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## Series B Volume 6

## LITERACY IN AN ABORIGINAL CONTEXT

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# PREFACE

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Series Editor

# INTRODUCTION TO
# SERIES B VOLUME 6

Literacy in an Aboriginal context is a complex concern. As the first four papers in this volume indicate, factors that need to be considered are psychological, sociolinguistic and anthropological as well as more directly educational.

The fifth paper is of a different mode but it too presents a factor for the literacy worker to consider — the growing importance of Kriol as an Aboriginal language. Whether one considers it a simplifying or complicating factor, it cannot be ignored.

All of the contributors are SIL field workers who themselves face the challenge of literacy in an Aboriginal context.

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# CHARACTERISTICS OF ABORIGINAL COGNITIVE ABILITIES: IMPLICATIONS FOR LITERACY AND RESEARCH PROGRAMMES

W.H. Langlands

## 0. INTRODUCTION: TOPIC, PURPOSE AND SCOPE

Even a short time spent in association with Aboriginal people, particularly those from a traditional background, will be sufficient to convince the sensitive non-Aboriginal that these people are different. Closer acquaintance will almost certainly bring an awareness that these superficial differences observed in activities and material culture are accompanied by deep rooted psychological, sociological, linguistic and spiritual differences which are manifest in a distinctive Aboriginal way of thinking.

The research of Harris (1977)[1] at Milingimbi, an Aboriginal community in Australia's Northern Territory, has far-reaching implications for those interested in Aboriginal education. Employing the method of participant observation, Harris explores situations of Aboriginal learning and teaching as it goes on in everyday life. He also looks at the kinds of sociolinguistic rules which operate in these situations. His findings show that Aboriginal people differ markedly from non-Aboriginal people both in learning methods and patterns of sociolinguistic interaction. These findings are in line with many overseas studies comparing western and minority culture teaching/learning contexts. (Take for example the work of John [1972] and Dumont [1972] which revealed a marked difference and even conflict between the way non-Indian teachers expected Indian children to learn and the way these children expected to learn and to be taught.)

Harris, generalising from his work at Milingimbi, summarised some of these differences between Aborigines and non-Aborigines in a paper presented at a conference of teachers of Aboriginal children. Figure 1 is taken from a published form of that paper.

FIGURE 1

THE MAIN FEATURES OF ABORIGINAL LEARNING PROCESSES (Harris 1978:4)

| Most non-Aboriginal learning in Australia is FORMAL, i.e. conducted as follows: | Most Aboriginal learning is INFORMAL, i.e. conducted as follows: |
|---|---|
| in specifically educational institutions and buildings | without specifically arranged educational institutions or buildings |
| by trained teachers who have a specific office of teacher | by various relatives |
| with the content having little immediate application to everyday life and survival | with the content having immediate relevance to, and arising out of, everyday life and survival |
| largely through verbal instruction (while there is much informal learning in western society - such as in the home - this is still accompanied by much more verbal teaching than is the case in Aboriginal society) | largely through non-verbal means |
| is often imparted in compact highly organised 'courses' which take comparatively little time | in most cases is time consuming with most skills being learned over many years |
| learning is often a highly conscious process | learning is often not a highly conscious process |

Harris expands what he means by 'largely non-verbal means' by giving examples of how he observed Aborigines learning by observation and imitation and personal trial and error. Aboriginal education is traditionally carried out, it seems, by 'real-life performance rather than through practice in contrived settings', through 'mastery of context specific skills rather than abstract, context free principles', and with an 'orientation to persons (most often close relatives) rather than to information' (1978:5,6).

Other relevant characteristics of Aboriginal learning summarised by Harris are

1. present and past-continuous rather than future time orientation
2. cultural conservatism resisting change
3. an upbringing which encourages independence
4. a definition of knowing which means as much 'the right to know' as it does actually 'knowing'
5. the use of persistence and repetition as a problem solving approach rather than an analysis-before-action approach

In the area of sociolinguistics, Harris (1978:8) makes the important observations that

1. Aboriginal languages do not allow for 'why' questions in the sense of 'for what reason' and they will often resist questions requiring 'if.....then' analysis or hypothesising about other people's motives for doing things. 'White teachers often fail to recognise that this classroom question and answer technique is a western classroom ritual. Aboriginal people are extremely pragmatic and see no sense in teachers asking questions when it is obvious that they already know the answers.'
2. In Aboriginal society there exists a right to speak and the right not to listen.
3. Aborigines do not equate restlessness and movement in audience with rudeness.
4. There is a tendency, due to the lack of an impersonal debate form in Aboriginal language, to avoid strong talk and direct verbal confrontation.

Many of these findings are clearly crucial for those involved in any education programme directed toward Aborigines. But as Harris (1977:447) has rightly pointed out, if we are to really understand the ways in which Aborigines can best learn, we must