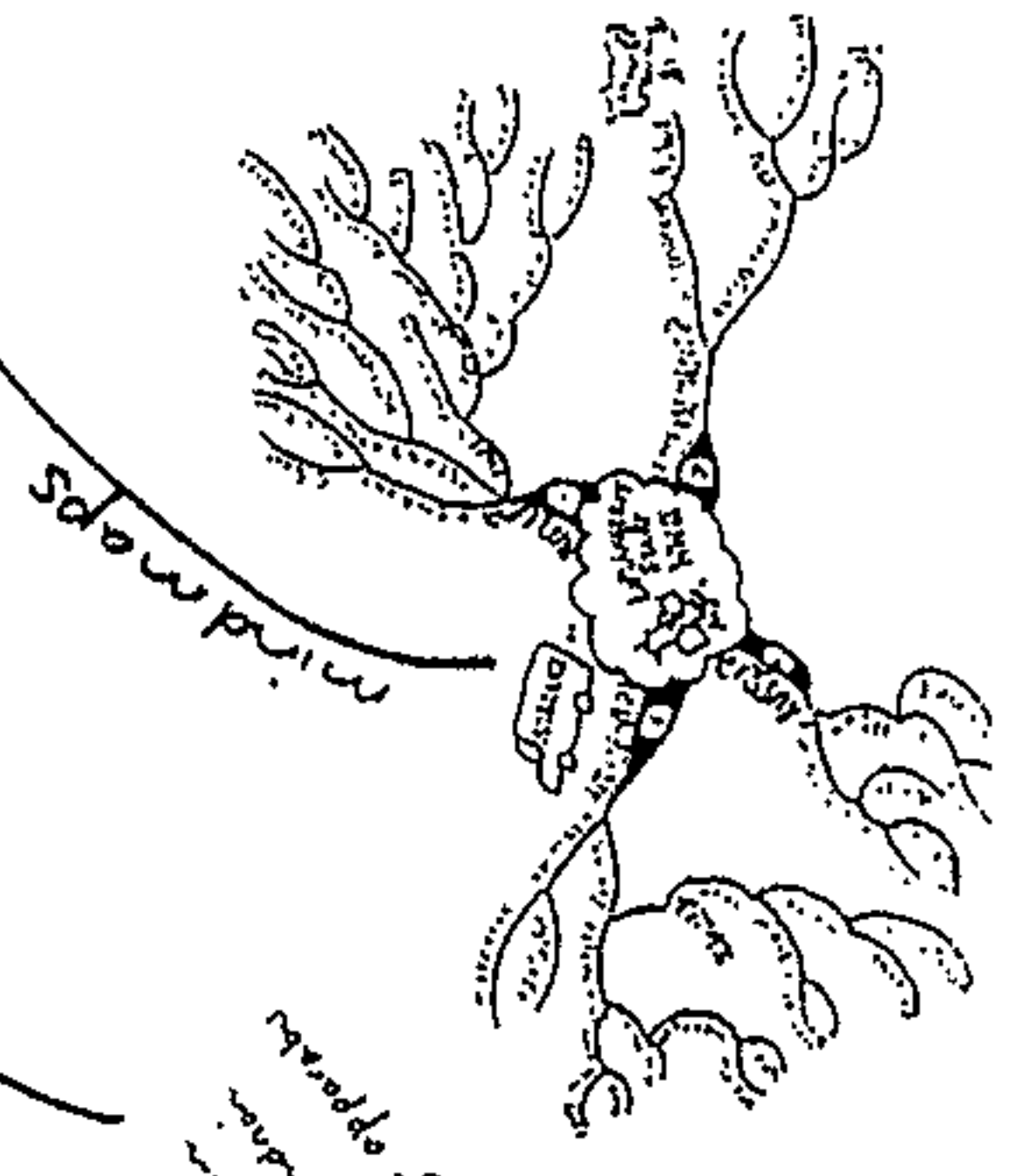
1 = bun  
 2 = shoe  
 3 = tree  
 4 = door  
 5 = hive  
 6 = sticks  
 7 = heaven  
 8 = gate  
 9 = wine  
 10 = hen

**number sound system**

number look alike system  
 number sound system

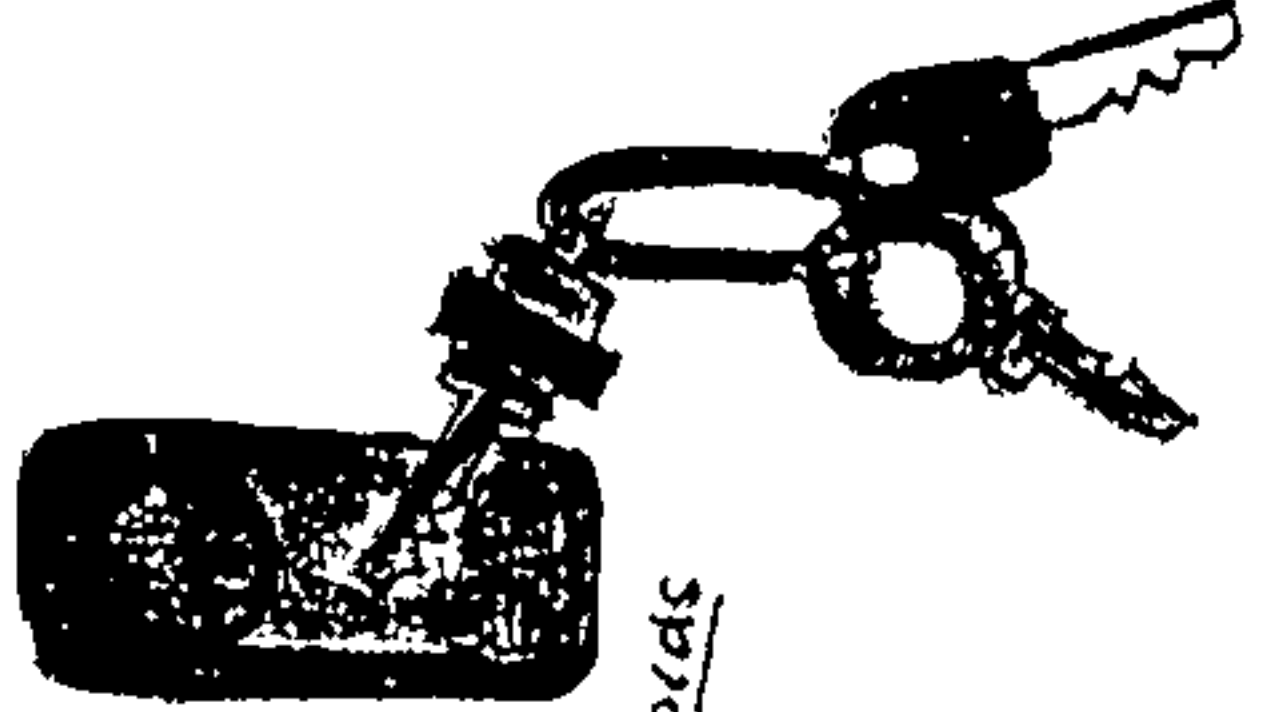
**the major system**

**maps + diagrams**



**other mnemonics**

**acronyms**  
 made from keywords  
 symbols / store words  
 (e.g. ... (Buzan))



# Barney's Brain Boosters



To facilitate transferring information into your long term memory (LTM), make use of **Lucille's LTM Team**.



- Use **Vicky** to make your work **visual**.
- Use **Candy** to **colour code** your material.
- Make sure you've added some of **Sandy's Sensory Components** (eg. Smell, sound, sight, touch, taste).
- **Olly** will help you **organize** the material and so remember and recall it better!
- Don't forget **Lucy's Lucky-Linking** to keep your facts in the correct sequence and chained together.
- And unless **Penelope** has **personalized** your work, you're sure to forget it...
- Lastly, **Eager Edgar** loves to **exaggerate** and add surprises – this makes it fun to learn..

# Vicky's Visualizing Skills

*To visualize is to make a mental image or picture of something read or said.*

*The purpose of visualization is to add character to incoming information in the form of pictures, colour and movement.*

**Guidelines for effective visualization:**

- ◆ *Visualize clearly.*
- ◆ *Make use of colour.*
- ◆ *Include movement.*
- ◆ *Use your senses.*
- ◆ *Use imagination and exaggerate!*





# Candy's Colour Coding

*By using colour, you are using the creative right hemisphere of your brain. Remember, using your left and right brain hemispheres facilitates learning and the transfer of information into long term memory*

*So...*

- ◆ Colour code your work.
- ◆ Use colour when doing summaries and mindmaps.
- ◆ Use different colours to distinguish different topics.



# Sandy's Sensory Components

*Sandy uses the five senses:*

- ◆ *Sight*
- ◆ *Smell*
- ◆ *Touch*
- ◆ *Taste*
- ◆ *Hearing*

*...to enhance visualization and the image formed as well as to strengthen the memory.*

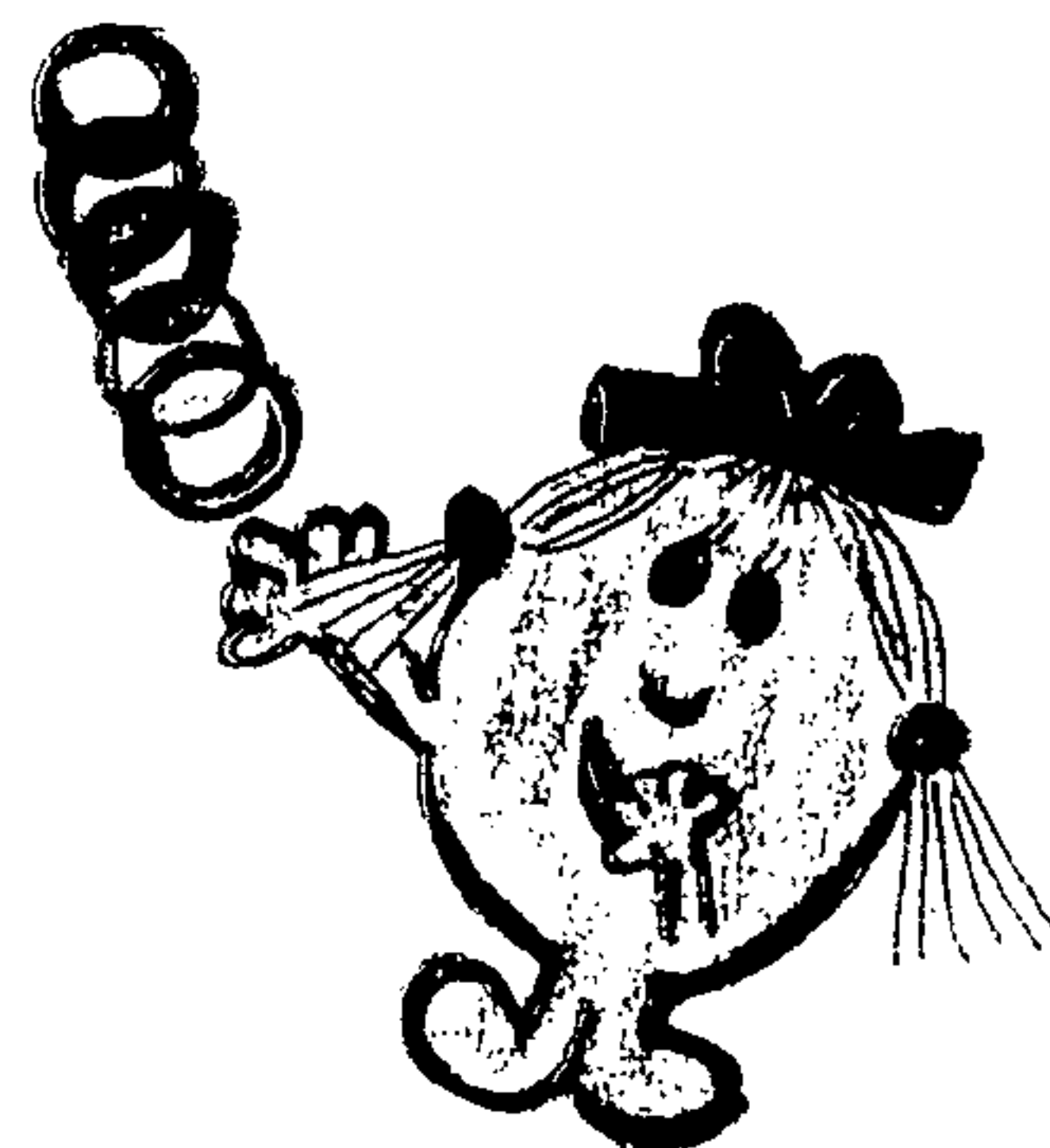


# Lucky Lucy's Linking Tips!

- ◆ *Visualize your linking words.*
- ◆ *Exaggerate your linking words.*
- ◆ *Make sure you've added some of 'Sandy's Sensory Components'.*
- ◆ *Visualize your words moving.*
- ◆ *Link your words by:*
  - ◇ *Letting them grow out of previous words.*
  - ◇ *Grabbing the next words.*
  - ◇ *Glueing the words together.*
- ◆ *Link only two words at a time.*

## Example:

- |            |           |
|------------|-----------|
| • Boat     | * Toes    |
| • Tail     | * Trumpet |
| • Tissue   | * Orange  |
| • Umbrella | * Teddy   |
| • Car      | * Book    |
| • Candle   | * Chimney |
| • Tyre     | * Tree    |
| • Cat      | * Packet  |
| • Takkie   | * Light   |





# Nicky's Number Naming System



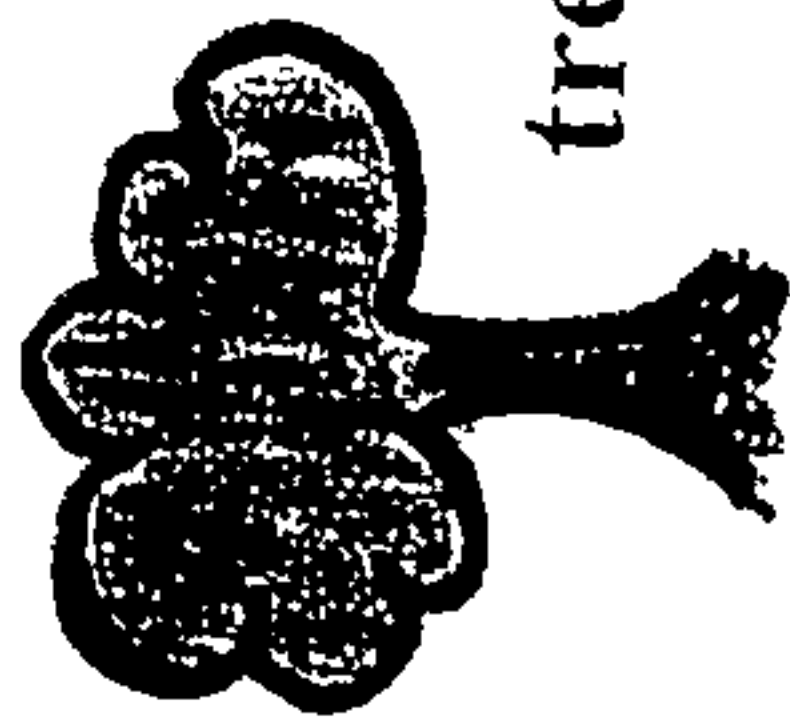
1.

bun



2.

shoe



3.

tree



4.

door



5.

hive



6.

sticks



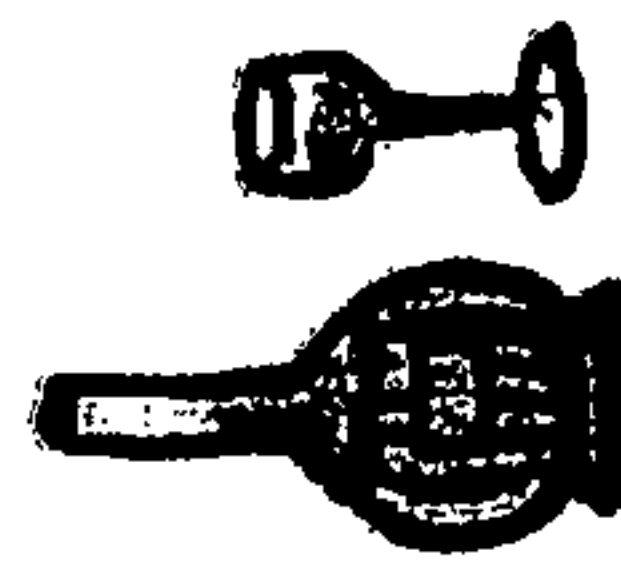
7.

heaven



8.

gate



9.

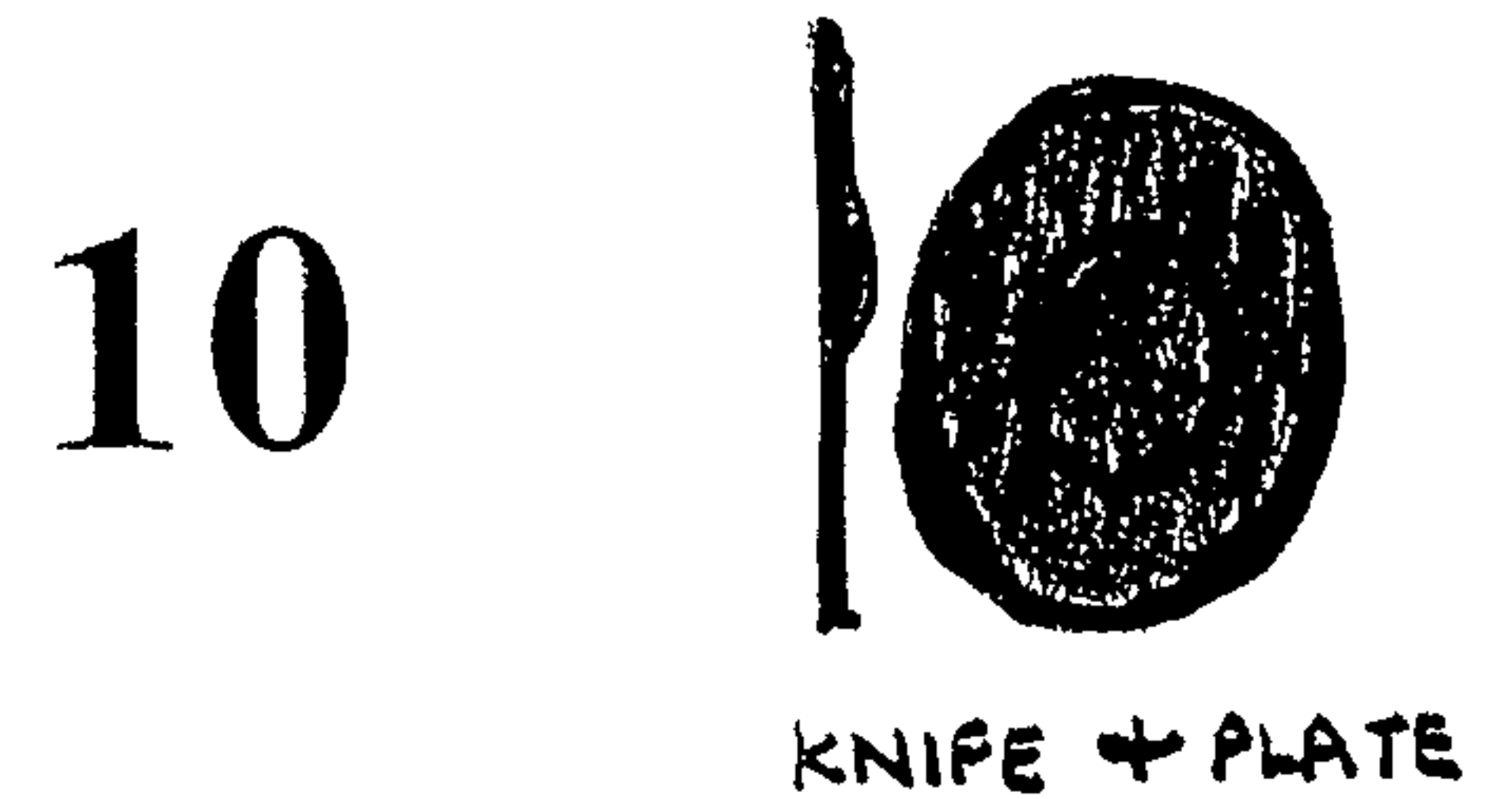
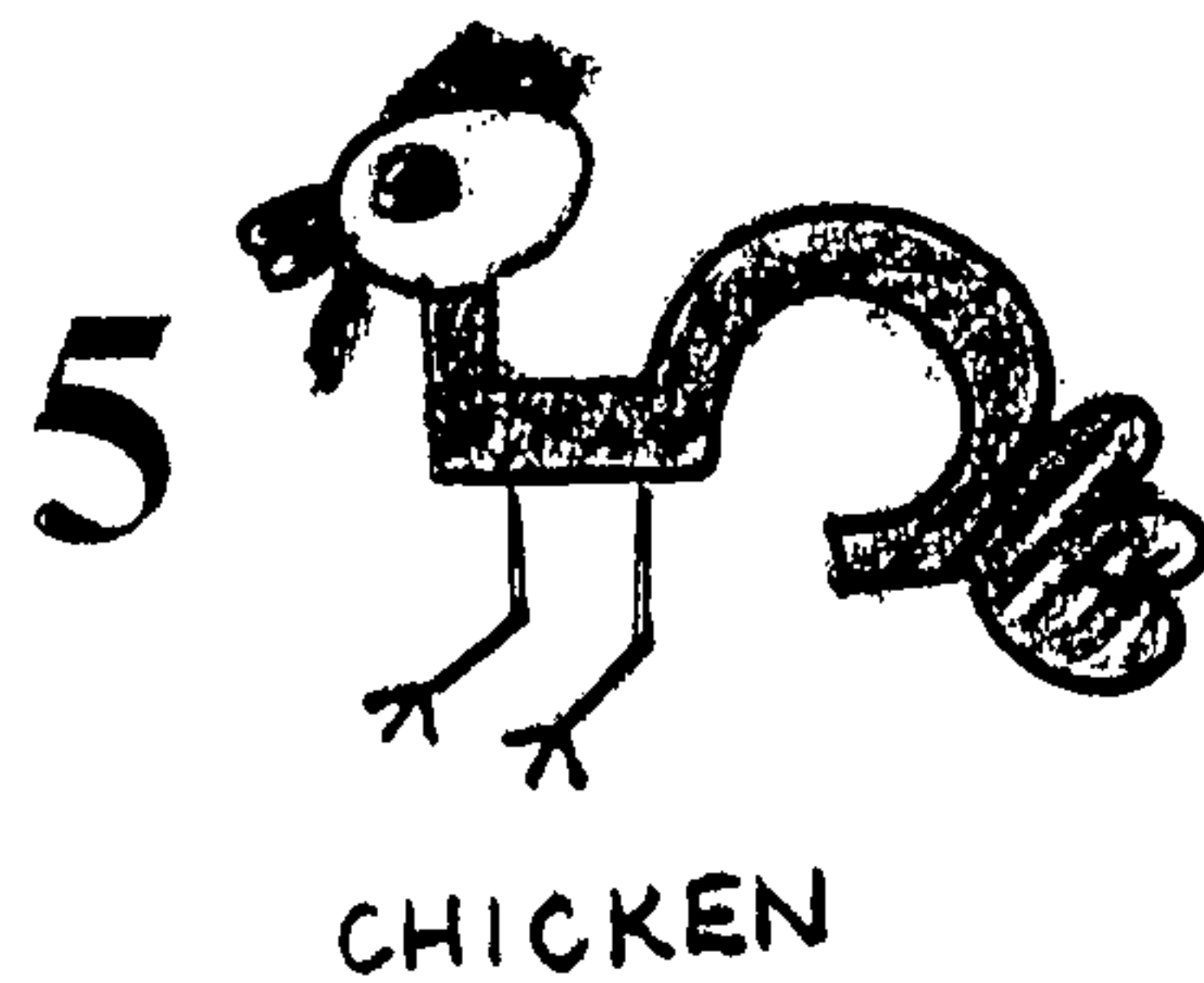
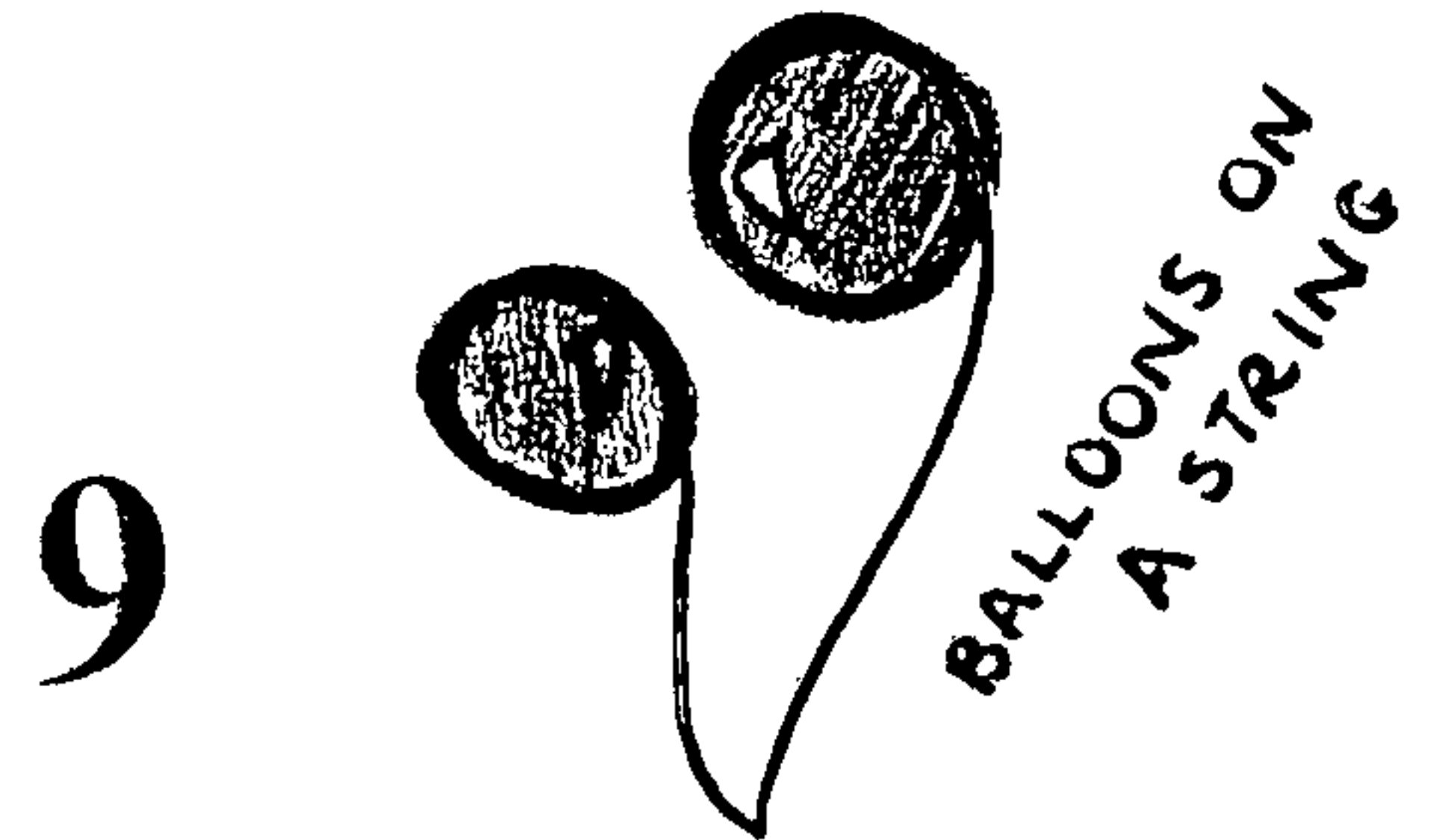
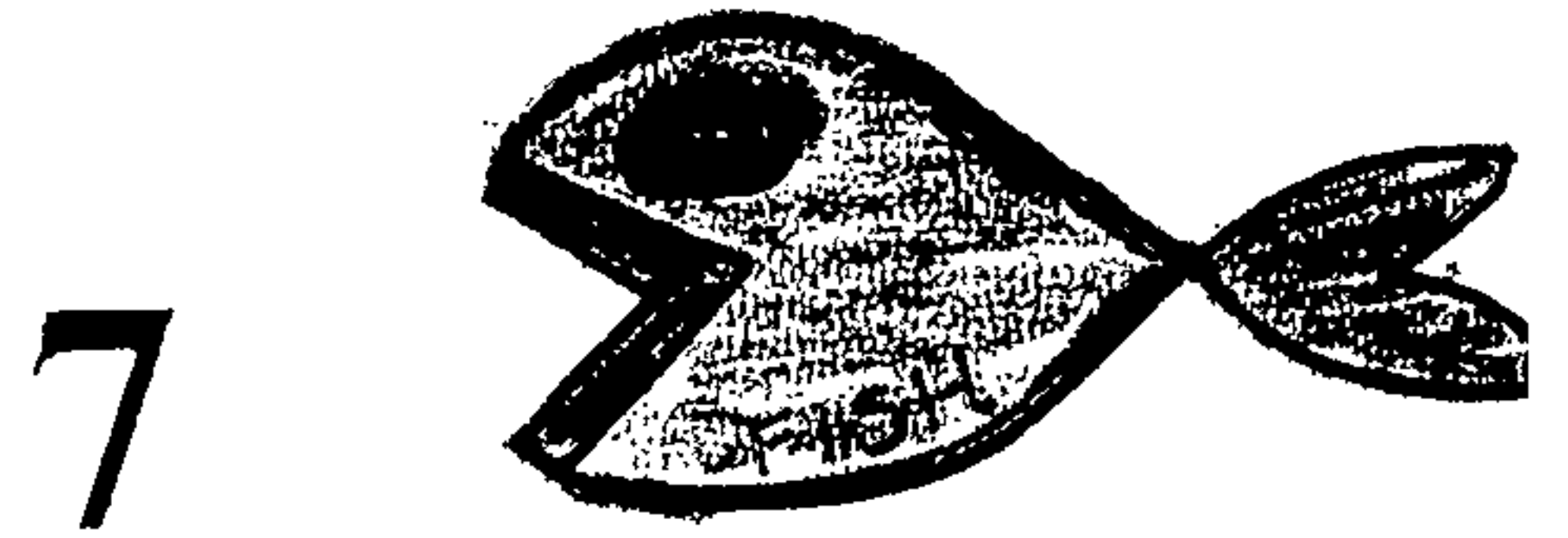
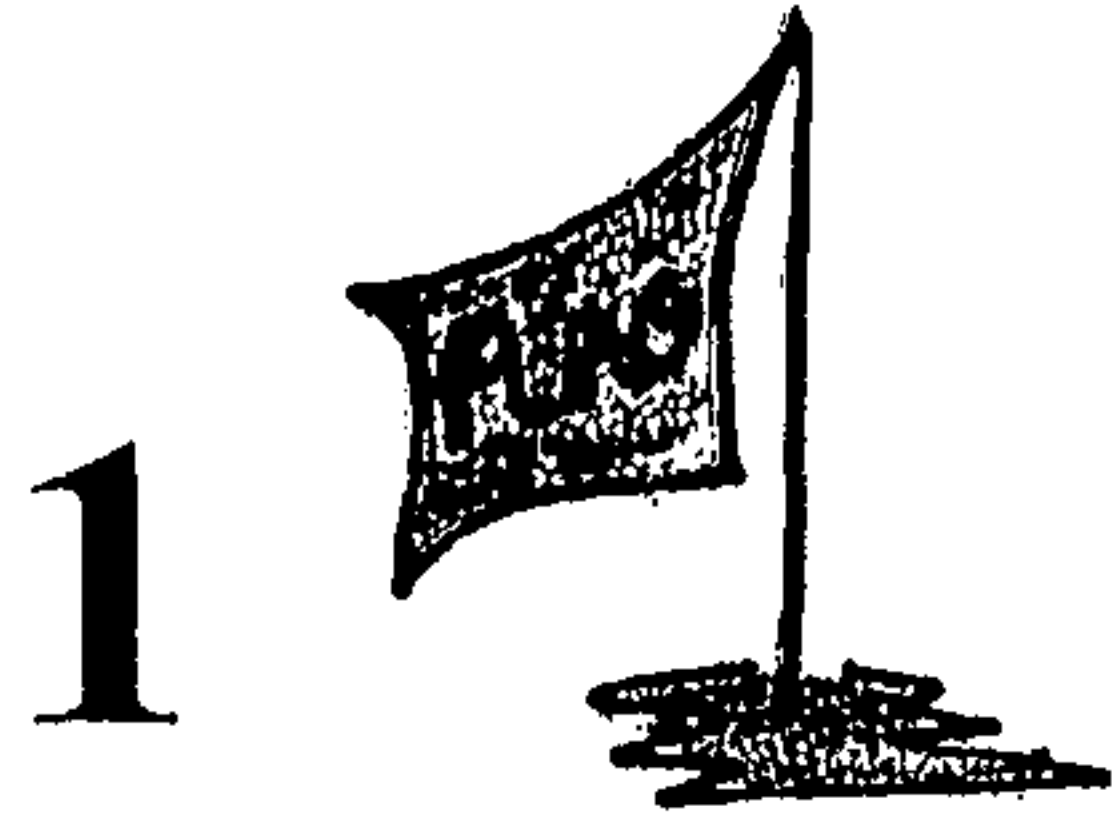
wine



10.

hen

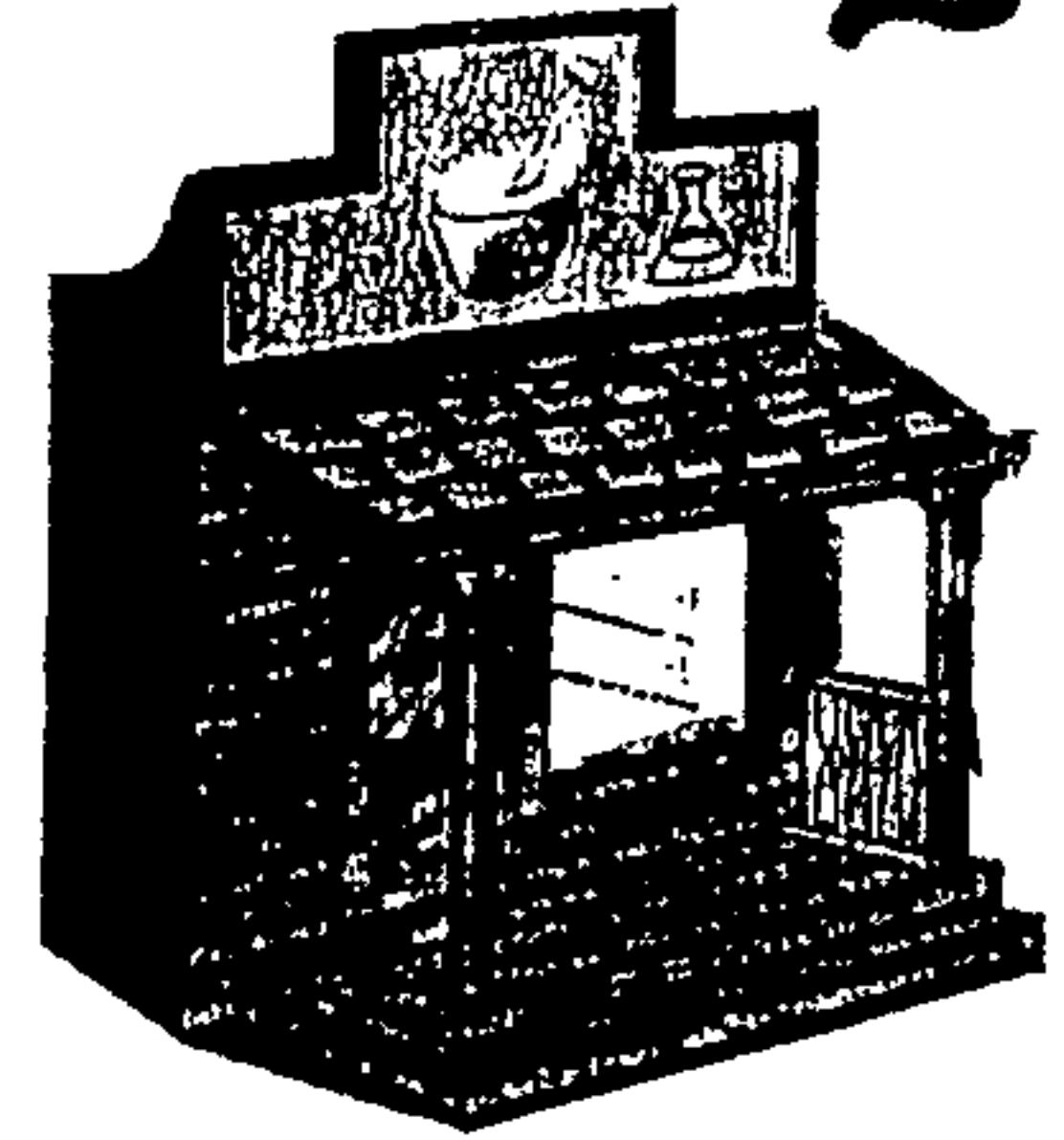
# Nicolette's Number Look-Alike System



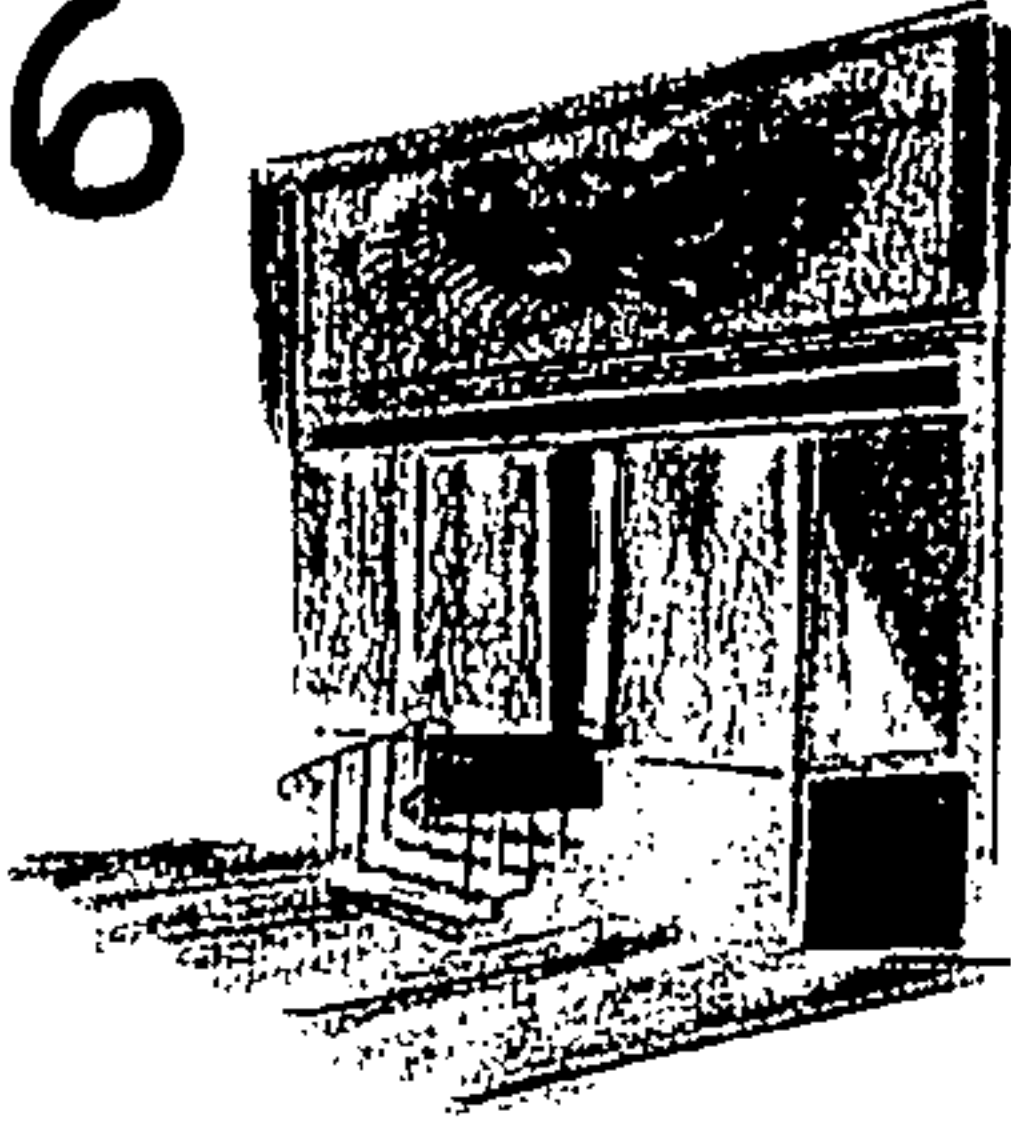
1



2

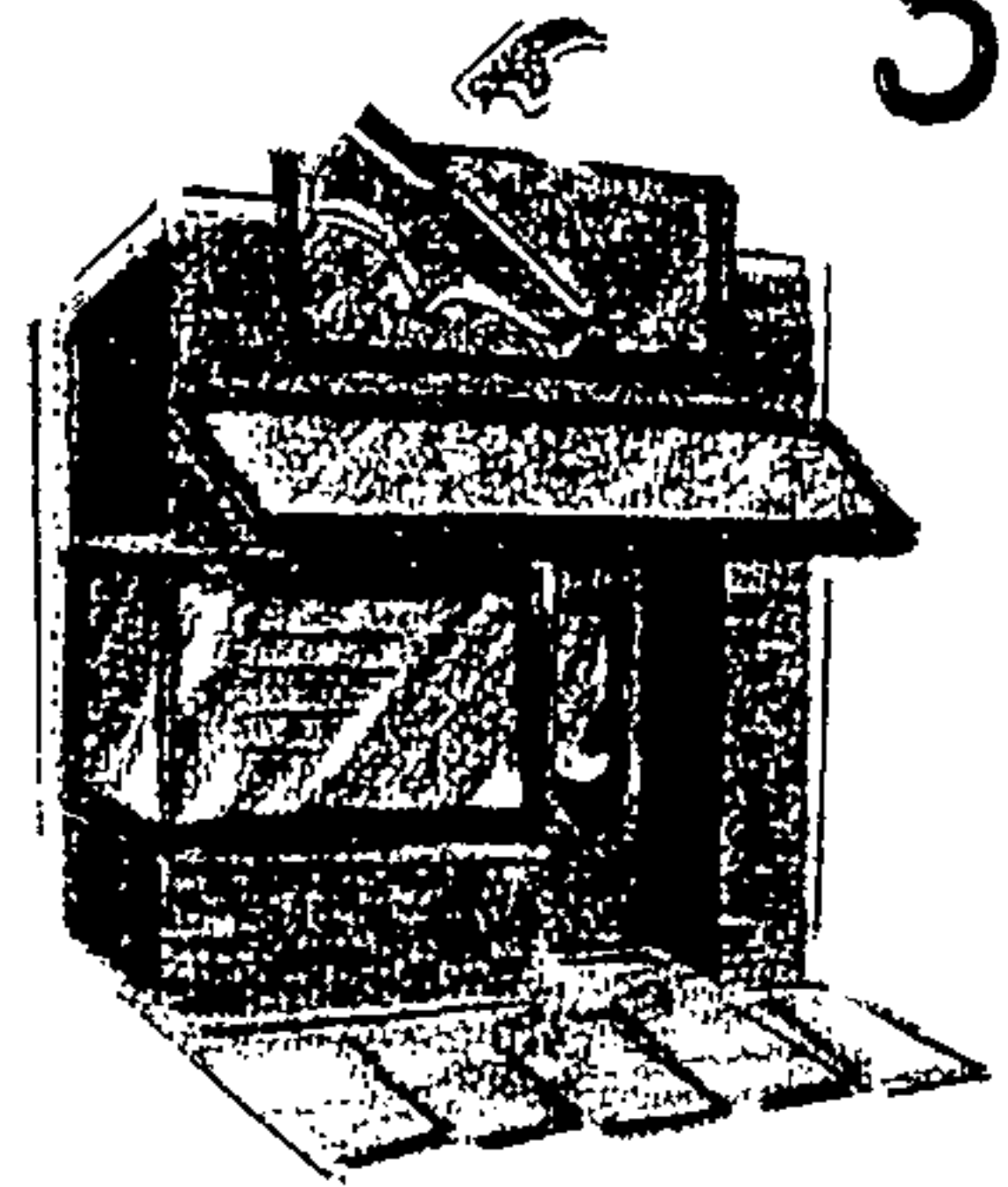


6



Sally's  
Selective  
Stalls

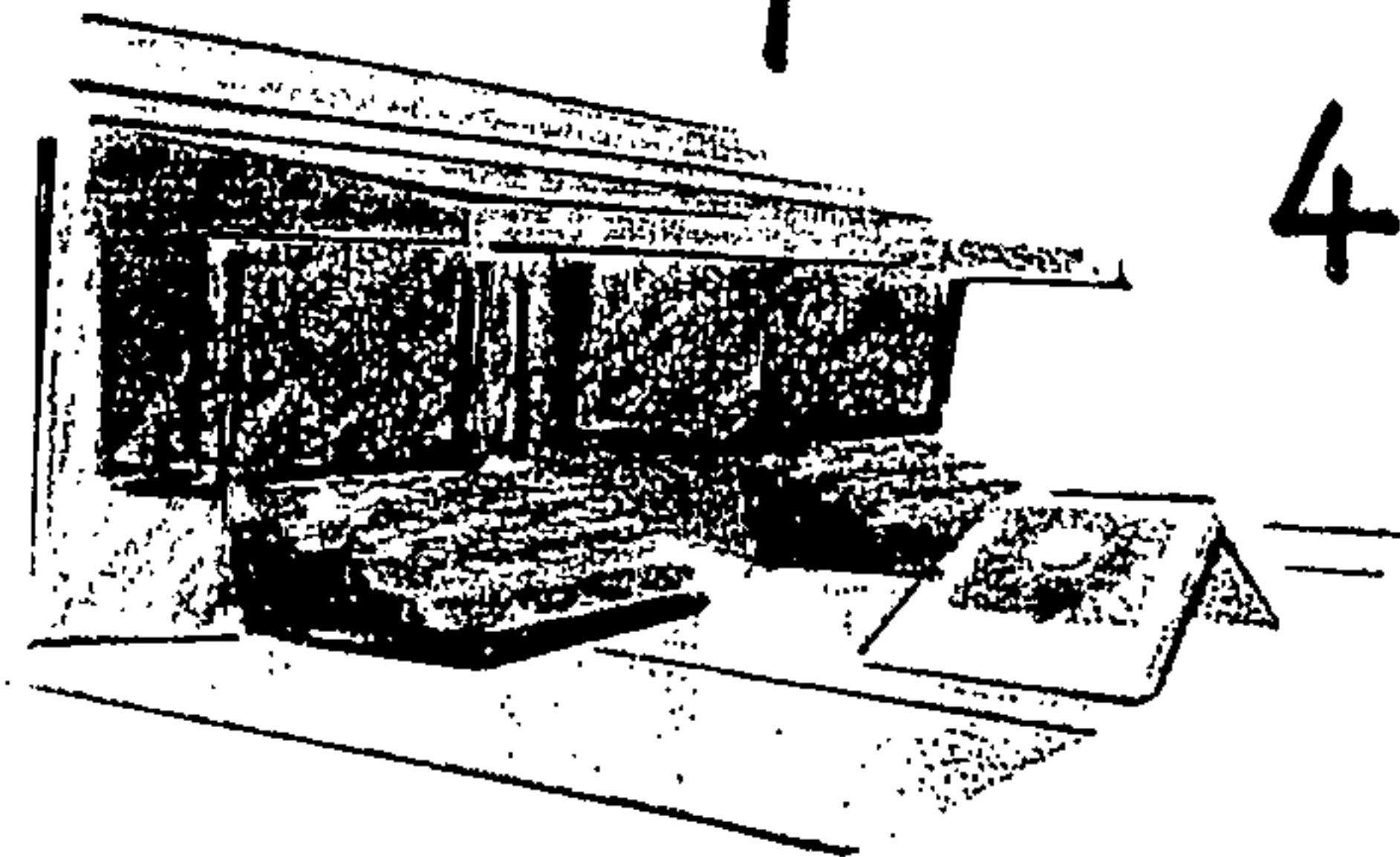
3



5



4





# Carel's Capital Clue Strategy

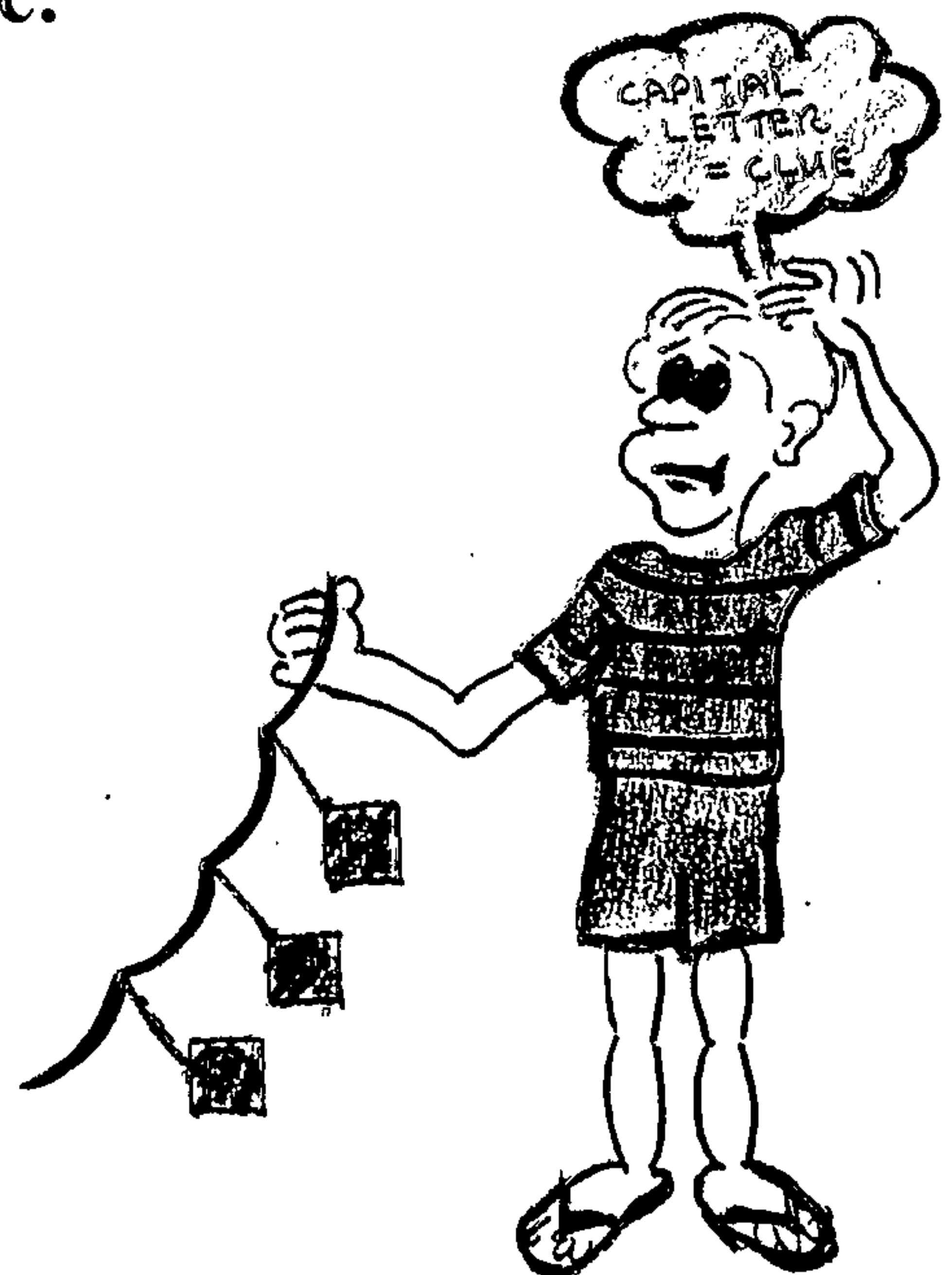
Another memory strategy which can be used for memorizing:

- ◆ headings
- ◆ sub-headings
- ◆ lists of keywords

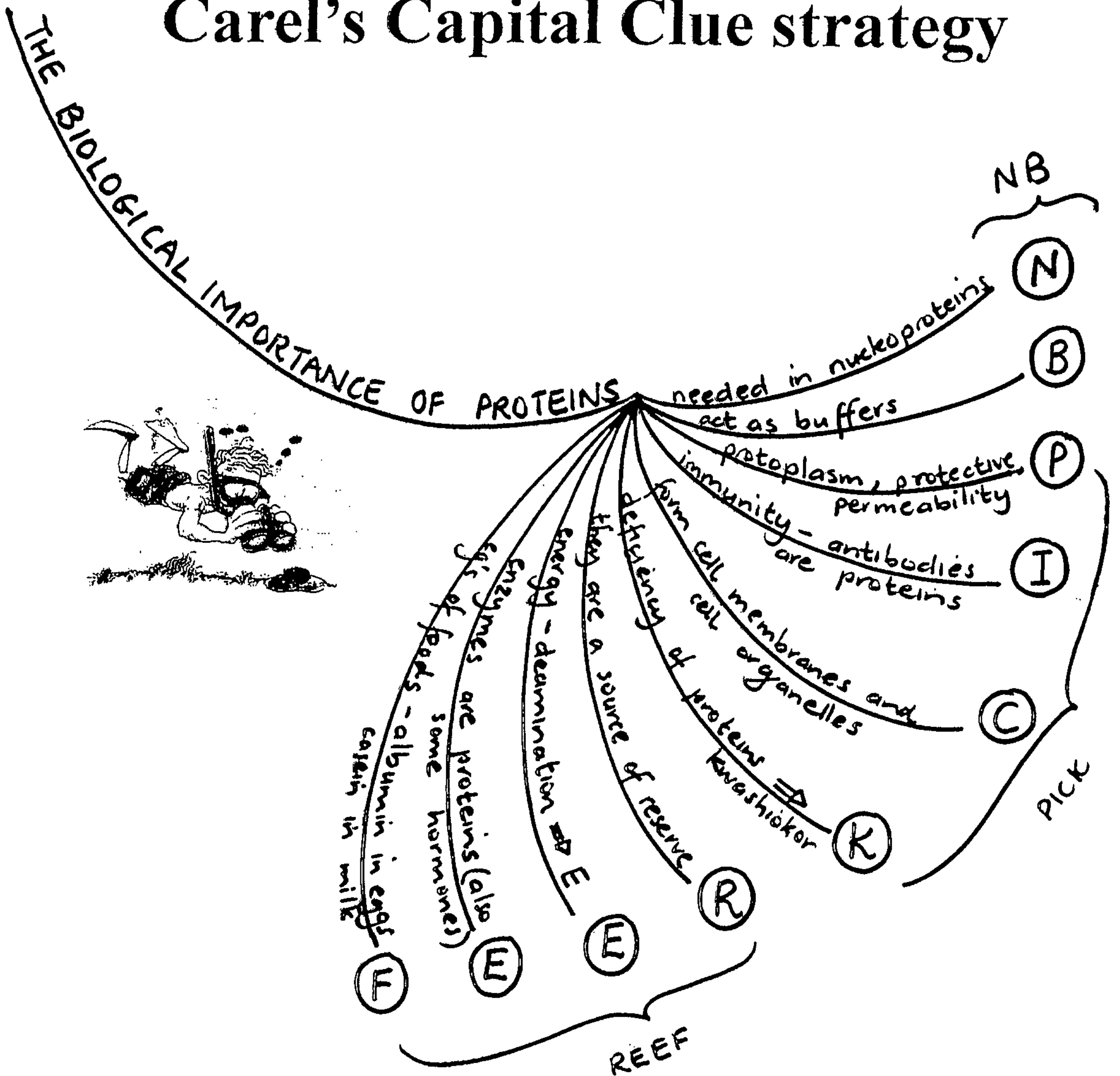
The *Clue* to using this strategy is.....

- ◆ Take the capital letters of each heading/subheading or keywords
- ◆ Arrange these capital letters in such a way that they tell a story or make a name.

Your story will unlock the contents contained under your main points.



# Carel's Capital Clue strategy



IT IS IMPORTANT (NB) TO PICK THE RIGHT REEF WHEN SPEAR-FISHING FOR YOUR PROTEIN FISH

# Melanie's Memory Mates

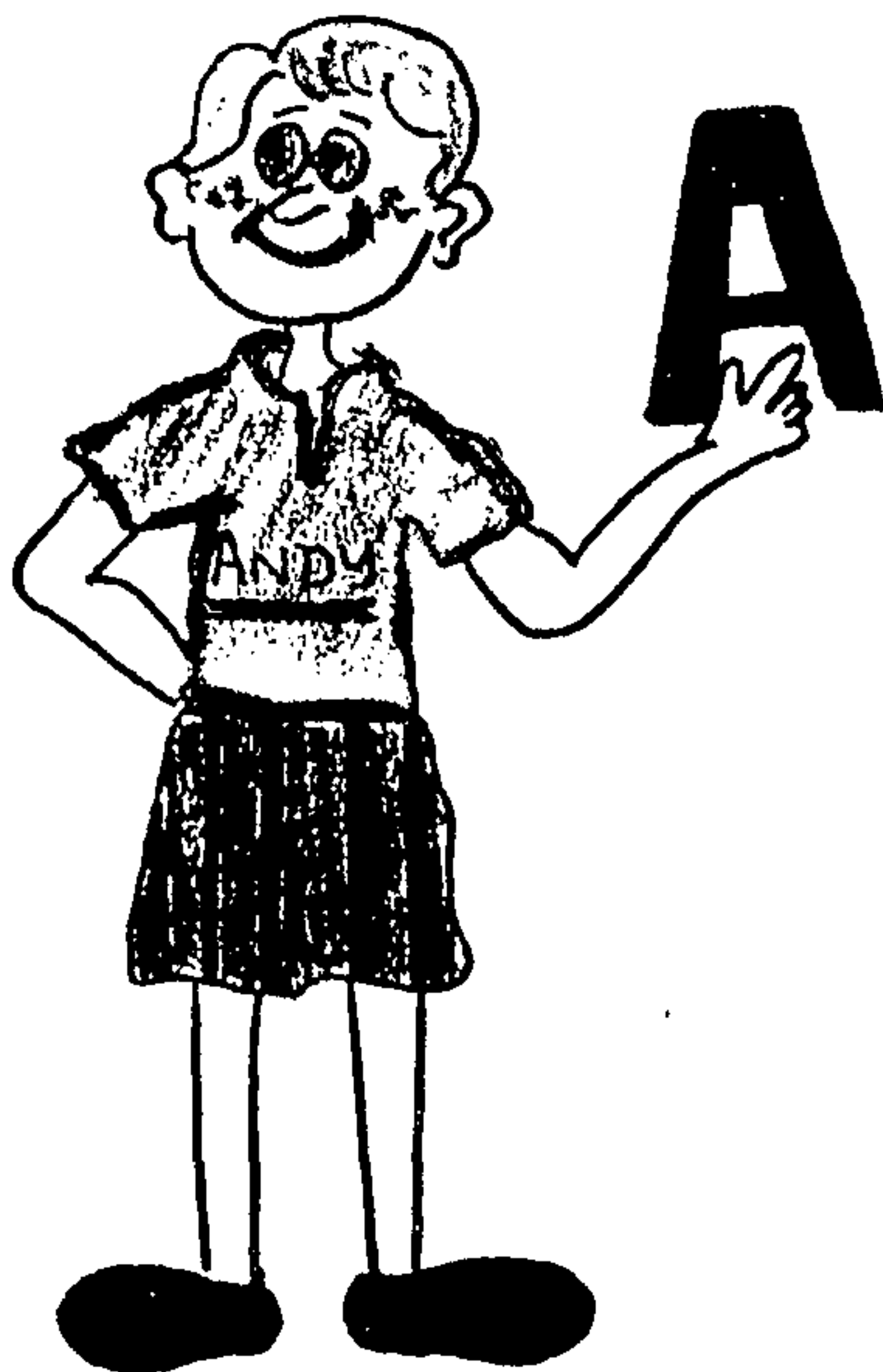
- ◆ **Lucky Lucy's Linking Tips**
- ◆ **Nicky's Number Naming System**
- ◆ **Nicolette's Number Look-Alike System**
- ◆ **Sally's Selective Stalls**
- ◆ **Carel's Capital Clue Strategy**
- ◆ **Andy's Awesome Acronyms**
- ◆ **Stella's Story Mnemonics**
- ◆ **Susan's Spelling Tricks**
- ◆ **Mary's Manipulative Map Method**
- ◆ **Des's Descriptive Diagram Technique**



# Stella's Story Mnemonics

*At the oil factory (olfactory nerve), the optician (optic nerve) was looking for the occupant of the motorcar (oculomotor) parked near a truck (trochlear). He was looking for him because three gems (trigeminal) had been abducted (abducens) by a man who was wearing a mask to hide his face (facial) and ears (auditory). Although a glossy photograph (glossopharyngeal) had been taken of him, this could not be used, because it was too vague (vagus). It was known that this man was fond of spinach (spinal accessory) and that he was a hypochondriac (hypo-glossal).*

Or... as Andy Acronym would say.....



On (*olfactory*)  
Old (*optic*)  
Olympus (*oculomotor*)  
Towering (*trochlear*)  
Top (*trigeminal*)  
A (*abducens*)  
Fin (*facial*)  
And (*auditory*)  
German (*glossopharyngeal*)  
Viewed (*vagus*)  
Some (*spinal accessory*)  
Hops (*hypo-glossal*)

**O O O T T A F A G V S H**

# ***Listening Techniques***

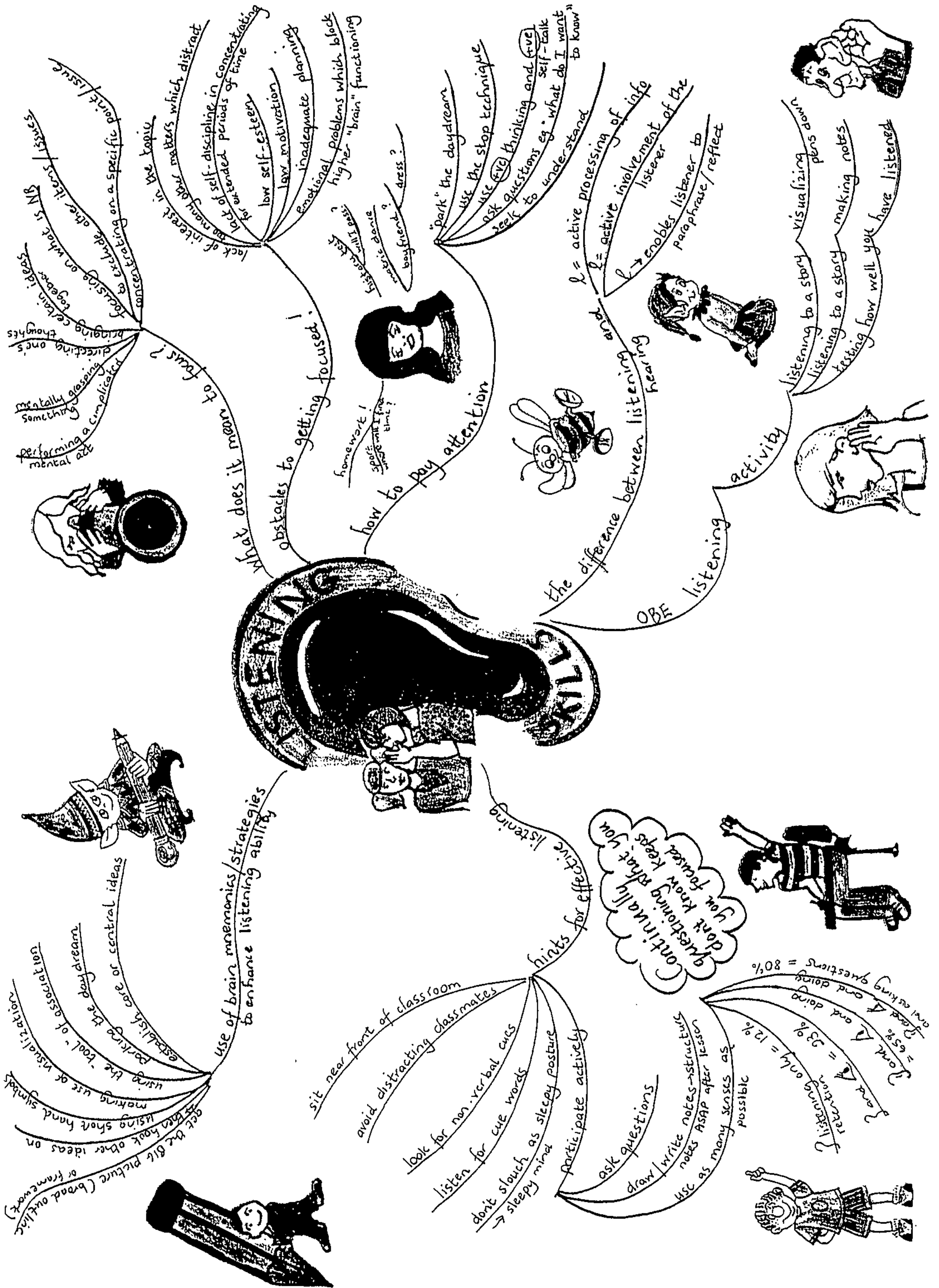
## ***Learner Outcomes***

- ***To create awareness of the importance of visualization.***
- ***Create awareness of the need to effectively store information.***
- ***To teach effective listening techniques.***
- ***To create awareness of the need for understanding.***

## ***Activities***

- ***Listening exercises, using visualization, association and note-taking skills to facilitate effective comprehension.***

# LISTENING SKILLS





# Lionel's Listening Skills

- ◆ *Listen with your whole body – use all your senses and muscles , so sit up straight and pull your buttocks tight!*
- ◆ *Focus with the lens of your mind – ignore all distractions.*
- ◆ *Park the daydream.*
- ◆ *Keep an eye on the clock - time your concentration span and work on improving.*
- ◆ *Listen for clues.*
- ◆ *Ask questions.*
- ◆ *Set goals – this helps you keep focused!*



# ***Reading Techniques***

## ***Learner Outcomes***

- ***To create awareness of importance of visualization.***
- ***Create awareness of the need to effectively process information for future retrieval.***
- ***To teach effective comprehension techniques.***
- ***To create awareness of the need for understanding.***
- ***To teach skimming, scanning and speed reading techniques.***
- ***To nurture a love for reading.***

## ***Activities***

- ***Reading exercises, using skimming, scanning, visualization and speed reading strategies.***

# READING TECHNIQUES

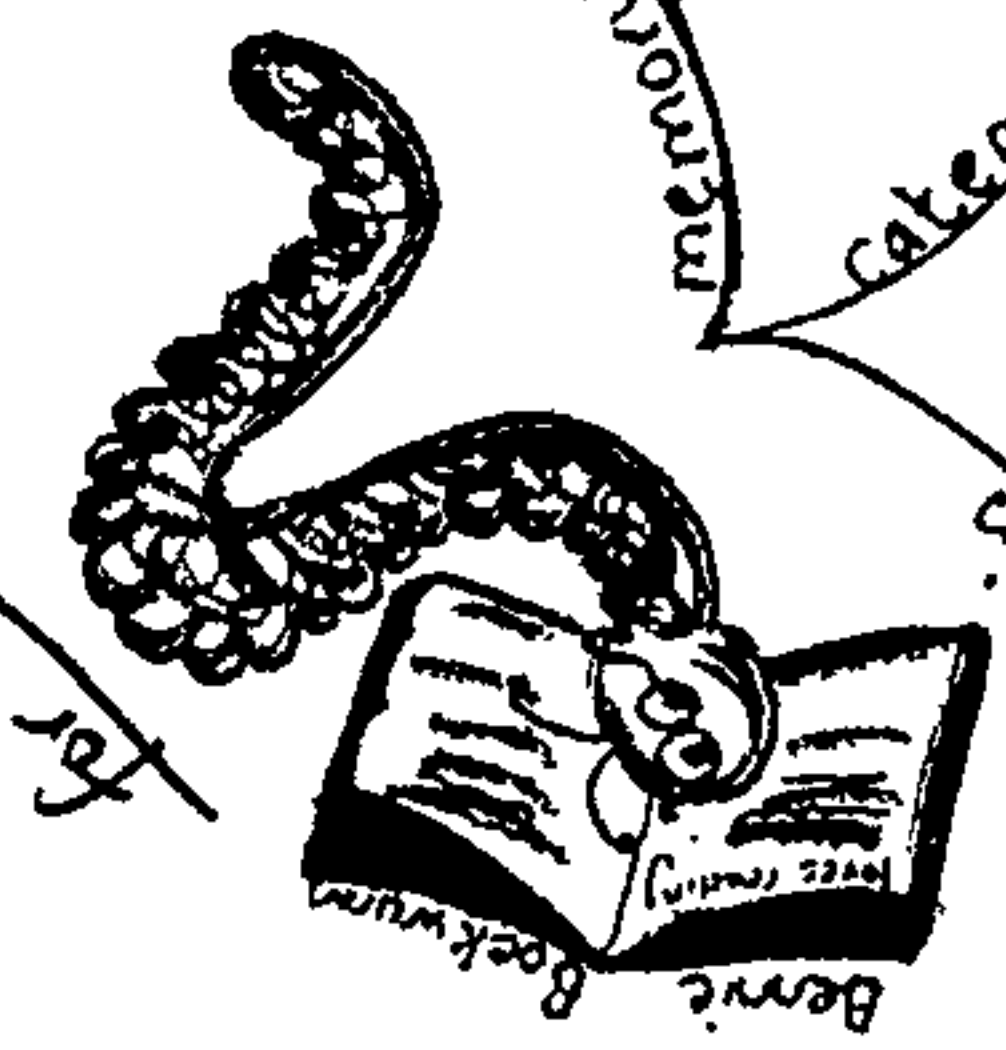


mark off pages  
time yourself  
read chunks  
use guides on  
try + improve on  
time

Speed reading exercises  
to improve reading rate

different reading speeds for  
diff. needs

for instruction  
for pleasure  
for studying for info



Visualization  
all senses  
colour  
movement  
exaggerate  
use n.

category



memory strategies to enhance encoding of  
material being read

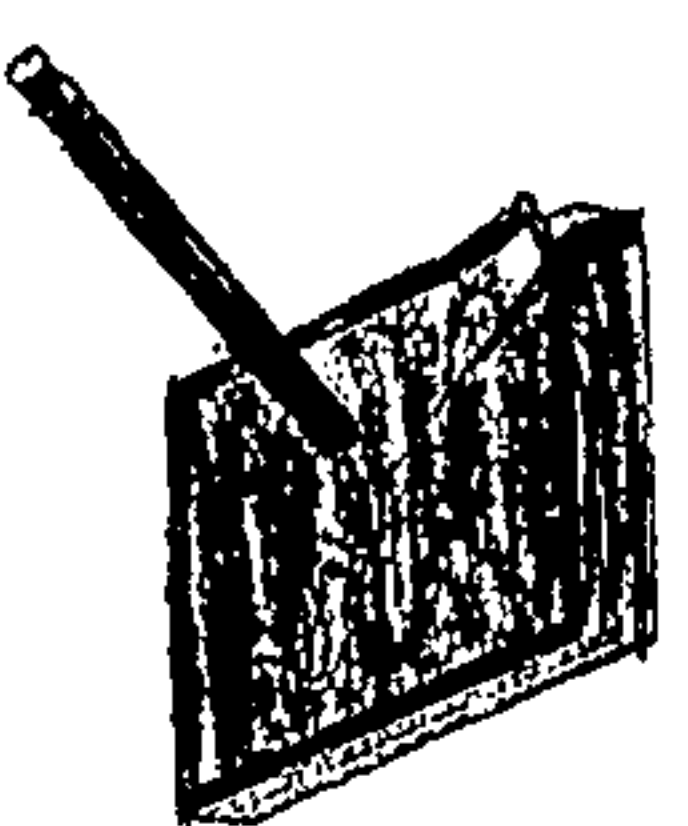
comprehension skills



visualize

let the  
story  
come  
alive

read passage again  
underline relevant  
over questions in  
all sentences  
skim passage  
read questions list



(i) Skimming

gives general idea  
how to skim  
write down info you  
have already acquired  
move finger in S shape  
from top of page  
until reach  
bottom  
end  
chapter

(ii) read conclusion then introduction

how much more do you  
now know?

(iii) scanning



processing info

OBE activities

SQR

?



Survey  
Question  
Read

skim  
scan  
for pleasure  
for instructions  
for understanding  
highlight or  
underline  
put down few words



(i) eye exercises  
(ii) finding out your  
reading speed level  
(iii) finding out your  
level of comprehension  
both  
(ii) and (iii)  
how to improve both



# Ronny's Rules for Reading

- ◆ *Determine purpose of reading.*
- ◆ *Ask questions while reading.*
- ◆ *Stop and recall briefly what you have read.*
- ◆ *Use your finger to do the 'walking through the pages'*
  - focus attention*
  - keeps both eyes focused on same spot*
  - prevents slow reading*
- ◆ *When reading for understanding, underline important words and jot down keywords.*
- ◆ *Don't read aloud – this is like reading with a handbrake on.*
- ◆ *Set small reading goals each day to increase your speed*
  - eg., 10 pages per day*
  - or...10 minutes of reading*
  - and recording the number of pages read.*
- ◆ *Don't forget to practise your eye exercises.*



# Scanning



Scanning  
Stan



- ◆ Stan's purpose is look for a specific piece of information.
- ◆ This means that when it is found, Scanning Stan says "I *can* stop!"
- ◆ Scanning provides answers to specific questions.
- ◆ Scanning entails moving your finger down the page vertically.

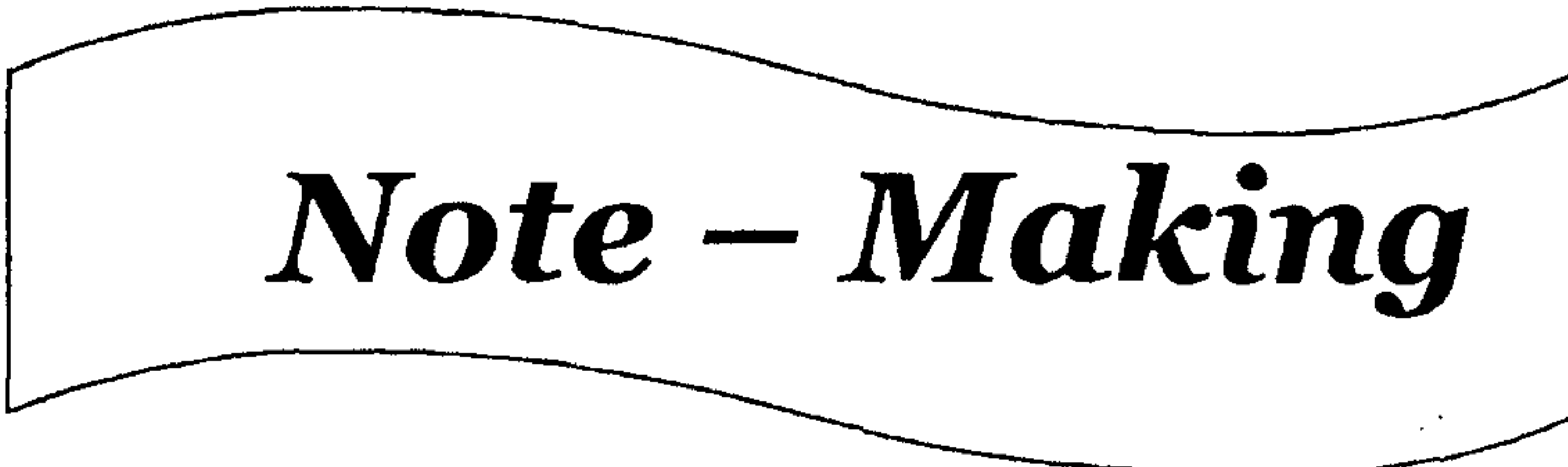
# Skimming

Skimming  
Kim



- ◆ The purpose of skimming is to get an overall view.
- ◆ This then provides the basic structure/ skeleton onto which further information can be hooked.
- ◆ Skimming is like a fish swimming over the surface of a pond.
- ◆ Use your forefinger and make an S' shape over each page, moving quickly and smoothly until the whole article has been skimmed.
- ◆ After skimming, read the conclusion to broaden your overview.





## ***Note – Making***

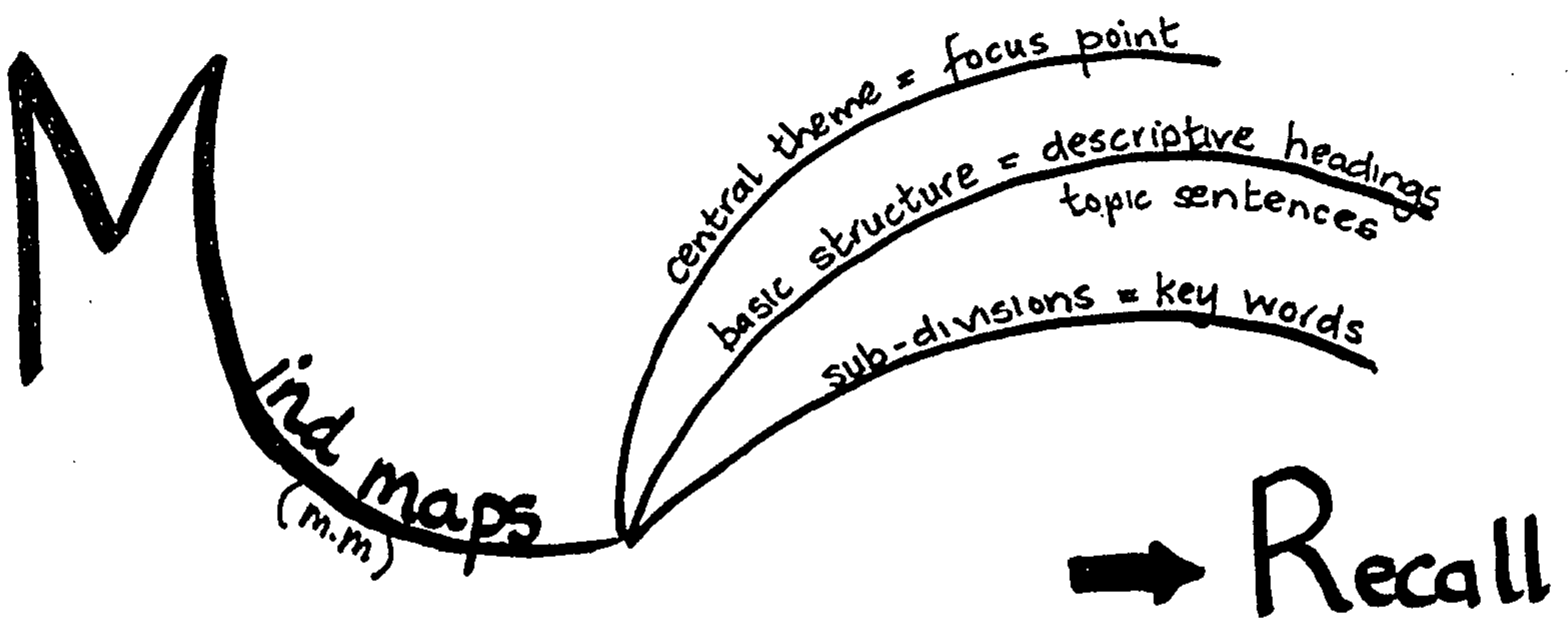
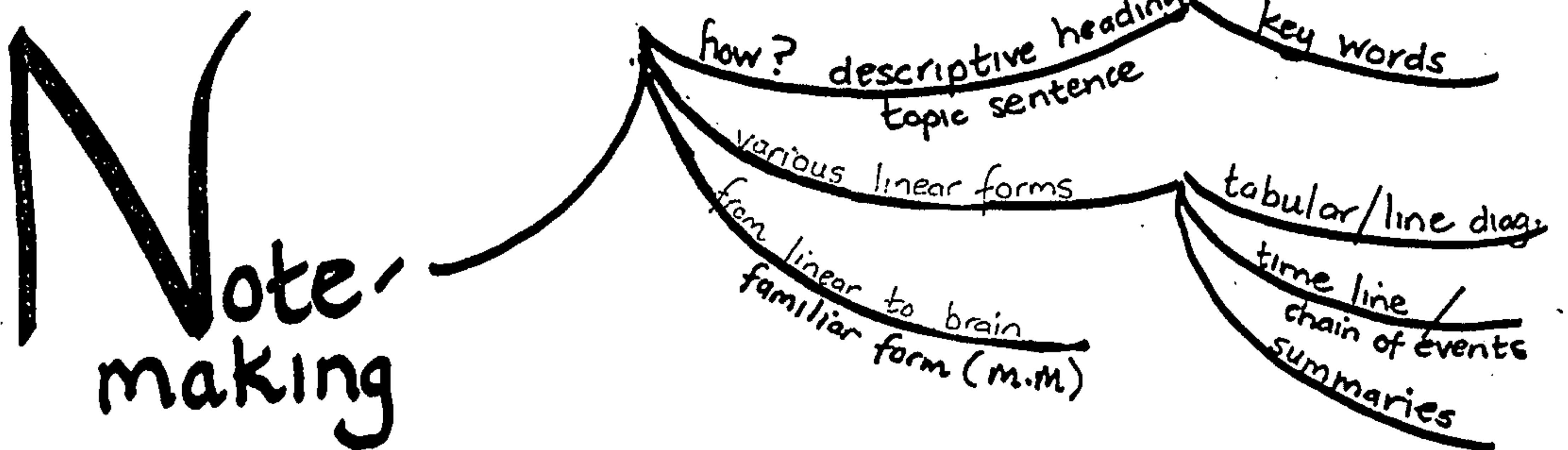
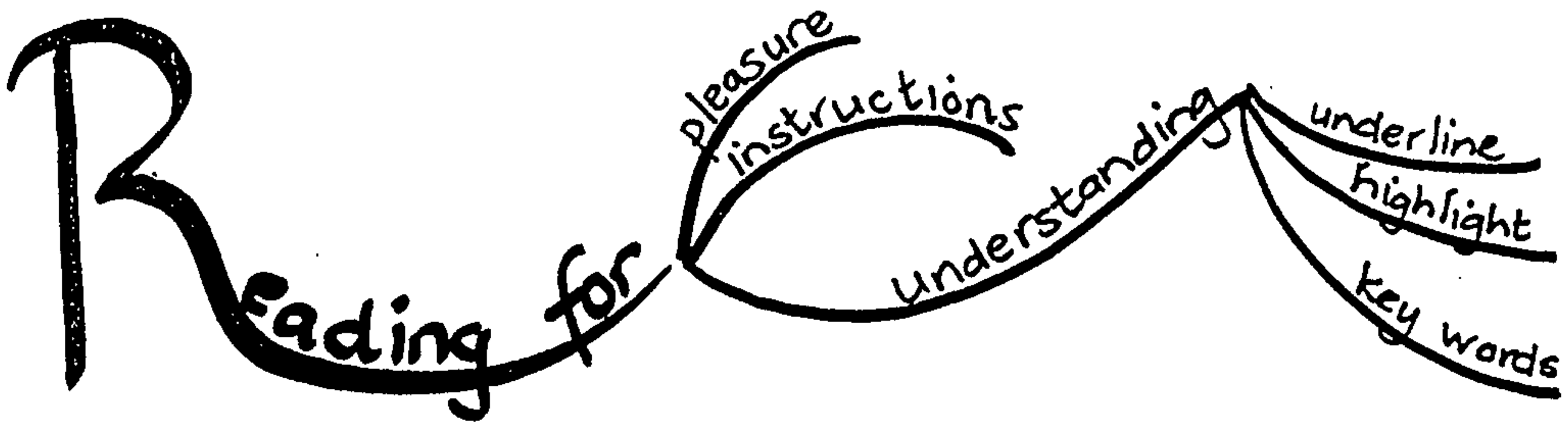
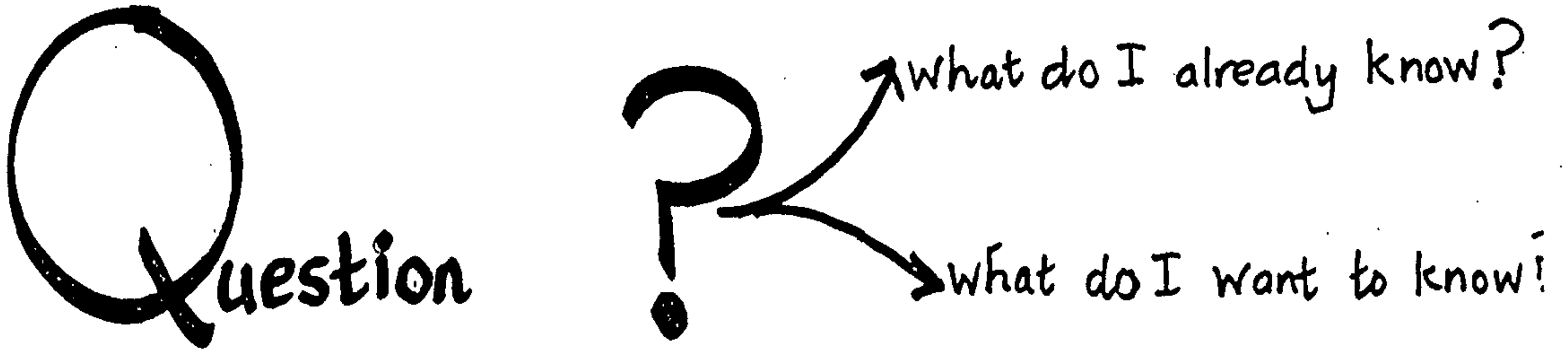
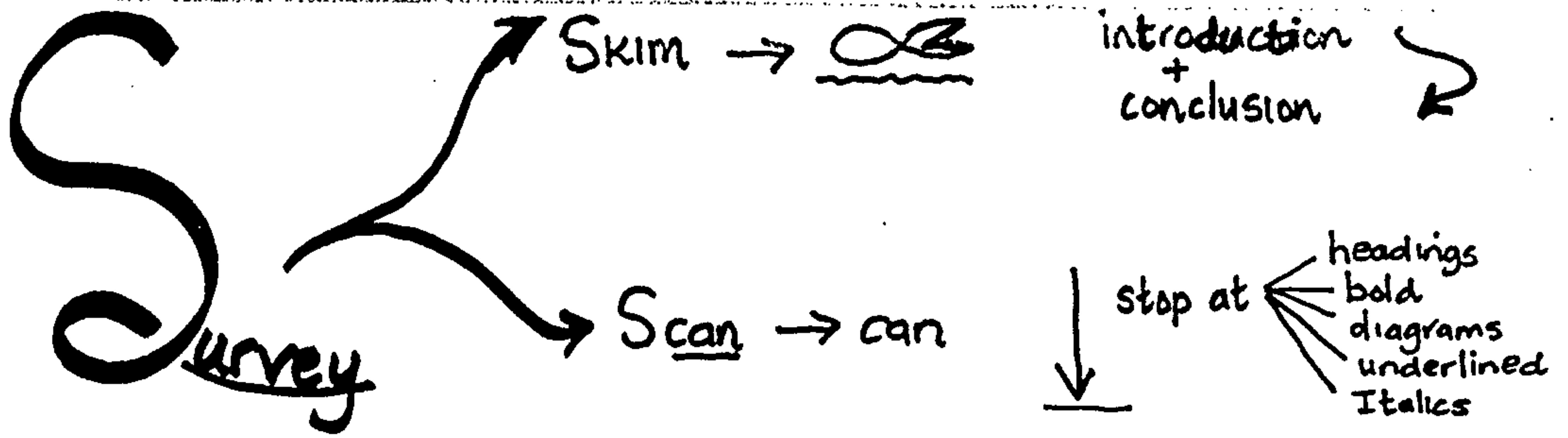
### ***Learner Outcomes***

- ***To teach skimming, scanning and information processing techniques.***
- ***Create awareness of importance of visualization.***
- ***Create awareness of the need to classify and categorize for effective retrieval.***
- ***To teach different note-making strategies for different work sections.***

### ***Activities***

- ***Pupils to apply a choice of note-making methods to a section of their own work.***



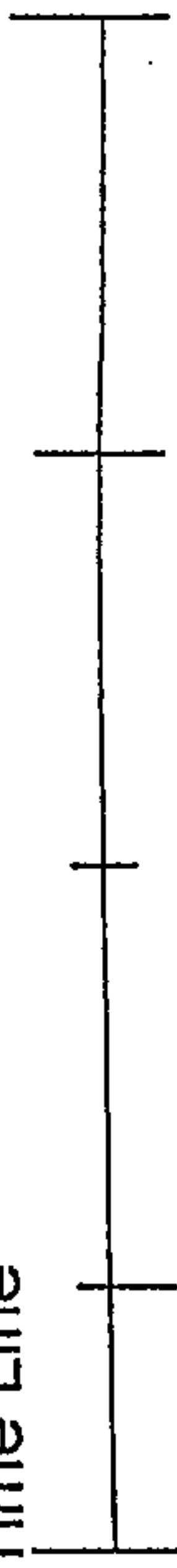




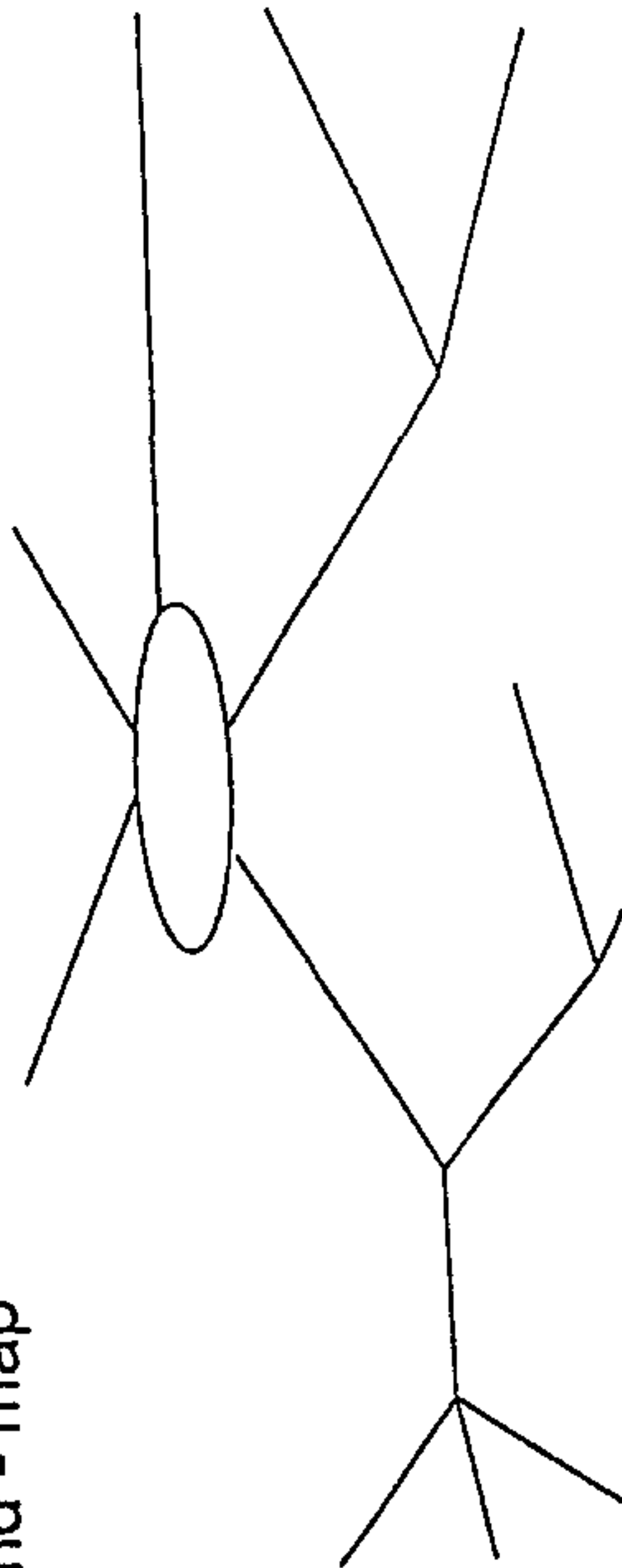
# NOTE-MAKING METHODS

## Note-making Methods

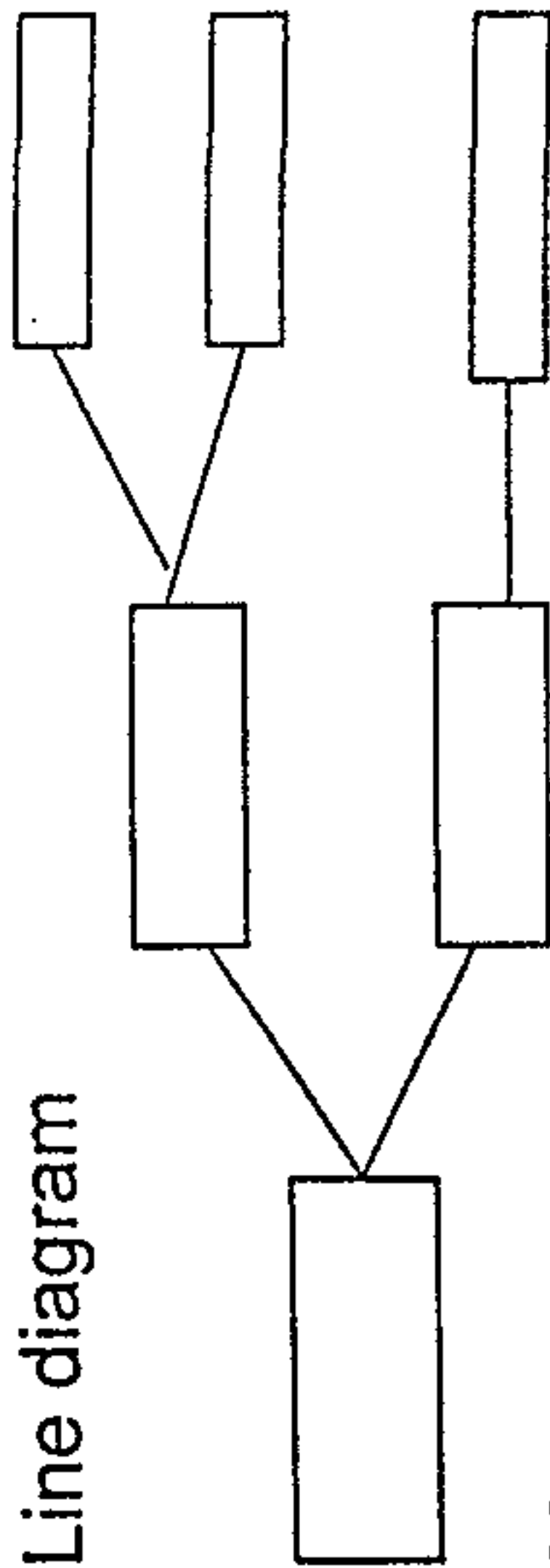
1. Time Line



2. Mind - map



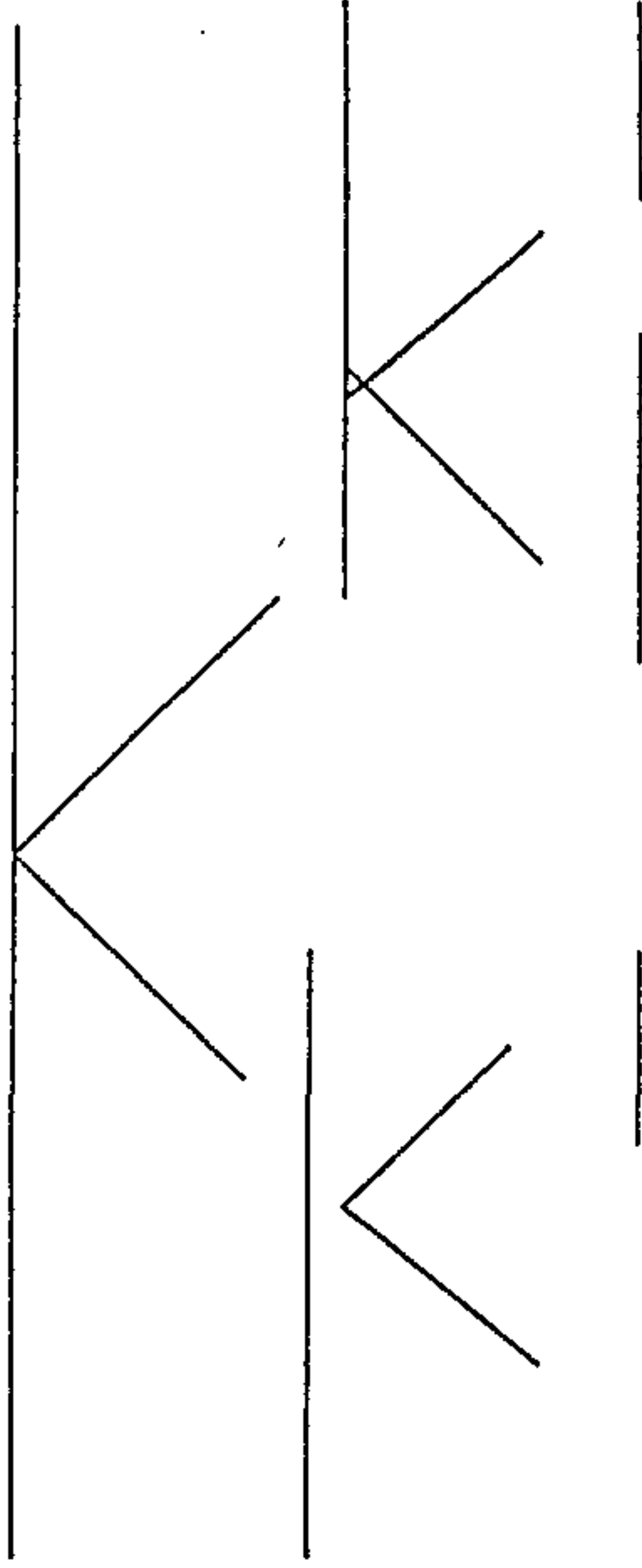
3. Line diagram



4. Maps

5. Diagrams

6. Chain of Events



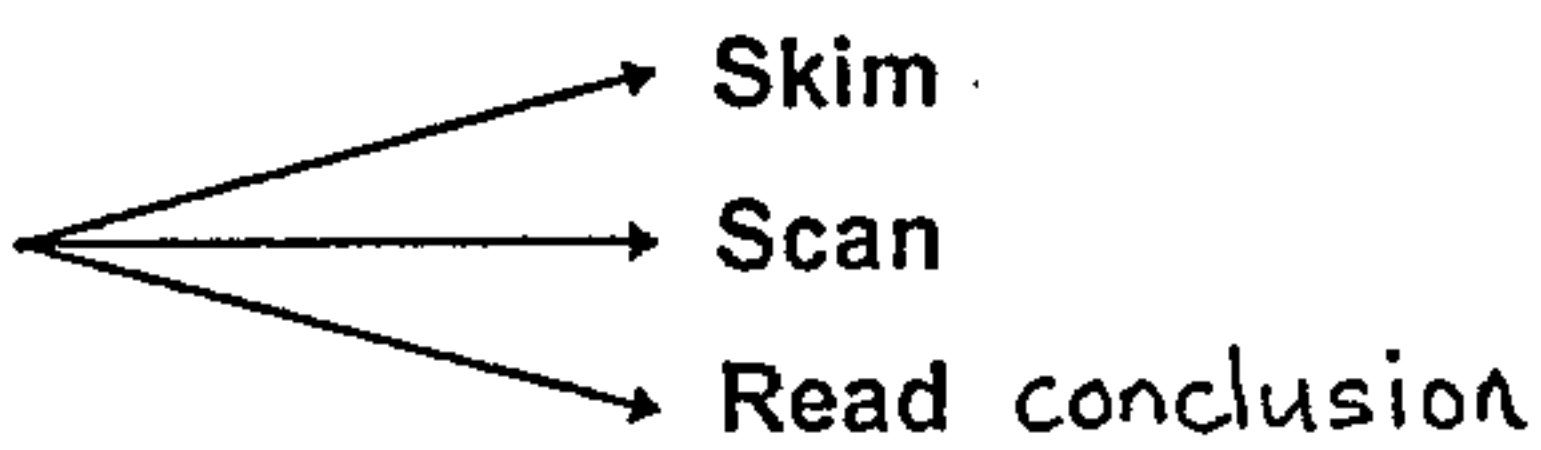
7. Summaries

Keywords	Main Notes

8. Tables

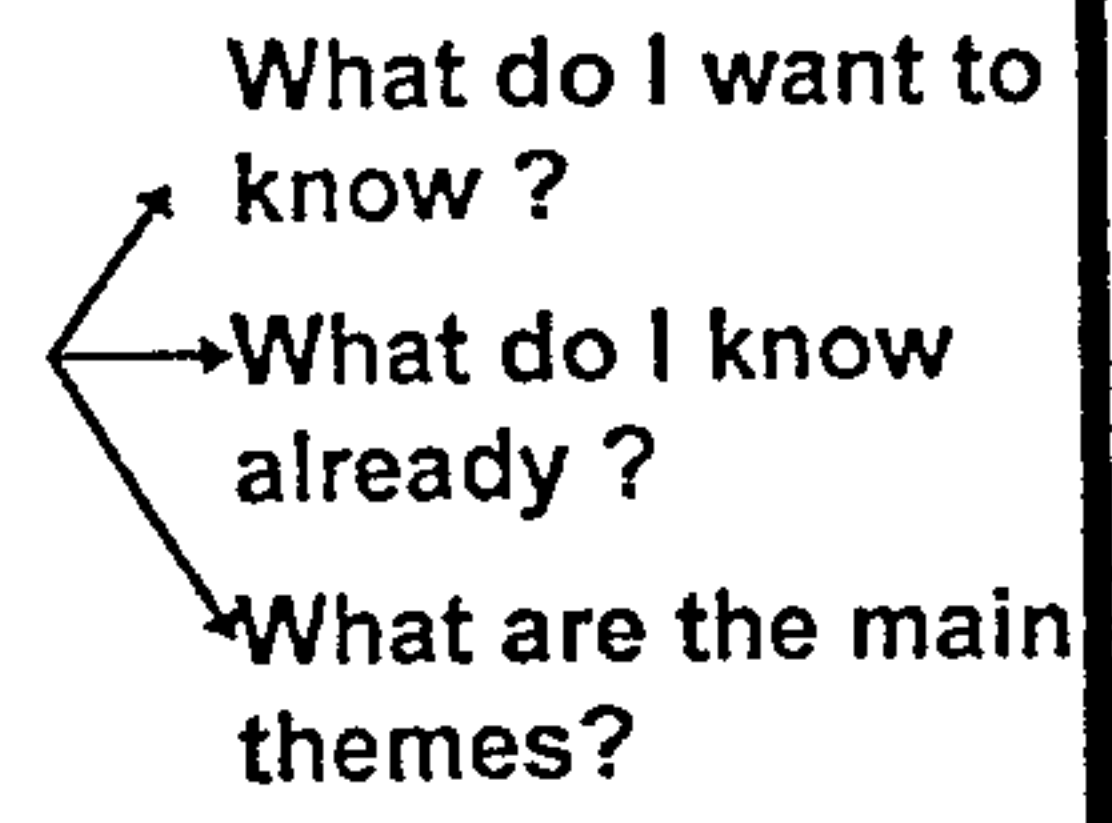
Sandy Soil	Loose soil	Clayey soil

# NOTE MAKING EXERCISE

1. Survey 

2. My impression

3. Ask questions before you start



4. Read for understanding  
(Start with the introduction)

5. Write own notes

- (i) determine the topic of discussion in each paragraph, give each paragraph a title (descriptive headings / topic sentence)

(ii)

KEYWORDS	DESCRIPTIVE TOPIC SENTENCE HEADING

In left column write down relevant keywords (i.e. keyword extraction)

(iii) group paragraphs together  
(categorize them) where & if necessary)

(iv) now make a linear summary of the chapter  
/ article

### HEADING = MAIN THEME

1. SUB-THEME = d.h (descriptive heading) / t.s. (topic sentence)

a) Sub-heading

- (i) Keywords (k.w)
- (ii) k.w
- (iii) k.w

b) Sub-heading

- (i) k.w
- (ii) k.w
- (iii) k.w

c) Sub-heading

- (i) k.w
- (ii) k.w
- (iii) k.w

2. SUB-THEME

a) Sub-heading

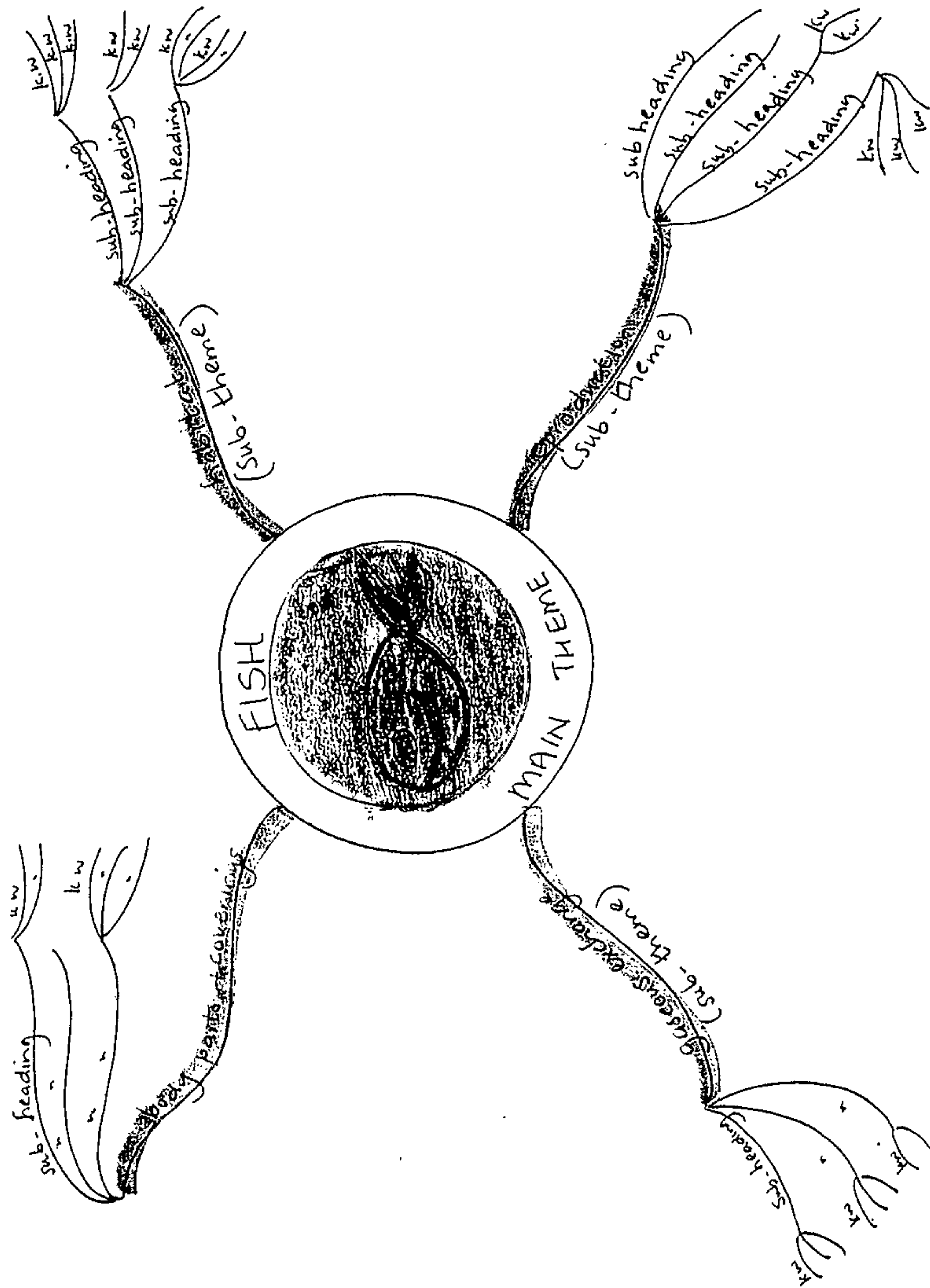
- (i) k.w
- (ii) k.w
- (iii) k.w

b) Sub-heading

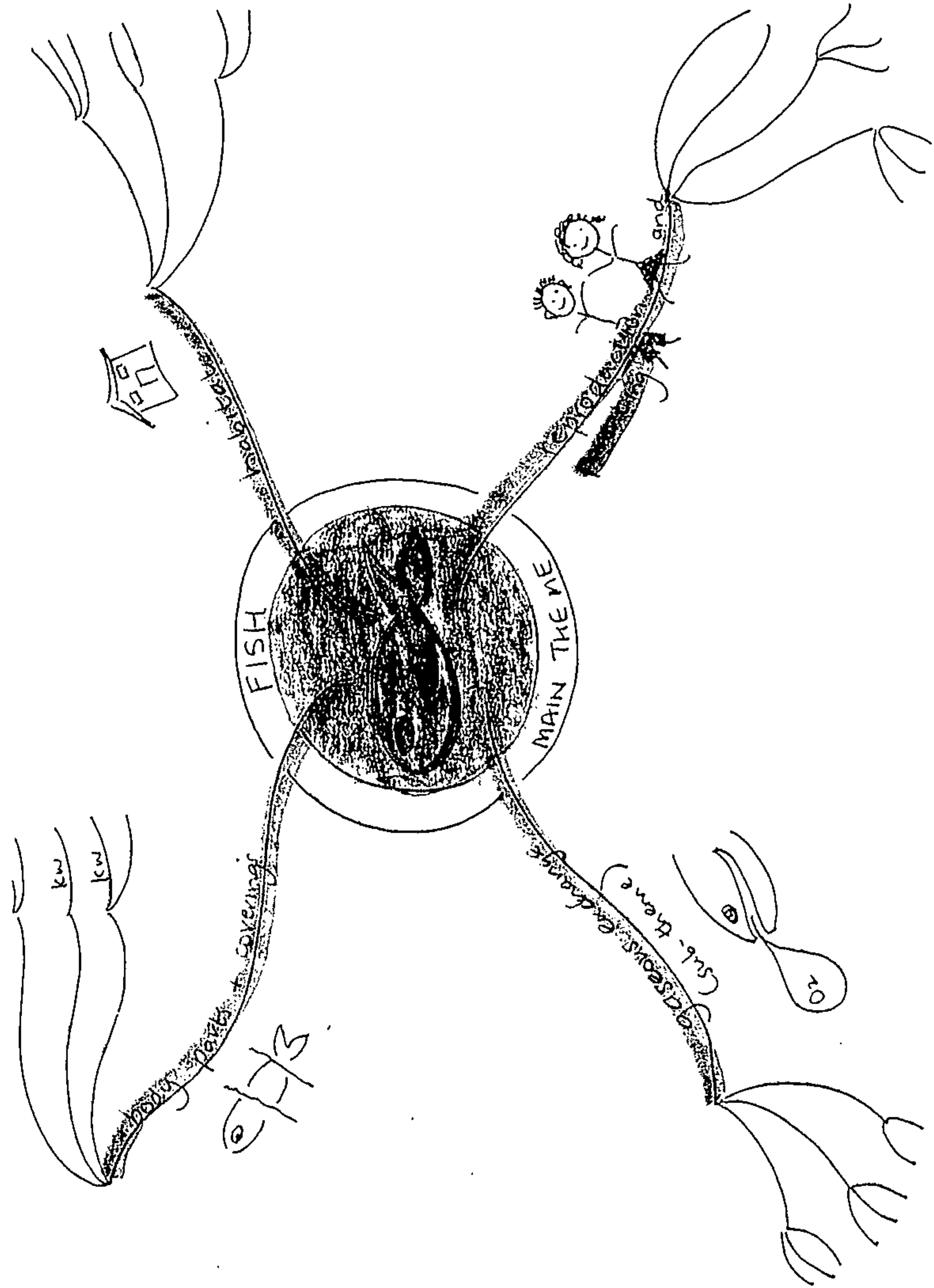
- (i) k.w
- (ii) k.w
- (iii) k.w



(v) Convert your linear summary into a mind-map.



(vi) Now make this mind map visual - use your imagination, exaggerate, use colours, visualize (using all L and R senses & draw diagrams / pictures to represent the facts)



(vii) Use memory strategies to encode this material in your brain *for example:-*

- ① acronyms
- ② number sound system
- ③ Use a diagram & label the parts & state functions as a means of encoding the material in your brain.





## ***Exam Planning***

### ***Learner Outcomes***

- ***To teach effective memory strategies.***
- ***Importance of time-management and planning.***
- ***Awareness of the need to prioritize.***
- ***Realization of different learning strategies for different work sections.***

### ***Activities***

- ***Pupils to formulate their own study plan.***
- ***Pupils to formulate work agendas with peers.***



# Elna's Exam Planning Approaches

- ◆ Don't panic – everything is safely stored in your brain.
- ◆ Reduce anxiety before the exam.
- ◆ Think before you ink!
- ◆ Read exam questions carefully.
- ◆ Do the easy questions first.
- ◆ After the exam – relax!



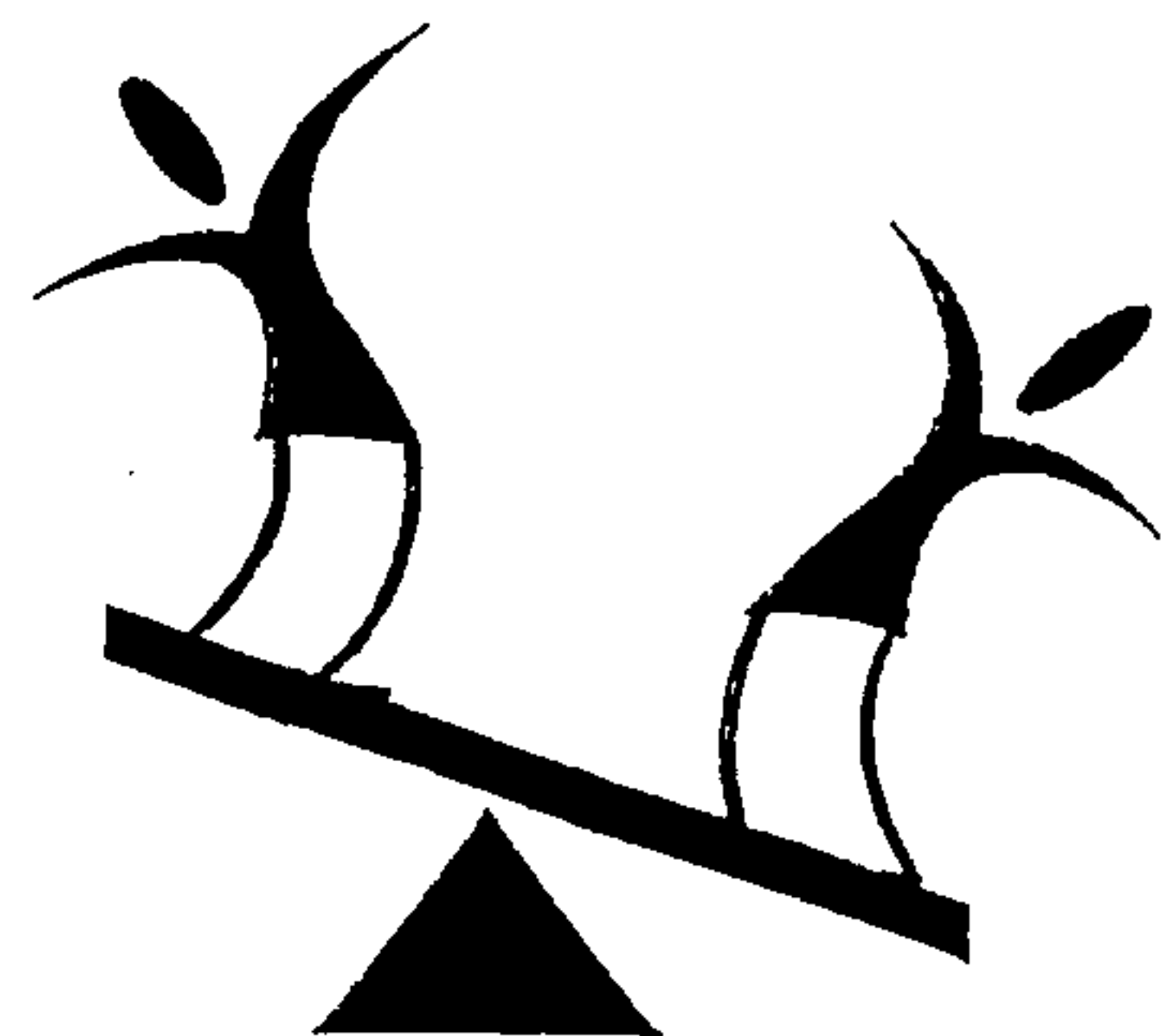
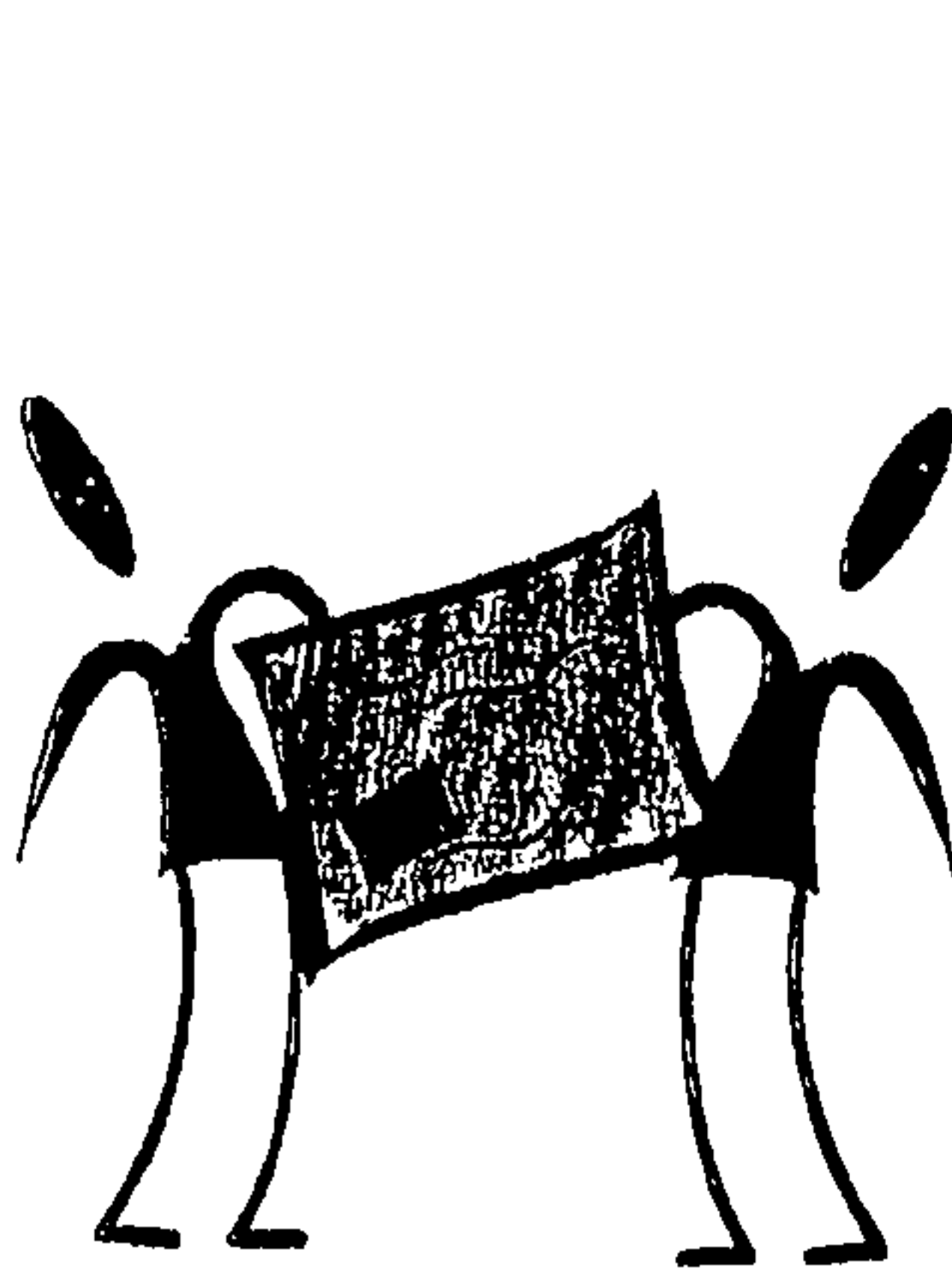




## *Plan of Action*



- . Don't fall behind*
- . Work consistently*
- . Make sure that you understand or ask.*
- . Don't put off until tomorrow what you are able to do today.*
- . Don't give up. You can do it!*
- . Live a healthy balanced life.*



# My Mission Statement

Lined area for writing a mission statement.



## **CHAPTER 5**

### **RESEARCH DESIGN**

#### **5.1 INTRODUCTION**

This chapter will focus on the research methodology followed in the investigation. The problem statement, purpose and aim of the study will be presented, followed by a discussion on the research design and sampling method. An overview of the measuring instruments and proposed statistical approach will also be presented.

The purpose of this research is to determine the efficacy of the educational, neuropsychological learning programme in the assistance of learners, in their development towards self-actualization. Self-actualisation is operationalised in terms of the instruments used, namely Adolescent Self-Concept Scale (ASCS), Values Scale (VS) and Survey of Study Habits and Attitudes (SSHA).

#### **5.2 DESCRIPTION OF THE EMPIRICAL STUDY**

The research is aimed at investigating whether a learning programme aimed at unlocking the potential of learners through neuropsychological educational methods, will result in the overall enhancement of the attributes a) self-concept, b) values and c) study habits and attitudes. This will be investigated through the administration of pre-tests and post-tests aimed at measuring self-concept, values and study habits and attitudes. The learning programme (intervention), implemented in three treatment/experimental groups will be evaluated when these groups are compared to the two comparison/control groups not exposed to the programme. A quantitative analysis procedure will be used to determine the effectiveness of the programme, in terms of values, study habits and attitudes, and self-concept.



### 5.2.1 Aim of the empirical study

The aim of the study is to investigate whether the learning programme administered to a group of Grade 7 learners, at a middle socio-economic class school, will result in enhanced self-concept, values and greater awareness in terms of study habits and attitudes. The specific aims in terms of the research design, would include the testing of the validity of a learning programme aimed at unlocking the potential of learners through neuropsychological educational methods, by pre-tests and post-tests measuring study habits and attitude, value, and self-concept as constructs of self-actualization.

### 5.2.2 Selection of the sample group

One hundred and twenty three learners from Freeway Park Primary School, a mixed cultural and gender school participated in the study. This is a large, middle socio-economic status school with 840 learners. Learners were divided into three treatment groups and two comparison groups. Logistical constraints arising from the need to work within the school system prevented the random assignment of learners to the groups. Demographic details of these two groups demonstrate that they are relatively equivalent.

The process of sampling is illustrated as follows:

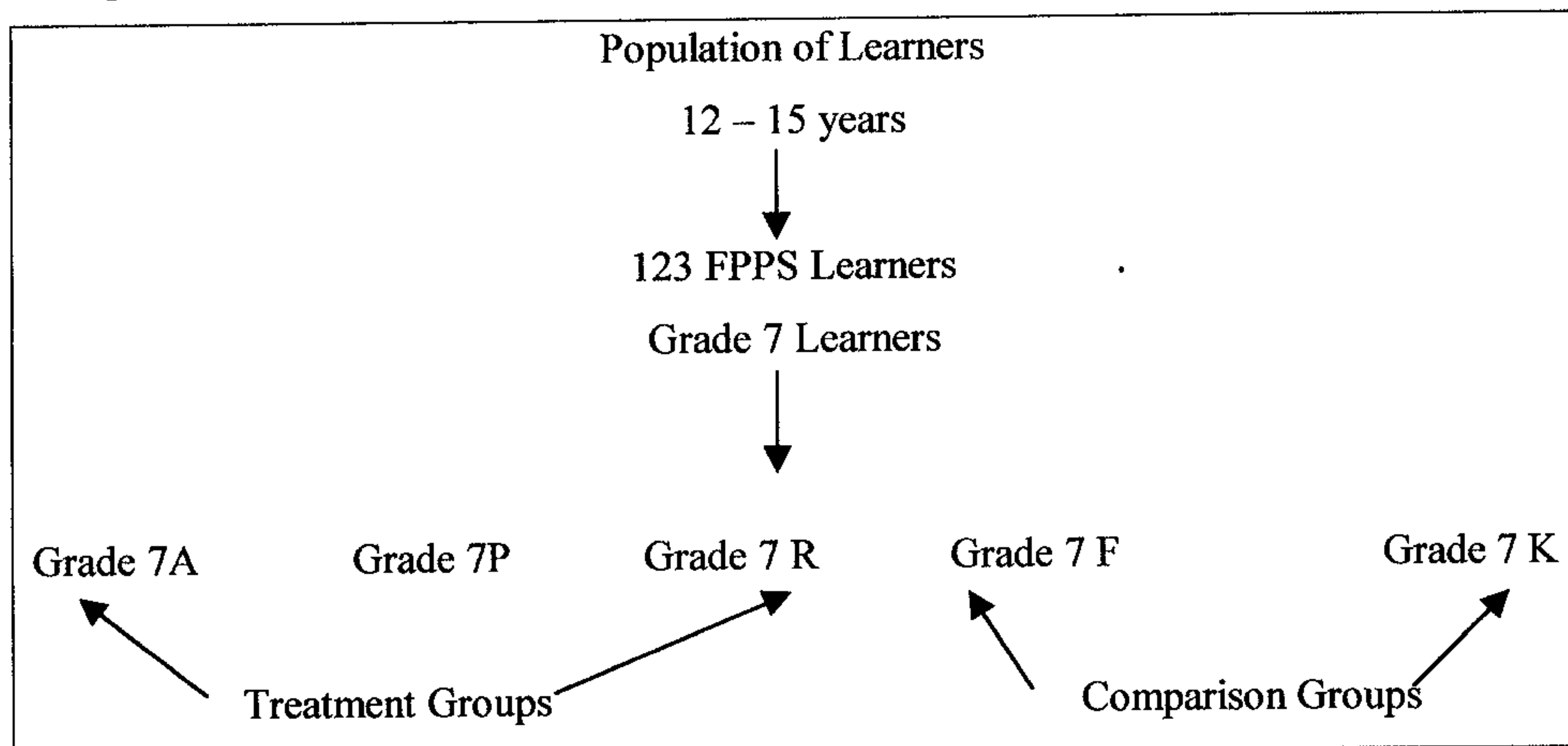


FIGURE 5.1 *Process of sampling*

TABLE 5.1 *Demographic details of participants*

<b>Age of Learners</b>	<b>Treatment Group</b>	<b>Comparison Group</b>
12 years	49%	46%
13 years	42%	47%
14 years	9%	6%
15 years		1%
<b>Gender</b>	<b>Treatment Group</b>	<b>Comparison Group</b>
<b>Female</b>	53%	50%
<b>Male</b>	47%	50%

Most learners in both groups were home language English speakers and English second language speakers. Other languages represented in both samples include Afrikaans, Sotho, Zulu and Xhosa.

### **5.2.3 Instruments implemented during research**

Before evaluating the measuring instruments intended for the sample of respondents, it is necessary to describe the instruments with which subjects were evaluated.

#### **5.2.3.1 Adolescent Self Concept Scale (ASCS) (Vrey & Venter 1983).**

##### **5.2.3.1.1 Background to the test**

Individuals must form a great number of conceptions about themselves in order to know themselves in all facets of their self-manifestation, including physical and psychological abilities and powers. Knowledge about a person's self-concept has practical value, since there is evidence that it relates to personality disorders and behavioural problems. Research has shown that people all over the world have been focusing on the child who is engaged in self-actualization. The self-concept test has been designed and standardized to satisfy this need to some extent.

The self-concept is of critical importance for a person, both in his psychological existence and in his coexistence with others. The self-concept, as a frame of reference, as a basis for evaluation and, as a method of associating with others, underlines the attitudinal aspect, namely its inclination towards patterns of actions and behaviour. The self-concept is the criterion, which is consulted, either consciously or unconsciously, in self-perception and in psychological experiences and also in the formation of relationships (Vrey & Venter 1983:1).

The quality of the individual's experience of self-respect and self-esteem in each of the relationships, both separately and jointly, indicates how he perceives himself. "Apart from the cognitive aspect, emotion, which indicates the quality of experience, will always enter into it. In all his actions man is explicitly or implicitly engaged in self-maintenance and self-development" (Vrey & Venter 1983: 3). In other words, the conative aspect of human nature - one's conscious sense of purpose - contributes to the self-concept. The self-concept refers to the configuration of convictions about oneself and to attitudes towards oneself, which are dynamic, and of which one is conscious (Vrey & Venter 1983:2). This implies that the total person is involved in the dynamic development of his self-concept. Therefore the self-concept is regarded as an aspect of personality as described in chapters one and two.

The background of this questionnaire describes how self-concept presupposes a conscious understanding of the self. That of which a person is or can be made conscious can be regarded as the dimensions of the self-concept. The dimensions, in turn, constitute the structure of the self-concept. The structure consists of the following constructs:

- the physical self, in other words the self in relation to physical aspects;
- the personal self, in other words the self in its own psychological relationship;
- the family self, in other words the self in family relationship;
- the social self, in other words the self in social relationships;
- the moral-ethical self, or the self in the relation to moral and religious norms;
- self-criticism (Vrey & Venter 1983:3).



Each dimension of the self-concept scale is compiled in terms of self-identity, acceptance of self, with which one has identified, and one's perception of one's behaviour or personal conduct. As opposed to the possibility of theoretical identification and acceptance, one's actions or behaviour as one personally perceives it, must endorse one's identification and acceptance (Vrey & Venter 1983:3).

The dimensions of the self-concept scale are:

- I. Physical self - identity, acceptance and behaviour
- II. Personal self - identity, acceptance and behaviour
- III. The self in relation to family and relatives - identity, acceptance and behaviour
- IV. The self in relation to social community - identity, acceptance and behaviour
- V. The self in relation to values - identity, acceptance and behaviour
- VI. Self criticism - identity, acceptance and behaviour

Items of the self-concept test include:

*Dimension 1: Relations with one's physical condition – physical self.*

- a) Identity - testees with a positive self-concept must identify with someone who is in the peak of health, attractive and neat.
- b) Acceptance - testees must indicate how satisfied they are to accept their appearance, height, physical parts, health and attractiveness to the opposite sex. Acceptance of these factors indicates a positive self-concept.
- c) Behaviour - actions in which people engaged may be typical of someone with either high or low self-esteem. Self-esteem is reflected in what people do and how they do it, for instance physical care, demanding work, public appearance and the pleasure derived from the performance of tasks. High self-esteem is also reflected in acts not impaired by anxiety, nervousness and clumsiness. If these characteristics do occur, they reflect a lack of self-confidence and indicate how one may regard oneself as inefficient or ineffectual; in other words, having a low self-concept. Six items have been compiled on every aspect of the physical self.

*Dimension II: Relation with one's psychological condition-person self.*

- a) Identity - people who regard themselves as adequate are cheerful, calm and composed, and they see themselves as the equal of others. They do not lose self-control or feel inferior.
- b) Acceptance - people with high self-esteems are satisfied with themselves and are pleasant towards others.
- c) Behaviour - people with high self-esteems act in such ways that they preserve their self-image. They consider possible consequences before acting. They are satisfied with their achievements, are able to maintain themselves, stand by their convictions, and make rapid decisions.

*Dimension III: Relations with one's family-family self.*

- a) Identity - people with positive self-concepts will have relations with their family and relatives, which indicate that they are accepted and supported by their family. They are sure of their family's affection, are happy and are held in high esteem by members of the family.
- b) Acceptance - people's self-esteems are revealed in their relationships with their family and relatives. They are proud of them all and there is little misunderstanding among them. They desire association and look forward to family get-togethers. Acceptance of their relationships with members of their family indicates that they are satisfied with the mutual affection among them.
- c) Behaviour - The relationships between people determine their mutual behaviour. Sound relationships resulting from a positive self-concept will be manifested in their behaviour. They are fair and just towards members of their family and will do nothing to harm them.

*Dimension IV: Relations with others in the social community – social self.*

- a) Identity – expanding relationships, starting with family and relatives, also involve the social community. Individuals with high self-esteem are pleasant towards others and popular among friends of both sexes. Others find it easy to befriend them and they are interested in others and in their activities.

- b) Acceptance - accepting the relationships with others gives rise to courtesy and sociability in the company of others. Such people are really reserved or self-conscious, but are popular and helpful.
- c) Behaviour - activities relating to high self-esteem include those indicating ease in forming friendships, getting along with others, and entering a conversation. Such people will easily forgive people and are quick to recognize their good qualities.

*Dimension V: Relationship to moral and religious values-moral-ethical self.*

- a) Identity - people with high positive self-concepts identify positively with moral and religious values. They are honest, religious and irreproachable.
- b) Acceptance - the acceptance of moral and religious values gives rise to contented acquiescence in the knowledge that virtues such as honesty, faithfulness and truth are being actualized. Such a person accepts the responsibility for others who need help.
- c) Behaviour - positive identification with values leads to corresponding modes of behaviour. In the light of one's convictions about right and wrong, one changes behaviour accordingly.

*Dimension VI: Self-Criticism*

Although statements about a person may be somewhat derogatory, most people in the present cultural society are guilty of them to a certain extent. The person who has no need to protect their self-image at all costs will not hesitate to acknowledge the fact if they are guilty. The following phenomena are mentioned: becoming annoyed, irritability, gossiping, having nasty thoughts, frustration, competing merely for the sake of winning, procrastinating a job, questionable jokes, the fact that one does not like everyone and the violation of laws, for instance failing to stop at a stop sign. It is assumed that someone with a realistic and high positive self-concept will be critical of themselves and respond accordingly.

The responses to the items distinguish between positive and negative self-concepts. A positive self-concept consists of a positive or favourable evaluation of the self in relation to certain values. The total score will refer to high, medium or low self-concepts (Vrey & Venter 1983:3-7).



#### 5.2.3.1.2 *Reliability of the ASCS*

Guilford (Vrey & Venter 1983:3-12), says: “ under the concept of reliability we are concerned about the accuracy with which a score represents the status of an individual in whatever aspect the test measures him.” He deduces that reality is the true variance ratio of the test results obtained.

All circumstances not connected with the object of the test contribute not connected with the object of the test contribute to error variance. Error variance is reduced and reliability increases by taking precautions to ensure uniformity of test tester and testee, etc. Even though the test conditions are carefully controlled no test is ever a completely reliable measuring instrument (Vrey & Venter 1983:3-12).

The most common method of calculating reliability is the Kuder-Richardson method for which only one test administration is necessary. It is based on the consistency of testee's responses to all items of the test. The reliability of the test as a whole and of the subtests is calculated according to the Kuder-Richardson formula 20 (see table 5.2 below).

#### 5.2.3.1.3 *Validity of the ASCS*

The validity of a test is the extent to which it measures the dimensions for which it was designed. Construct validity is the extent to which a test is based on a specific theory. The validity of such a test is usually established by calculating the correlation between these test scores and those on other tests of which the construct validity has been proved. In determining the construct validity of the self-concept test, the scores cannot be correlated with those of another self-concept test since no such test exists. Therefore one has to rely on the calculation of internal consistency. The internal consistency of this self-concept test is determined by calculating the point biserial correlation between each item score and the total test score and shows the following results:

TABLE 5.2 *Psychometric features of the self-concept test*

Source: Vrey & Venter (1983:14)

	<i>Max score</i>	<i>Average Score</i>	<i>Standard Deviation</i>	<i>Reliability K-R20</i>	<i>Average PJ</i>	<i>Average Reliability Index Ave. RXSJ</i>
Full SC test	92	70.7	10.5	0.850	0.707	0.104
Subtest A	18	12.6	2.7	0.624	0.702	0.150
Subtest B	18	12.6	3.1	0.704	0.702	0.174
Subtest C	18	14.4	2.9	0.748	0.798	0.161
Subtest D	18	12.7	3.6	0.778	0.704	0.198
Subtest E	18	12.3	2.9	0.672	0.682	0.158
Subtest F	10	6.1	2.1	0.563	0.610	0.210

From the table it is noted that all the correlations are highly significant. For significance at the 0.01 level,  $R=0.172$  (0.05 is  $R=0.148$ ). In studying this matrix it is evident that all the subtests indicate a large common factor. If only one factor is being measured there is no sense in retaining different subtests. The specific variance ratio equals the reliability ratio minus the common variance ratio. The common variance is established by calculating the sum of the square of the loading in one row of a factor matrix. The difference between the reliability and the communality of each variable gives the specific variance of the variable.

Venter (Vrey & Venter 1983:23) standardized the self-concept test for English speakers. The raw scores were converted into the following stanines as listed in table 5.3:

TABLE 5.3 *Raw scores with corresponding stanines*

Source: Vrey & Venter (1983:23)

<i>Raw Scores</i>	<i>Stanines</i>	<i>Level of self-concept</i>
35-44	1	Low self-concept
45-48	2	
49-52	3	
53-58	4	Medium self-concept
59-68	5	
69-75	6	
76-80	7	High self-concept
81-83	8	
84-95	9	

### 5.2.3.2 *Values Scale (Langley, R., du Toit, R., & Herbst, D.L. 1996)*

#### 5.2.3.2.1 *Background*

The characteristics, which are measured by the value scale (VS), can be better described as needs. The value scale was developed to measure an individual's needs for each of the following: - ability, utilization, achievement, advancement, aesthetics, altruism, authority, autonomy, creativity, cultural identity, economic rewards, economic security, own life style, personal development, physical activities, physical prowess, prestige, risk, social interaction, social relations, spirituality, variety, and agreeable working conditions.

During adolescence individuals start to question existing values in order to arrive at an independent philosophy of life. At the same time, they also need to understand the relative importance of work in their own value system.



The standardised South African version of the value scale was developed by the HSRC in co-operation with the Work Importance Study (WIS). The objective of this collaborative effort was:

- a) to understand the needs that individuals experience and satisfy in various life roles
- b) to assess the relative importance of the work role as a means of needs satisfaction in the context of other life roles.

The VS provided acceptable psychometric characteristics for learners from the different education departments and the major language groups in South Africa. The statistical analyses of the VS included means, standard deviations, internal consistency, item scale correlations, interscale correlations and factor analysis. The most appropriate items for all the study groups concerned were retained. The 22 values, which were included in the VS, were regarded as scales and each of these consisted of five items.

#### 5.2.3.2.2 *The scales*

The scales are described in table 5.4 below:

TABLE 5.4 *The definition of the value scale and related needs*

<b><u>VALUE/NEED</u></b>	<b><u>DEFINITION</u></b>
<b>1. <i>Ability Utilization</i></b>	-the extent to which a person wishes, wants or needs -the opportunity to develop their talents and skills.
<b>2. <i>Achievement</i></b>	-the feeling that they have done something well.
<b>3. <i>Advancement</i></b>	-to progress in their career, to have a better standard of living, to live in a better environment and to have a better income.
<b>4. <i>Aesthetics</i></b>	-to enhance and enjoy the beauty of processes, products and surroundings, both natural and man-made.
<b>5. <i>Altruism</i></b>	-to help others and to be concerned about their welfare.

<b>6. Authority</b>	-to have an influence over others and to encourage them to follow a certain point of view or policy. It can be obtained through position, power, expertise, charisma or seniority.
<b>7. Autonomy</b>	-to make decisions and to carry out plans as sees fit; to have independence of action within their sphere.
<b>8. Creativity</b>	-to develop or make something original. This may be an object, writing, painting or other artwork, a new idea or an organizational innovation.
<b>9. Cultural identity</b>	-to have the freedom to conduct themselves in public and in private life according to the habits of their group
<b>10. Economic rewards</b>	-to maintain a high standard of living and to have the financial capacity to keep it up.
<b>11. Economic security</b>	-to have a stable income and to be assured of being able to survive difficult economic times.
<b>12. Own life style</b>	-to have the freedom to live their own life according to their own standards and values, which can be defined in different ways (e.g. conventional, Bohemian , intellectual, artistic, materialistic).
<b>13. Personal development</b>	-to develop and to have plans about what they want to do with their life.
<b>14. Physical activities</b>	-to be physically active and fit.
<b>15. Physical prowess</b>	-to follow an occupation which demands physical prowess.
<b>16. Prestige</b>	-social, economic or occupational status, which arouses respect, esteem and admiration.
<b>17. Risk</b>	-to enjoy the excitement of physical danger, financial gain or loss and other risks incurred in projects proposed, undertaken or carried out.

<b>18. Social interaction</b>	-as part of their work, to give attention to other people and to converse with them.
<b>19. Social relationships</b>	-to attach value to pleasant, friendly contact with the people with whom they associate in their work or in another sphere (e.g. home, recreation).
<b>20. Spirituality</b>	-to live according to religious principles.
<b>21. Variety</b>	-to have change and variety in what they do, whether tasks, processes or methods, i.e. a diversity of activities, location or people with whom they associate.
<b>22. Agreeable working</b>	-to work under pleasant circumstances (e.g. good lighting, conditions, comfortable space and temperature).

#### 5.2.3.2.3 Reliability

All the scales obtained reliability coefficients higher than 0,70 for the total sample, with 12 scales having a reliability coefficient of 0,80 or higher. The reliability coefficients of the VS can be regarded as being satisfactory if the questionnaire is used together with other relevant psychometric instruments in guidance practice.

#### 5.2.3.2.4 Validity

##### A. Content validity

The following procedure was used in compiling the questionnaire so as to ensure content validity beforehand:

- a) A literature study was undertaken on needs and lists of needs were compiled.
- b) The lists of needs so developed, were studied.
- c) The needs were placed in categories to prevent duplication and a representative value per category was identified.
- d) Definitions were compiled for the needs.



- e) Definitions were refined and rounded off during the discussions of project leaders and research workers.
- f) On the grounds of the last-mentioned definitions of these needs, items were compiled.

The item selection process included item scale correlations and factor analysis.

### B. Construct Validity

Construct validity is defined as the extent to which the test actually measures the theoretical construct (trait, characteristic), which it is supposed to measure. The ability of test scores to differentiate between different groups can provide support for the construct validity of an instrument. As a result of the large number of learners that were included in this study, a small numerical difference, which can also be statistically significant, was obtained.

A factor analysis of the VS items was performed on the pooled data of three subsamples (N=5 350). In order to form a better understanding of the constructs underlying the needs, a principal component analysis was performed. It resulted in six factors with eigenvalues greater than one. These factors explained 76,3% of the total variance.

According to a factor analysis of the VS items, the following needs can be associated with the six factors:

- *Inner-oriented needs* focus on intrinsic needs and include scales such as ability utilisation, economic security, personal development, advancement, achievement and to a certain extent own life style, pleasant working conditions, cultural identity, economic rewards and aesthetics
- *Material needs* focus on extrinsic needs and defined as prestige, economic rewards, authority and, to a certain extent, advancement, achievement and pleasant working conditions.
- *Autonomous life style* consists of autonomy, own life style, variety, creativity and risks.

- *Humanism and Religions* comprise altruism, spirituality, and to a certain extent, aesthetics.
- *Social needs* include social interaction, social relations, and, to a certain extent, cultural identity and pleasant working conditions.
- *Physical needs* are defined as physical prowess, physical activities and, to a certain extent, risk.

### **5.2.3.3 Survey of Study Habits and Attitude (SSHA)**

#### **5.2.3.3.1 Background**

English and English (Du Toit 1996:2) define *habit* as, “an acquired act, usually a relatively simple one, that is regularly and customarily manifested”, and *attitude* as, “an enduring, learned disposition to behave in a consistent way toward a given class of objects; a persistent mental and/or neural state of readiness to react to a certain object or class of objects, not as they are, but as they are conceived to be. It is by the consistency of response to a class of objects that an attitude is identified”.

According to the above definitions *study habits* are acquired acts pertaining to the study of academic material that are regularly and customarily manifested; *study attitudes* are enduring, learned dispositions to behave in a consistent way toward study and study material, or a persistent mental and neural state of readiness, to react to studying and objects associated with study, according to the way they are conceived by the student.

The fact that some students with apparently high scholastic aptitude underachieve in academic work while others with only mediocre aptitude do comparatively well, presents a continual challenge to educators. The SSHA was developed to help meet this challenge. It is an easily administered measure of study methods, motivation for studying, and certain attitudes towards scholastic activities, which contribute to academic achievement.

*5.2.3.3.2 The purpose of the SSHA is:*

- a) to identify students whose study habits and attitudes are different from those who obtain high marks
- b) to help teachers and others to understand students with academic problems, and
- c) to provide a basis to help these students improve their study habits and attitudes and thus more fully realise their potentialities.

It is assumed that students' responses to the selected statements on study habits and attitudes which are included in the final questionnaire, provide a valid indication of the relevance of their study habits and attitudes to study success.

*5.2.3.3.3 A brief description of the SSHA scales are as follows:*

- I. Delay avoidance (DA) indicates to what extent learners promptly complete their assignments, avoid delay and are not inclined to waste time.
- II. Work methods (WM) gives an indication of the learners' use of effective study methods, their efficiency in doing assignments and the extent to which they set about their schoolwork in the most effective way.
- III. Study habits (SH) combine the scores on the DA and WM scales to provide a measure for academic behavior.
- IV. Teacher approval (TA) provides a measure of the learner's attitude towards the teacher's classroom behaviour and methods.
- V. Education acceptance (EA) determines the extent of the learner's acceptance of educational ideals, objectives, practices and requirements.
- VI. Study attitudes (SA) combine the scores of TA and EA to provide a measure of the learner's confidence in scholastic aims.
- VII. Study orientation (SO) is a combination of all the above-mentioned aspects and provides an overall measure of the learner's study habits and attitudes.



#### 5.2.3.3.4 Validity

The SSHA has been constructed to measure quantitatively those study habits and attitudes that show a positive relationship to successful performance in academic study.

Research has shown that the SSHA has a high predictive validity with regard to academic achievement. It correlates sufficiently low with different achievement tests to indicate that the predictive value of the SSHA is based on factors largely untouched by these tests. The questionnaire was adapted and standardized for use in South African schools and produced the following results:

#### 5.2.3.3.5 Reliability

TABLE 5.5 *Retest reliability for the SSHA scales*

Source: Du Toit (1996:9)

<b>GROUP</b>	<b>N</b>	<b>DA</b>	<b>WM</b>	<b>TA</b>	<b>EA</b>	<b>SH</b>	<b>SA</b>	<b>SO</b>
<b>Boys</b>	229	0.888	0.856	0.868	0.874	0.900	0.899	0.923
<b>Girls</b>	223	0.875	0.811	0.863	0.876	0.875	0.895	0.901

From the above, it is evident that:

- a) the SSHA is a very reliable instrument
- b) the characteristics measured by the SSHA are relatively independent of intelligence.
- c) there is a relatively high, statistically significant relationship between study habits and attitudes and school achievement.

#### 5.2.4 Modus operandi implemented during research

Aimed at testing the hypotheses, pre-tests were administered prior to the implementation of the programme and post-test after the implementation. Logistical constraints arising from the need to work within the school system prevented the random assignment of learners to the groups, as already mentioned in 5.2.2. However, demographic details of the groups demonstrated their equivalence.

Five classes of Grade 7 learners, with no significant differences between classes, were asked to participate in a research project. They were told that participation was voluntary. Learners in both the experimental/treatment and control/comparison groups completed the Self-Concept Scale, Values Scale and Survey of Study Habits and Attitudes (previously described) pre-tests.

Both the researcher and the Head of Department-Guidance (trained by the researcher), administered the learning programme intervention. Three experimental/treatment groups were presented with the learning programme. Two control/comparison groups were not exposed to the programme. The Intervention was implemented once a week, during Life Orientation Lessons, for three-quarters of an hour, to all three treatment groups initially conducted by myself and then by the Head of Department-Guidance. During this time, allocated teachers taught the comparison groups.

Post-tests were then administered to all five groups, at the end of the six-month period. Learners in both experimental/treatment and control/comparison groups were re-tested with the same instruments (described in 5.2.3) after completion of the intervention.

The research design is as follows:

***Two groups pre-test/ post-test comparison group design:***

Group A (experimental/treatment)	Pre-test	Treatment	Post-test
Group B (control/comparison)	Pre-test	No treatment	Post-test

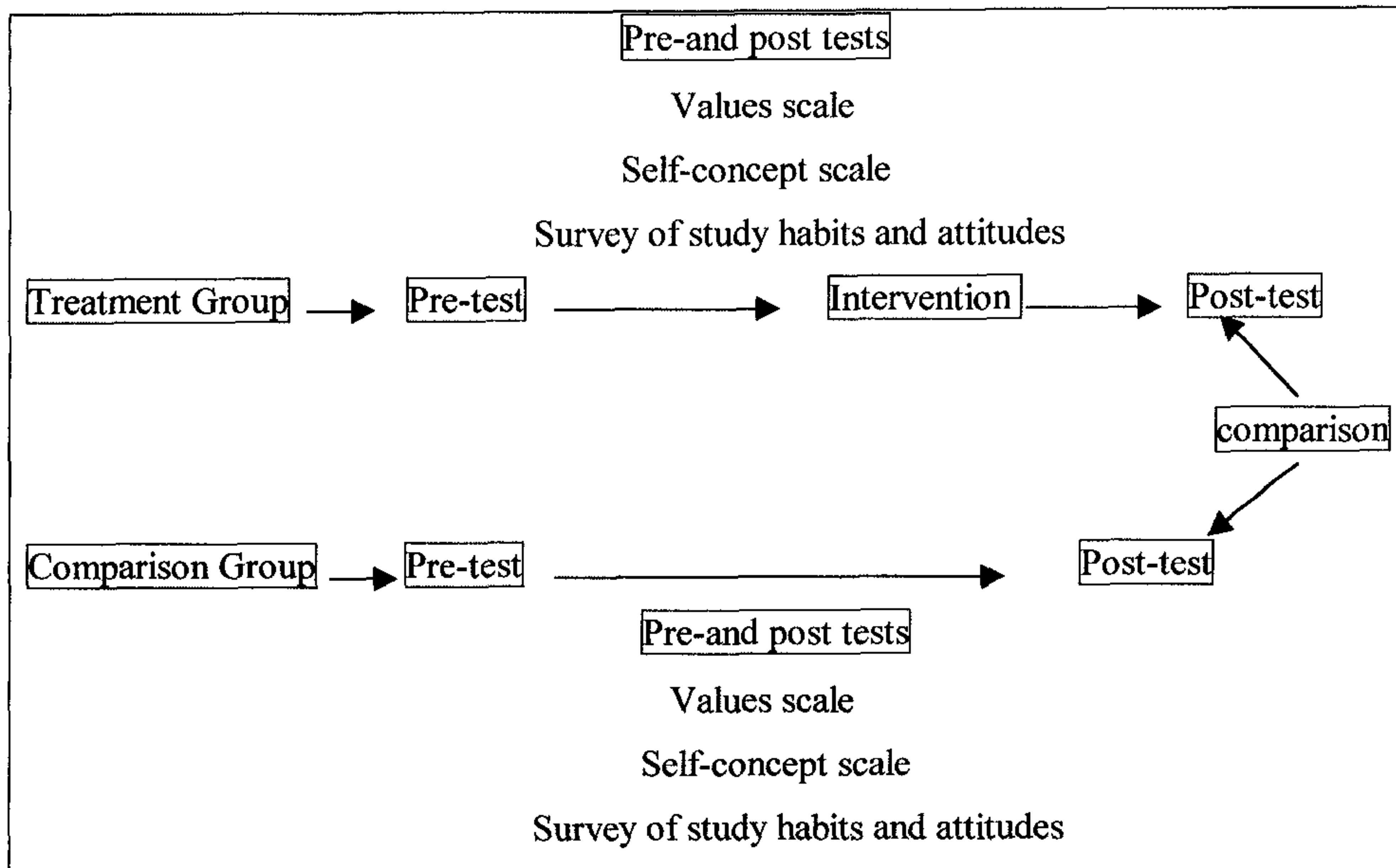


FIGURE 5.2 *Two groups pre-test/ post-test comparison group design*

This design was chosen to minimize the effects of maturation, history, reactivity and other sources of bias. However, Ghiselli, Campbell and Zedeck (1981:247-248) points out that no single treatment design satisfactorily compares all components of external and internal validity.

### 5.2.5 Research Method

The research method was aimed at conducting standardized pre-tests to gauge the values, study habits and attitudes as well as self-concept of five classes of Grade 7 learners. The learning programme was then implemented to three of those classes (three treatment groups). This took place once a week over the course of six months. Two comparison groups were not exposed to the programme. Post-tests were then administered to all five groups, at the end of the six-month period. A quantitative analysis procedure was used to determine the effectiveness of the programme, in terms of values, study habits and attitudes, and self-concept as a recognized construct of self-actualization. Unfortunately, during the time period, substitute teachers were replacing some of the regular teachers,



there were children who left the school and there were children who enrolled. Therefore there were inconsistencies that spoilt much of the data.

### **5.2.6 Hypotheses**

The Hypothesis as stated in Chapter 1 is as follows:

“With the knowledge of themselves, their potential, the basic workings of the brain, as well as the means to unlock their potential, not only will the learners’ self-concept be enhanced, but so will their attitudes, values and study habits”.

The following hypotheses are based on the main aim of the research, which was to determine efficacy of the learning programme.

#### ***Hypothesis 1:***

Those learners subjected to the programme, in comparison to those who were not subjected to the programme will show enhanced self-concept (a construct of self-actualization).

#### ***Hypothesis 2:***

Those learners subjected to the programme, in comparison to those who were not subjected to the programme will show increased awareness of a positive value system.

#### ***Hypothesis 3:***

Those learners subjected to the programme, in comparison to those who were not subjected to the programme will show enhanced awareness of study habits and attitudes.

#### ***5.2.6.1 Variables***

McCall (1990:284) states that the dependent variable's values "depend" on another variable, called the independent variable. These two concepts will now be discussed within the context of this research:

### ***Independent variable***

In the present research the one independent variable is the learning programme to which only the treatment group is assigned; the second independent variable is the pretest to which subjects were assigned.

### ***Dependent Variable***

The dependent variables as described in the hypotheses presented previously include:

*Self-Concept:* self-concept is measured as a component of self-actualization and is operationalised in the form of the self-concept scale as described in 5.3.2.1.

*Values Scale:* values are measured in terms of inner-oriented needs, material needs, autonomous life style, humanism and religions, social needs and physical needs as described in 5.3.2.2.

*Survey of Study Habits and Attitudes:* while study habits are measured in terms of delay avoidance and work methods, study attitudes are measured in terms of teacher approval and education acceptance. The combined study habits and attitudes constitute an overall study orientation. This has been described in 5.3.2.3.

For each dependent variable it is hypothesized that there be a significant increase, except in the case of self-criticism (a sub-section of the self-concept scale, where criticism is made of oneself, by oneself – see 5.3.2.1) for which a significant decrease is expected, in the scores of the treatment groups and no significant change in the scores of the comparison groups. The hypotheses will be supported by a statistically significant result from the interaction between the treatment/comparison and pre-test/post-test dimensions of the design.

### **5.2.7 Assumptions of study**

It is assumed that learners' responses to the instruments implemented, provide a valid indication of the relevance of self-concept, values, study habits and attitudes to self-actualisation.

### 5.2.8 Data Analysis

Scores were collated using the Excel spreadsheet. Cross tabulation of nominal variables provided the description of the samples as outlined above. Means and standard deviations for all dependent variables were calculated and are presented in chapter 6. The data gathered during the investigation were analyzed using Statistical Package for the Social Sciences (SPSS) Version 10.0. The following statistical procedures were used:

- Two way analysis of variance (ANOVA) with repeated measures performed on each of the dependent variables. By using two way ANOVA, the main effects of pre-testing and treatment can be assessed, as well as the interaction effect of pre-test and treatment. Mean squares, f-ratios and significance estimates are presented for both main effects (treatment/comparison group effect and pre-test/post-test effect) and the interaction effect. The treatment/comparison group effect is a between subjects effects, while the pre-test/post-test effect is a within subjects or repeated measures effect. The convention of using  $p < 0.05$  is used to determine significant results and is symbolized with an asterix (\*).
- Graphical illustrations

### 5.2.9 Interpretation of the results of the empirical study

A critical component of the treatment procedure is that the researcher compares the variables that may contaminate the results of the experiment. The dependent variables are affected by manipulating the independent variable (McCall 1990:284).

Ghiselli et al (1981:265-281) emphasise the importance of internal and external validity to prevent problems during the interpretation of results:

#### 5.2.9.1 Validity

*External validity* refers to whether the assessment procedures allocate the same value to an element each time it is measured under fundamentally the same circumstances. The



major factors that influence the external validity are described by (Campbell & Stanley 1996:5-6) as:

- when a test influences the sensitivity of the respondent towards the treatment variable
- consequences of the interaction between selection bias and the treatment variable
- reactive results of the treatment arrangements-the exclusion of generalizations concerning the effect of the treatment variable, on respondents who were exposed to it under the non-treatment circumstances
- when the same respondents are exposed to multiple and repeated treatments.

**Internal validity** in an experiment is when the constructs measured reveal valid measures, the data is accurate and reliable, the analyses are consequent and the final results are supported by the data. An experiment lacks internal validity if changes in the dependent variables are due to sources of systematic extraneous variables that arise from a lack of comparison of treatment conditions (Kerlinger 1986: 287-288). These extraneous confounding factors will be discussed below.

Campbell and Stanley (1996:5) list the following variables that require comparison to ensure internal validity:

- events which may occur between the first and the follow-up assessments (history) processes to which respondents are exposed during the interval periods (maturation) [history and maturation are the terms used to describe effects which may have occurred between the pre-test phase and the post-test phase, and developmental changes within the subject (Kerlinger 1986:313)].
- The effects of pre-testing which could confound results, as pre-testing involves the possibility that the pre-test sensitizes the individual to respond differently to the experimental intervention, compared to how he would have reacted if he had not been pre-tested.
- the effects of testing during the post-test phase (reactivity).
- bias which may occur during allocation of respondents to groups (experimenter bias).
- losing respondents between measures (attrition).

- the administration of the programme by different teachers in terms of method of implementation, flexibility and the importance placed on the programme by the teachers, as this was non-examinable.
- the Hawthorne effect as described by Luthans (1985:16). He cautions that many social scientists believe that increases in post intervention assessment scores be attributed solely to the special attention that participants in the study receive and to their enjoyment of a novel, interesting experience. This threat to validity is referred to as the Hawthorne effect, and presents when humans are subjected to experimental procedures.

### **5.3 IN CONCLUSION**

This chapter provided an overview of the intended approach to this investigation. The research methodology consists of a series of logical steps, including designing an intervention, sample selection, application of intervention, choosing suitable evaluation criteria and evaluating the efficacy of the intervention.

The learning programme was developed based on the principles as described in the literature. Psychometric instruments and inventories necessary for the evaluation of the efficacy of the intervention were discussed with respect to their reliability, validity and appropriateness for inclusion in this study.

The population was described and the method of sampling indicated. The pre-test, post-test Comparison Group Design was accepted as the best design for the evaluation of the efficacy of the intervention. The statistical techniques used in the analysis of the present research were justified.

Chapter 6 addresses the primary aim of the research, and investigates the efficacy of the proposed learning programme, through the comparison of pre-test and post-test scores of the adolescent self-concept scale (ASCS), Values Scale (VS), and Survey of Study Habits and Attitudes (SSHA), in order to determine the effectiveness of the learning programme.

## CHAPTER 6

### RESULTS AND FINDINGS

#### 6.1 INTRODUCTION

The primary goal of this investigation is to research the efficacy of a self-actualisation learning programme, by administering this programme to three groups of Grade 7 learners and noting positive changes in certain self-actualisation variables. As such, the central analysis of this study, tests how the intervention positively affects the levels of learners' self-concept, values, as well as study habits and attitudes.

The general aim of this chapter is to investigate the efficacy of the proposed learning programme, in terms of the overall enhancement of self-concept, values as well as study habits and attitudes, through the comparison of pre-test and post-test scores.

#### 6.2 COMPARISON OF PRE-TEST, POST-TEST DIFFERENCES, TREATMENT VERSUS COMPARISON GROUPS

The section addresses the primary analytic aim of the research, namely, whether the learning programme resulted in a positive effect on self-concept, values, study habits and attitudes.

In order to assess the efficacy of the programme, it was necessary to follow a number of steps. Each of these steps is presented in a separate subsection as follows:

- a) The pre-test scores of the experimental/treatment and control/comparison groups are compared in order to investigate initial group comparability (homogeneity). In order to do this, the samples are evaluated (by means of t-tests) on the pre-test scores to gauge their level of self-concept attribution, values, as well as study habits and attitudes. Hereby the potential for change in scores is evaluated (see section 6.2.1).



- b) The post-test scores of the experimental/treatment and control/comparison groups are assessed in order to determine whether there is a significant difference between the experimental/treatment and control/comparison group scores (see section 6.2.2).
- c) The treatment effect is further analysed via repeated measures 2-way ANOVA in which the effect of the learning programme is tested by assessing the interaction of the treatment with the pre-test, post-test factor – in other words, by assessing the interaction of the treatment with the within-subject factor (i.e. treatment over time). This bivariate analysis of variance isolates the particular variables, which yield significant intergroup comparisons (see section 6.2.3). This analysis is also performed at the multivariate level in order to control for an overall 5% level of significance for the test and to take into account scale inter-correlations. This multivariate analysis complements the repeated measures 2-way ANOVA performed on the post-test scores as it takes into account the magnitude of the pre-test scores (see section 6.2.4).
- d) The magnitudes of the pre-test/post-test differences for all three dependent variables (self-concept, values, study habits and attitudes) are compared graphically for the experimental/treatment and control/comparison groups. Hereby the meaningfulness of the change in scores can be assessed, bearing in mind that even significant score changes are not necessarily meaningful (see section 6.2.5).
- e) Finally, in section 6.2.6 the results are summarised with reference to hypotheses 1-3 of the research as stated in chapter 5 (see section 5.2.6).

### **6.2.1 Comparison of the pre-test scores of the experimental and control groups**

Before examining the effect of the treatment and the possible interaction of the pre-test and treatment effects, it is necessary to investigate the presence of possible pre-test differences between the experimental/treatment and control/comparison groups, on all three variables. The univariate t-test approach was used for the pre-test intergroup comparisons.

The result of the intergroup comparison is not significant, in other words, the univariate t-test results are not significant; therefore assuring that the groups are similar beforehand. Consequently, the experimental/treatment and control/comparison groups cannot be said to differ significantly on the pre-test, thereby confirming that the two groups are relatively homogenous.

TABLE 6.1 *Summary of t-test comparisons between pre-test scale means of the experimental/treatment and control/comparison groups for the self-concept scale*

SELF-CONCEPT SCALE PRE-TEST					
Self-concept	Mean Control/ Comparison	Mean <i>Experimental/ Treatment</i>	t-value	df	p
Physical	11.4	11.3	-0.36145	46	0.719415
Personal	10.3	10.9	-0.78437	46	0.436843
Fam-Friends	12.5	13.4	-1.28514	46	0.205177
Society	11.3	10.9	0.41232	46	0.682020
Values	11.1	11.4	-0.06164	46	0.951119
Criticism	4.0	4.6	-0.98377	46	0.330375
Total SC	60.7	62.5	-0.75952	46	0.451416

TABLE 6.2 *Summary of t-test comparisons between pre-test scale means of the experimental/treatment and control/comparison groups for the values scale*

VALUES SCALE PRE-TEST					
	Control/ Comparison	<i>Experimental/ Treatment</i>			
	Mean	Mean	t-value	df	p
A1	18.1	18.4	-1.01378	121	0.312711

A2	<b>17.9</b>	<i>17.5</i>	1.27963	121	0.203122
A3	<b>16.9</b>	<i>17.2</i>	-0.81349	121	0.417535
A4	<b>15.2</b>	<i>14.9</i>	0.68591	121	0.494085
A5	<b>16.5</b>	<i>17.1</i>	-1.40506	121	0.162566
A6	<b>13.4</b>	<i>13.9</i>	-0.86297	121	0.389860
A7	<b>14.7</b>	<i>14.1</i>	1.03134	121	0.304438
A8	<b>16.5</b>	<i>15.9</i>	1.38145	121	0.169685
A9	<b>15.3</b>	<i>15.3</i>	0.02269	121	0.981938
A10	<b>16.3</b>	<i>17.0</i>	-1.58384	121	0.115840
A11	<b>17.3</b>	<i>17.6</i>	-0.74752	121	0.456198
A12	<b>15.7</b>	<i>15.3</i>	0.97361	121	0.332191
A13	<b>17.4</b>	<i>17.0</i>	1.09639	121	0.275084
A14	<b>16.0</b>	<i>16.3</i>	-0.74366	121	0.458525
A15	<b>14.4</b>	<i>14.1</i>	0.54679	121	0.585533
A16	<b>16.9</b>	<i>16.2</i>	1.45821	121	0.147373
A17	<b>13.4</b>	<i>12.5</i>	1.44934	121	0.149830
A18	<b>15.0</b>	<i>16.1</i>	-2.41665	121	0.017157
A19	<b>15.6</b>	<i>16.1</i>	-0.93306	121	0.352646
A20	<b>16.8</b>	<i>16.9</i>	-0.16859	121	0.866404
A21	<b>14.9</b>	<i>14.5</i>	0.81253	121	0.418081
A22	<b>15.1</b>	<i>14.9</i>	0.44065	121	0.660256



TABLE 6.3 Summary of t-test comparisons between pre-test scale means of the experimental/treatment and control/comparison groups for survey of study habits and attitudes.

STUDY HABITS AND ATTITUDES PRE-TEST					
	Control/ Comparison	Experimental/ Treatment			
	Mean	Mean	t-value	df	p
DA	84.0	88.3	-1.81245	99	0.072947
WM	89.8	90.9	-0.45769	99	0.648176
TA	87.4	86.5	0.27832	99	0.781346
EA	86.1	90.1	-1.72818	99	0.087074
SH	173.8	176.0	-0.40081	100	0.689412
SA	173.5	173.5	-0.00378	100	0.996995
SO	347.3	355.8	-1.23818	99	0.218577

As discussed above, no significant pre-test differences were found between the experimental and control groups on any of the dependent variables (self-concept, values, study habits and attitudes) and their subscales.

#### 6.2.2 Comparison of the post-test scores of the experimental and control groups

TABLE 6.4 Comparison of the post-test scores of self-concept scale

SELF-CONCEPT SCALE POST-TEST					
Self-concept	Control/ Comparison Mean	Experimental/ Treatment Mean	t-value	df	p
Physical	12.4	13.0	-0.59023	42	0.558197
Personal	11.6	11.7	-0.06557	42	0.948035
Fam-Friends	13.9	14.7	-0.96290	42	0.341109
Society	11.4	12.9	-1.53232	42	0.132943
Values	11.7	12.3	-0.91900	42	0.363342
Criticism	4.2	5.1	-1.59661	42	0.117851
Total SC	65.2	69.7	-1.35081	42	0.183989

TABLE 6.5 Comparison of the post-test scores of values scale

VALUES SCALE POST-TEST					
	Control/ Comparison	Experimental Treatment			
	Mean	Mean	t-value	df	p
A1	17.7	18.1	-1.27035	121	0.206396
A2	17.4	17.4	-0.14625	121	0.883965
A3	16.9	17.1	-0.53487	121	0.593722
A4	16.0	15.8	0.43781	121	0.662304
A5	16.2	16.8	-1.51819	121	0.131575
A6	13.7	13.4	0.48531	121	0.628336
A7	15.0	14.4	1.15232	121	0.251461
A8	16.1	15.5	1.28909	121	0.199824
A9	14.9	15.1	-0.29516	121	0.768377
A10	17.0	17.1	-0.25593	121	0.798437
A11	17.1	17.3	-0.49175	121	0.623786
A12	15.2	15.2	0.05123	121	0.959230
A13	17.1	17.2	-0.27392	121	0.784612
A14	15.6	15.9	-0.60510	121	0.546247
A15	13.7	14.2	-0.81166	121	0.418580
A16	16.2	16.5	-0.53110	121	0.596326
A17	13.6	12.4	1.67273	121	0.096965
A18	14.3	15.4	-2.26433	121	0.025334
A19	14.9	15.8	-1.71388	121	0.089112
A20	16.0	16.1	-0.19527	121	0.845510
A21	15.0	15.1	-0.20797	121	0.835604
A22	15.8	16.0	-0.42227	121	0.673580

TABLE 6.6 Comparison of the post-test scores of survey of study habits and attitudes

STUDY HABITS AND ATTITUDES POST-TEST					
	Control/ comparison	Experimental/ treatment			
	Mean	Mean	t-value	df	p
DA	85.1	89.8	-1.71548	92	0.089624
WM	89.8	93.9	-1.53037	92	0.129357
TA	91.2	91.4	-0.07493	92	0.940436
EA	92.1	92.1	0.02541	92	0.979781
SH	174.9	183.7	-1.77863	92	0.078604
SA	183.3	183.5	-0.03694	92	0.970617
SO	358.2	367.2	-1.12366	92	0.264082

The analysis of only the post-test scores does not take into account any differences on pre-test, no matter how large these differences may be. In the present research, pre-test intergroup differences were not found to be significantly different. Hence the analysis of the post-test scores was considered justified. However, even non-significant intergroup differences on pre-test may mask changes in scores rendering changes to be non-significant even when post-test scores of the experimental and control groups are significantly different. The pre and post-test scale means are presented graphically in section 6.2.5.

For the above post-test tables, the means of the experimental and control groups were compared via t-tests, for all of the levels of the three independent variables (self-concept, values, as well as study habits and attitudes). From these univariate t-test analyses, differences are seen between the post-tests of the experimental and control groups, although these differences are not statistically significant, possibly due to the relatively small sample sizes and the presence of threats to validity (see section 5.2.9).



### 6.2.3 Repeated measures ANOVA

Two-way analyses of variance (ANOVA) with repeated measures were performed on each of the dependent variables (self-concept, values, study habits) using the SPSS version 10 Statistical package. The significance level of 0.05 is used to determine significant results. Mean squares, F-ratios, and significance estimates are presented for both of the main effects (Experimental/ Control and the Pre-test/ Post-test) as well as for the interaction effects. The experimental/ control group effect is a between subjects effect, while the pre-test/ post-test effect is a within subjects or repeated measures effect.

In order to assess whether the effect of the intervention depends on whether subjects were pre-tested or not, the interaction of pre-test and treatment effects were examined for each scale of the post-test. The presence of a significant interaction of the within group factor and the treatment would show that changes from pre to post-test depend on whether the subjects belong to the experimental or control conditions. Accordingly, the interaction effects as well as the two main effects of the repeated measures analysis are presented in the tables below.

TABLE 6.7 *The interaction and main effects of repeated measures analysis on self-concept scores*

<b>DIMENSIONS OF SELF</b>					
<b>Scale</b>	<b>Effect</b>	<b>Df</b>	<b>Mean square</b>	<b>F-value</b>	<b>Significance</b>
	Exp/ Con	1	3.007	0.202	0.656
<b>Physical self</b>	<b>Pre/ Post</b>	<b>1</b>	<b>37.026</b>	<b>8.881</b>	<b>0.005 ** Sig</b>
	Interaction	1	0.7008	0.170	0.682
	Exp/ Con	1	3.542	0.258	0.614
<b>Personal self</b>	<b>Pre/ Post</b>	<b>1</b>	<b>30.308</b>	<b>10.162</b>	<b>0.003 ** Sig</b>
	Interaction	1	2.672	0.896	0.349
	Exp/ Con	1	16.799	1.033	0.315
<b>Family</b>	<b>Pre/ Post</b>	<b>1</b>	<b>38.186</b>	<b>14.479</b>	<b>0.000 ** Sig</b>
	Interaction	1	4.611	0.002	0.967

	Exp/ Con	1	6.289	0.483	0.491
<b>Society</b>	<b>Pre/ Post</b>	<b>1</b>	<b>24.960</b>	<b>4.213</b>	<b>0.046** Sig</b>
	Interaction	1	23.858	4.026	0.051
	Exp/ Con	1	4.290	0.632	0.431
<b>Values</b>	<b>Pre/ Post</b>	<b>1</b>	<b>12.061</b>	<b>5.400</b>	<b>0.025 ** Sig</b>
	Interaction	1	0.823	0.368	0.547
	Exp/ Con	1	9.667	2.046	0.160
<b>Criticism</b>	<b>Pre/ Post</b>	<b>1</b>	<b>2.752</b>	<b>1.087</b>	<b>0.303</b>
	Interaction	1	0.979	0.387	0.537
	Exp/ Con	1	237.244	1.171	0.285
<b>Total SC</b>	<b>Pre/ Post</b>	<b>1</b>	<b>778.274</b>	<b>17.779</b>	<b>0.000 ** Sig</b>
	Interaction	1	35.047	0.801	0.376

As can be seen from the above-mentioned table, the pre/ post-test within-subjects effects are significant for all of the self-concept subscales except the self-criticism subscale (as expected and described in 5.2.3). From this we can conclude that the effect of the treatment over time had a significant impact on the learner's self-concept, albeit on both the experimental/treatment and control/comparison groups. Ideally, the pre/ post-test (within-group) effect should be accompanied by a significant experimental/treatment and control/comparison (between-group) effect, indicative of the fact that the pre-test post-test differences are confined to the experimental/treatment group alone. The fact that the control groups' self-concept scores also improved suggests that threats to validity (e.g. Hawthorne effect, described in 5.2.9) were present.

TABLE 6.8 *The interaction and main effects of repeated measures analysis on values scores*

#### VALUES

Scale	Effect	Df	Mean square	F-value	Significance
	Exp/ Con	1	4.418	0.435	0.511
<b>A4</b>	<b>Pre/ Post</b>	<b>1</b>	<b>43.931</b>	<b>11.503</b>	<b>0.001**Sig</b>
	Interaction	1	0.224	0.059	0.809
	Exp/ Con	1	6.248	0.553	0.458

<b>A14</b>	<b>Pre/ Post</b>	<b>1</b>	<b>11.474</b>	<b>4.462</b>	<b>0.037**Sig</b>
	Interaction	1	2.666	0.010	0.919
	<b>Exp/ Con</b>	<b>1</b>	<b>72.833</b>	<b>7.893</b>	<b>0.006**Sig</b>
<b>A18</b>	<b>Pre/ Post</b>	<b>1</b>	<b>31.514</b>	<b>7.683</b>	<b>0.006** Sig</b>
	Interaction	1	2.026	0.000	0.982
	Exp/ Con	1	25.140	2.321	0.130
<b>A19</b>	<b>Pre/ Post</b>	<b>1</b>	<b>15.163</b>	<b>4.759</b>	<b>0.031** Sig</b>
	Interaction	1	2.805	0.880	0.350
	Exp/ Con	1	0.344	0.045	0.832
<b>A20</b>	<b>Pre/ Post</b>	<b>1</b>	<b>34.681</b>	<b>12.627</b>	<b>0.001**Sig</b>
	Interaction	1	1.424	0.005	0.943
	Exp/ Con	1	4.383	0.000	0.999
<b>A22</b>	<b>Pre/ Post</b>	<b>1</b>	<b>48.513</b>	<b>11.153</b>	<b>0.001**Sig</b>
	Interaction	1	2.854	0.656	0.419

As can be seen from the above table, only 6 out of the 22 values sub-scales showed any significant results. With the exception of A18, this significance is seen in the pre-test/ post-test main effect (or within-groups factor). This implies that for the above-mentioned sub-scales, the learner's values differed significantly between the pre and post testing. This difference is however, (with the exception of A18), unfortunately seen in both the experimental/treatment and control/comparison groups, even though the control group was not exposed to the programme. This undesirable effect is probably as a result of the Hawthorne effect operating (see section 5.2.9) in the learners participating in the control group.

TABLE 6.9 *The interaction and main effects of repeated measures analysis on study habits and attitudes scores*

#### STUDY HABITS

Scale	Effect	Df	Mean square	F-value	Significance
	Exp/ Con	1	895.731	3.187	0.078
<b>DA</b>	<b>Pre/ Post</b>	<b>1</b>	<b>67.063</b>	<b>1.544</b>	<b>0.217</b>
	Interaction	1	8.159	0.188	0.666
	Exp/ Con	1	232.331	0.954	0.331



<b>WM</b>	<b>Pre/ Post</b>	<b>1</b>	<b>119.188</b>	<b>2.693</b>	<b>0.104</b>
	Interaction	1	153.059	3.458	0.066
	Exp/ Con	1	18.135	0.050	0.823
<b>TA</b>	<b>Pre/ Post</b>	<b>1</b>	<b>545.482</b>	<b>5.874</b>	<b>0.017** Sig</b>
	Interaction	1	27.633	0.298	0.587
	Exp/ Con	1	137.706	1.046	0.309
<b>EA</b>	<b>Pre/ Post</b>	<b>1</b>	<b>669.739</b>	<b>4.205</b>	<b>0.043** Sig</b>
	Interaction	1	196.987	1.237	0.269
	Exp/ Con	1	1107.042	1.033	0.312
<b>SH</b>	<b>Pre/ Post</b>	<b>1</b>	<b>931.810</b>	<b>3.300</b>	<b>0.073</b>
	Interaction	1	709.171	2.512	0.116
	Exp/ Con	1	8.590	0.13	0.909
<b>SA</b>	<b>Pre/ Post</b>	<b>1</b>	<b>3873.078</b>	<b>8.453</b>	<b>0.005 **Sig</b>
	Interaction	1	15.738	0.034	0.853
	Exp/ Con	1	2771.752	1.232	0.270
<b>SO</b>	<b>Pre/ Post</b>	<b>1</b>	<b>4670.544</b>	<b>10.904</b>	<b>0.001 ** Sig</b>
	Interaction	1	41.598	0.097	0.756

As can be seen from the above-mentioned table, 4 out of the 7 'study habit' subscales showed significant results for the pre-test/ post (within group) main effect, in the absence of any significant experimental/treatment and control/comparison (between groups) main effect. In other words, for the majority of the study habits sub-scales, there was a significant difference between the pre and post-test scores, irrespective of whether the learners belonged to the experimental/treatment or control/comparison groups. Ideally, the between-group main effect (i.e. the treatment effect) should be significant, indicative of a substantial difference between the experimental/treatment and control/comparison groups as measured on the post-tests. A significant within-groups effect implies that the threats to validity were not effectively controlled for, thereby contributing to the fact that the error variance (the variance one hopes to minimise) exceeds the systematic/ experimental variance, the very variance one hopes to maximise through interventions (e.g. the learning programme).

#### **6.2.4 Multivariate analysis of the interactions**

Univariate techniques (ANOVA) are relatively powerless in detecting small reliable changes between highly correlated conditions [e.g. the testing of same person prior to (pre-test), and after an intervention (post-test)]. In such cases, multivariate techniques (e.g. Wilks-Lambda, Hotelling's Trace etc.) are recommended.

Multivariate analyses are not dependent upon the assumptions of sphericity being met. In other words multivariate tests can tolerate the violation of the assumptions of sphericity. The Mauchly's test is used to determine whether the sphericity assumption is violated, with a significant Mauchly's factor indicating that violation has occurred. In the case of violation, correction factors (e.g. Greenhouse-Geisser etc.) are applied, which adjust the degrees of freedom and hence the critical value for the within-subjects effects. As an example see attached SPSS output, pages 1 and 2 under General Linear Model (Physical self-concept). For all of the values shown in the above tables, the F-value for Wilks-Lambda = the corrected Greenhouse-Geisser F value = the original F-value obtained via the repeated measures ANOVA, thereby confirming the accuracy of the latter.

#### **6.2.5 Graphical representations of the pre-test/post-test differences for all three dependent variables (i.e. self-concept, values, study habits and attitudes).**

From the graphical representations, differences are seen between pre-tests and post-tests for both the treatment and comparison groups.



6.2.5.1 Self-concept scale – pre-test/post-test differences

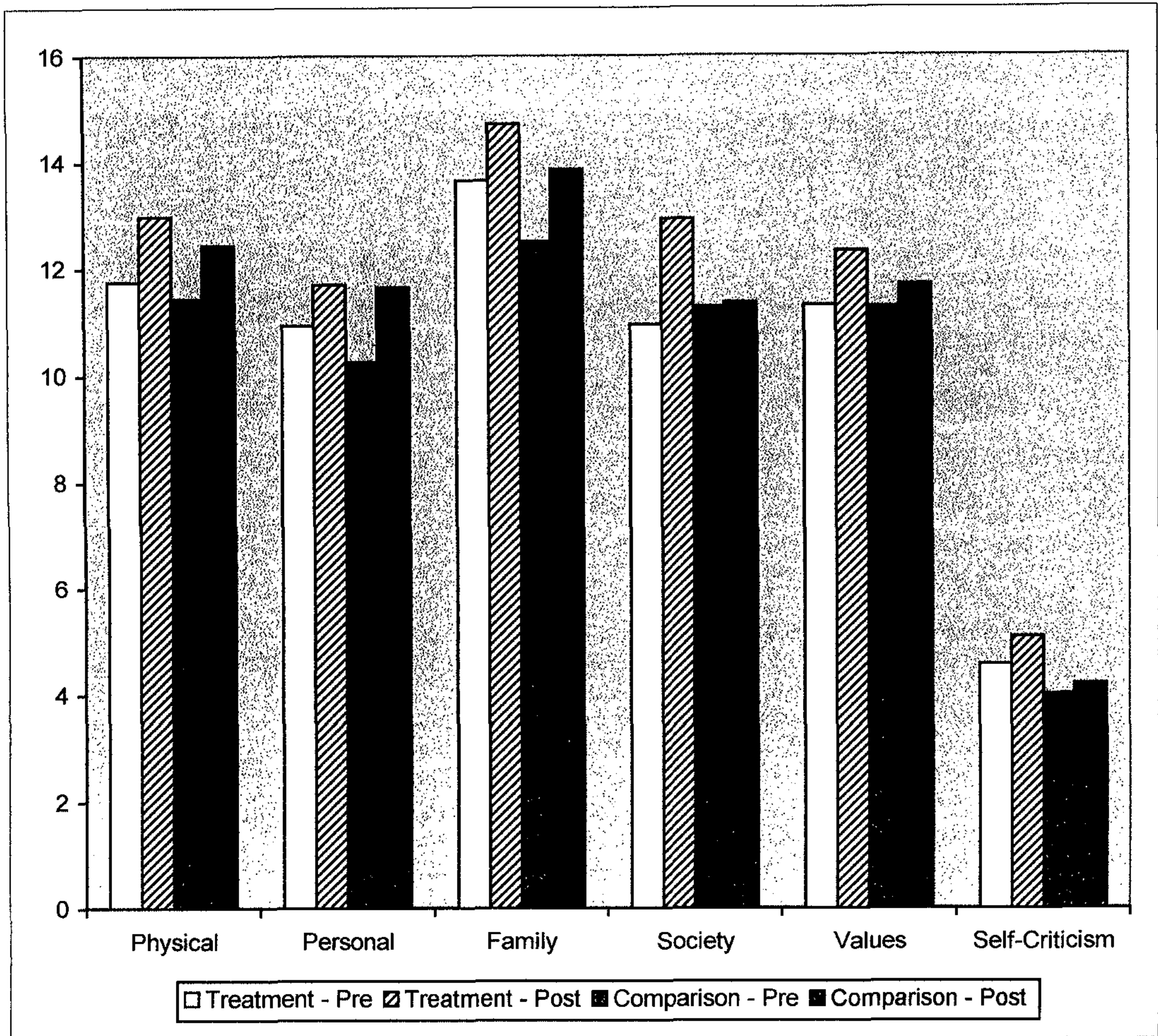


FIGURE 6.1 Graphical representation of pre-test/post-test self-concept differences



6.2.5.2 Values Scale pre-test/post-test differences

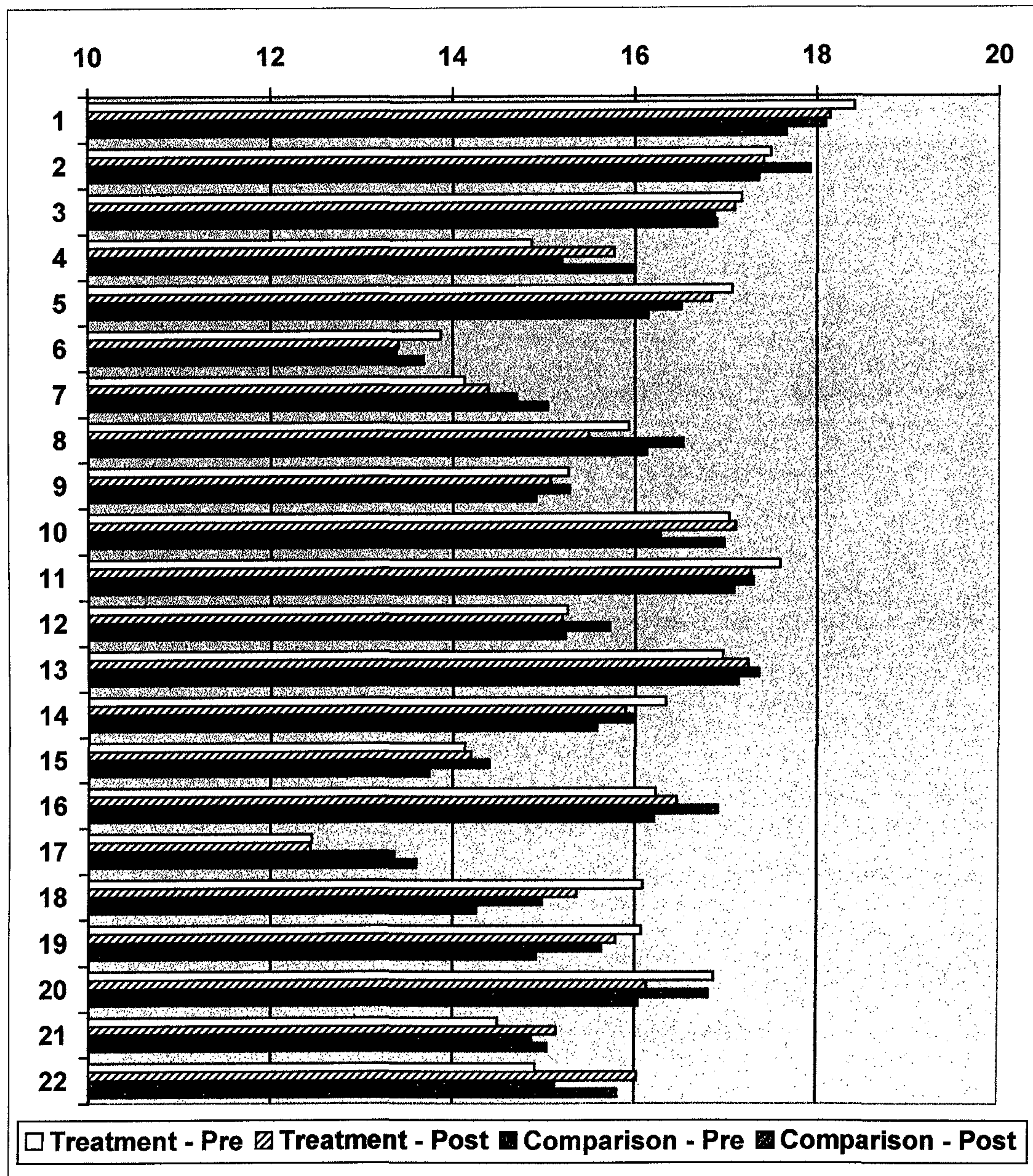


FIGURE 6.2 Graphical representation of pre-test/post-test values scores differences



6.2.5.3 Survey of study habits and attitudes pre-test/post-test differences

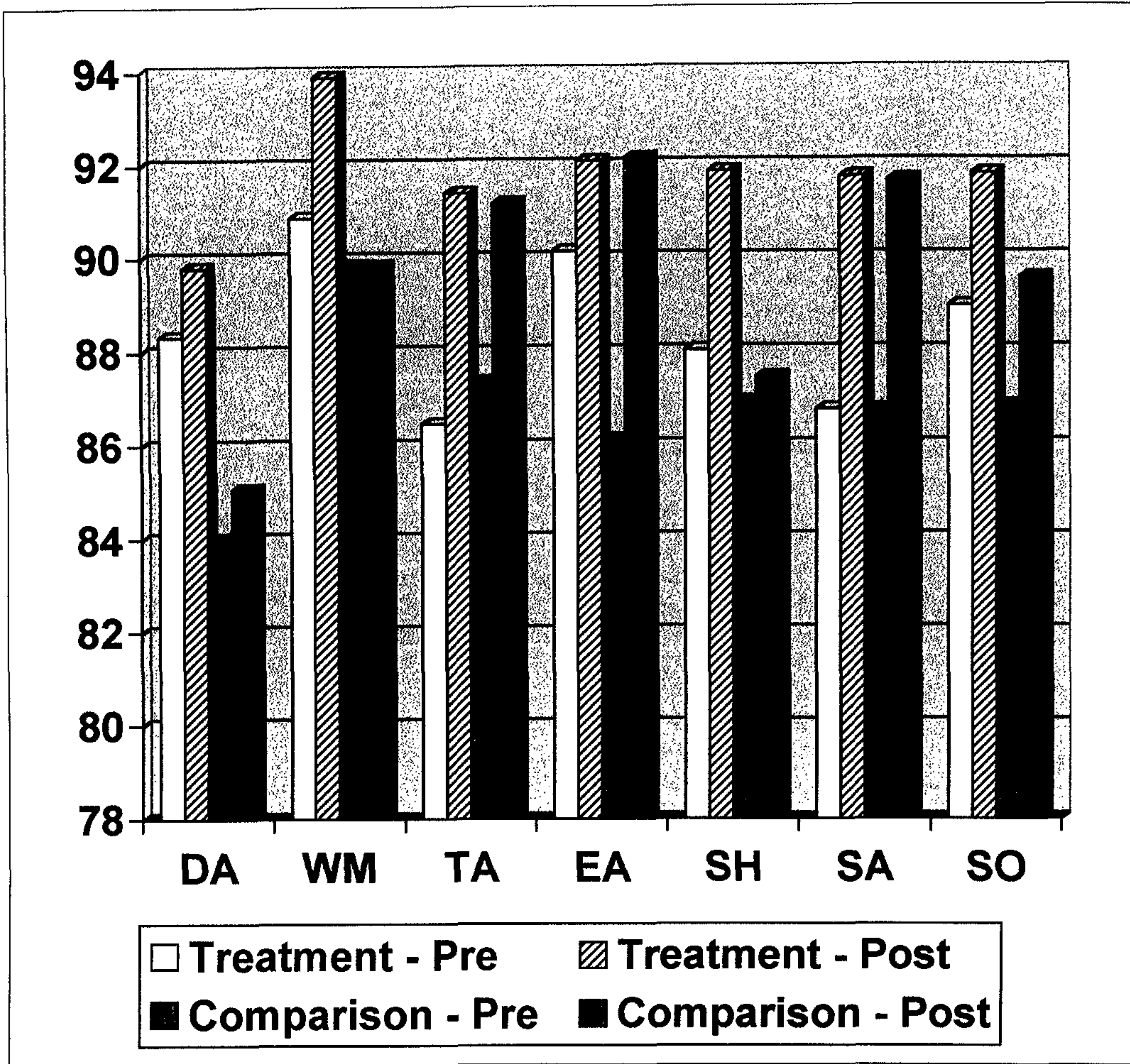


FIGURE 6.3 Graphical representation of pre-test/post-test study habits and attitudes differences

### 6.2.6 Conclusions drawn for the hypotheses of study

The results of section 6 are now summarised by addressing each hypothesis of the research in turn:

➤ *Hypothesis 1:*

Those learners subjected to the programme, in comparison to those who were not subjected to the programme will show enhanced self-concept (a construct of self-actualisation).

➤ *Hypothesis 2:*

Those learners subjected to the programme, in comparison to those who were not subjected to the programme will show increased awareness of a positive value system.

➤ *Hypothesis 3:*

Those learners subjected to the programme, in comparison to those who were not subjected to the programme will show enhanced awareness of study habits and attitudes.

### 6.3 IN CONCLUSION

Responses to the Self-Concept Scale showed a higher level of motivation and increased self-awareness in terms of their potential. However, the Values Scale presented with few significant differences. Only 6 out of the 22 values sub-scales showed any significant results. This difference is however, seen in both the experimental/treatment and control/comparison groups. Responses to the study habits and attitudes survey suggest that the programme was influential. Results showed that for the majority of the study habits sub-scales, there was a significant difference between the pre and post-test scores, for both experimental/treatment or control/comparison groups.

As discussed in chapter 5, the threats to validity in this design could have prevented the proving of the above-mentioned hypotheses. In summary, the overall significant treatment effect and the direction of the changes in the corresponding group means show that change scores are significantly greater for the experimental subjects than are the change scores of the controls, and that these changes are generally in the favourable direction.



# General Linear Model

## Notes

<b>Output Created</b>		06-DEC-2001 11:59:01
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<b>Missing Value Handling</b>	<b>Definition of Missing</b>	User-defined missing values are treated as missing.
	<b>Cases Used</b>	Statistics are based on all cases with valid data for all variables in the model.
<b>Syntax</b>		GLM phypre phypst BY v2 /WSFACTOR = factor1 2 Polynomial /METHOD = SSTYPE(3) /PLOT = PROFILE( v2*factor1 factor1*v2 ) /CRITERIA = ALPHA(.05) /WSDSIGN = factor1 /DESIGN = v2 .
<b>Resources</b>	<b>Elapsed Time</b>	0:00:00.93

### Within-Subjects Factors Measure: MEASURE\_1

FACTOR1	Dependent
1	PHYPRE
2	PHYPST

### Between-Subjects Factors

		N
E/C	control	21
	expmnt	23

### Multivariate Tests(b)

Effect		Value	F	Hypothesis df	Error df	Sig.
<b>FACTOR1</b>	<b>Pillai's Trace</b>	.175	8.881	1.000	42.000	.005
	<b>Wilks' Lambda</b>	.825	8.881	1.000	42.000	.005
	<b>Hotelling's Trace</b>	.211	8.881	1.000	42.000	.005
	<b>Roy's Largest</b>	.211	8.881	1.000	42.000	.005
<b>FACTOR1 *</b>	<b>Pillai's Trace</b>	.004	.170(a)	1.000	42.000	.682
	<b>Wilks' Lambda</b>	.996	.170(a)	1.000	42.000	.682
	<b>Hotelling's Trace</b>	.004	.170(a)	1.000	42.000	.682
	<b>Roy's Largest</b>	.004	.170(a)	1.000	42.000	.682

a Exact statistic
b Design: Intercept+V2 Within Subjects Design: FACTOR1

**Mauchly's Test of Sphericity(b)**  
Measure: MEASURE\_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon(a)		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
FACTOR1	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b Design: Intercept+V2  
Within Subjects Design: FACTOR1

**Tests of Within-Subjects Effects**  
Measure: MEASURE\_1

Source		Type III Sum of Squares	df	Mean	F	Sig.
FACTOR1	Sphericity Assumed	37.026	1	37.026	8.881	.005
	Greenhouse-	37.026	1.000	37.026	8.881	.005
	Huynh-Feldt	37.026	1.000	37.026	8.881	.005
	Lower-bound	37.026	1.000	37.026	8.881	.005
FACTOR1 * V2	Sphericity Assumed	.708	1	.708	.170	.682
	Greenhouse-	.708	1.000	.708	.170	.682
	Huynh-Feldt	.708	1.000	.708	.170	.682
	Lower-bound	.708	1.000	.708	.170	.682
Error	Sphericity Assumed	175.096	42	4.169		
	Greenhouse-	175.096	42.000	4.169		
	Huynh-Feldt	175.096	42.000	4.169		
	Lower-bound	175.096	42.000	4.169		

**Tests of Within-Subjects Contrasts**  
Measure: MEASURE\_1

Source	FACTOR1	Type III Sum of Squares	df	Mean	F	Sig.
FACTOR1	Linear	37.026	1	37.026	8.881	.005
FACTOR1 * V2	Linear	.708	1	.708	.170	.682
Error	Linear	175.096	42	4.169		

**Tests of Between-Subjects Effects**

## CHAPTER 7

### CONCLUSION

#### 7.1 INTRODUCTION

This study has examined the effectiveness of a neuropsychologically based learning programme aimed at enhancing the self-actualisation of learners. As mentioned in chapter 2, while brain development and higher cognitive processes have been implicated in educational and psychological disorders, brain structure and functions can similarly be used to stimulate learning, by enhancing awareness of brain potential. The field of neuropsychology assists in the application of brain structure and functions to the psychological aspects of education. Neuropsychology, the basis for the learning programme (LP), provided insight into thinking, memory processes and individual differences of learners. A neuropsychological perspective allows for the enhancement of self-awareness and self-concept, knowledge of unique brain potential and related learning processes as well as motivational aspects related to brain awareness.

As previously mentioned, there is an explosion of knowledge in almost all fields. In order to keep pace with this knowledge, it is necessary to develop effective means of acquiring the knowledge. In other words new practices in teaching are to be developed. Good educational practices in teaching are those that help in meeting individual differences of learners through instruction. Learners' achievements have been influenced by their characteristics, such as intelligence, study habits, attitude, personal and academic motivation (Anuradha 1990:87). Learner outcomes of the LP include belief in one's self and ability, enhanced self-concept, motivation and purpose, confidence and determination (as seen in section 4.2.4). The awareness of underlying potential enhances the realisation of each person's uniqueness and individual contributions to society, and facilitates awareness of the need to accept responsibility for one's own future.

The researcher explored the lack of motivation, low self-esteem and lack of self-awareness of learners as well as their inability to cope with the increasing amount of information available in today's society, through the implementation of three instruments,



namely, self-concept scale, values scale as well as study habits and attitudes. The study was directed towards enhancing self-awareness and self-actualisation through the increase in knowledge of brain structure and function, provided in a psycho-educational climate.

With neuropsychology as a rapidly expanding and relevant discipline, there is increasing need to incorporate its principles and methods into the education system as part of the self-actualising process. Understanding the brain and its functions creates awareness of the formidable potential of the human brain. Consequently, an effective educational neuropsychological learning programme would be able to inform learners of the intrinsic abilities of their own brains. However, as previously mentioned, this requires a paradigm shift on the part of teachers and learners.

Previous educational systems evaluated learners according to achievement only. The new education system provides us with OBE – a more holistic approach to teaching and evaluation. The implementation of OBE provides a framework for such a programme. Life Orientation (LO), a section of the OBE curriculum provides scope for the implementation of the learning programme, as it enhances the practice of positive values, attitudes, behaviour and skills in the individual and the community as well as the appreciation of their own beliefs, values and practices. LO promotes the achievement of individual learners' potential by strengthening and integrating their self-concept as well as their capacity to develop healthy relationships, their ability to make informed and responsible decisions in an independent, critical and creative way, that is, taking pleasure in the expression and coordination of their intellectual, physical, spiritual, emotional and moral powers. LO, therefore is central to the holistic unfolding of learners, caring for their intellectual, physical, personal, social, spiritual and emotional growth, and for the way these facets work together.

In line with LO, an important aim of the programme is to enhance the self-concept of learners, as self-concept is considered an integral construct of self-actualisation. The learner's self-concept is based on evaluation of one's identity, behaviour and self-esteem, within the framework of one's self-knowledge. Vrey (1979:25) places importance on the

role of educators within the education system. If learners are educationally influenced in terms of physical and psychological functioning, this contributes to enhancement of their self-concept and actualisation of their potential.

## **7.2 FINDINGS**

The research conducted therefore aimed at measuring aspects of self-actualisation --- operationalised as self-concept, values and study attitude surveys, after the implementation of a neuropsychological learning programme. Psychometric instruments and inventories necessary for the evaluation of the efficacy of the intervention were used and discussed with respect to their reliability, validity and appropriateness for inclusion in this study. The results of the post-tests assisted in validating the effectiveness of the programme, due to the fact that the results indicated a move in a positive direction for learners exposed to the learning programme.

The threats to validity in the design adopted for this research could have prevented the proving of the hypotheses. The fact that not all results were statistically significant can be explained by the threats to validity as well as other contributing factors, which appeared to have affected the statistical significance of the results, for example, the Hawthorne effect, reactivity, history and maturation, experimenter bias and attrition.

## **7.3 CONCLUSIONS**

Responses to the Self-Concept Scale showed gains in self-confidence among learners. Learners showed a higher level of motivation and increased self-awareness in terms of their potential. Therefore the effect of the treatment over time had a significant impact on the learner's self-concept, albeit on both the experimental/treatment and control/comparison groups.

However, the Values Scale presented with few significant differences. Only 6 out of the 22 values sub-scales showed any significant results. This difference is seen in both the experimental/treatment and control/comparison groups.

Responses to the study habits and attitudes survey, demonstrated the benefits of the learning programme implemented, suggesting that the programme was influential. There was a significant difference between the pre and post-test scores, for the majority of the study habits sub-scales.

In summary, the overall significant treatment effect and the direction of the changes in the corresponding group means show that change scores are significantly greater for the experimental subjects than are the change scores of the controls, and that these changes are generally in the favourable direction.

#### **7.4 RECOMMENDATIONS FOR FURTHER STUDY**

It would be interesting to determine the efficacy of such a programme over a longer time period (perhaps a full year), and using qualitative research methods, in line with O.B.E. assessment. In order to maintain uniformity, the implementation of the programme should be accompanied by a teacher's manual, in order to guide teachers towards effective implementation of this programme.

While a longer time period would be more beneficial for learners, implementation of related subject material in order to reinforce aspects of the programme would assist in long-term changes in learning styles and therefore added support educationally.

#### **7.5 SHORTFALLS OF THIS STUDY**

Besides the influence of well-researched factors, and the confounding by extraneous variables (as mentioned in chapter 4), there are unique individual idiosyncrasies that contribute to overall development of learners --- factors which can influence the study's results. These differences are also evident on the part of the facilitators involved in the implementation of the programme, resulting in the probable compromising of the intended effect of the programme.



In addition, cultural idiosyncrasies also present problems in assessing the impact of a learning programme of this nature, due to the fact that cultural values, beliefs and language usage influence the individual's differential learning ability.

## 7.6 IN CONCLUSION

General research findings suggest that the application of the intervention/learning programme and the programme support provided by classroom teachers is a complex issue. The relationship between a learner's achievement and a teacher's expectations has been well documented by researchers: "Children tend to achieve according to their teacher's high expectations and succumb to their low estimates in self-fulfilling prophecies" (Short, Frye & Homan 1999:387). There is increasing evidence of the need for positive encouragement so as to boost learners' self-esteem and belief in their abilities. However, some learners are more difficult to encourage than others, teacher support in the classroom therefore being one of several elements that influence the degree of success each individual learner experiences (Short et al 1999:400).

The aim of the programme is to create awareness of one's unique purpose in life. Holistic thinking is an important concept throughout the programme, in that it is aimed at unlocking latent potential. Learner outcomes include belief in one's self and ability, enhanced self-concept, motivation and purpose, confidence and determination, while facilitating awareness of the need to accept responsibility for one's own future. The main aim of the learning programme is to fill a gap in education. The emphasis should be education's contribution to stimulating potential. In the words of Cogar and Raebeck (1989:96): "Something is missing at the heart of education. It can only be recovered through co-operation and collegiality of administrators, teachers and students. The result will be well-rounded, well-prepared citizens."

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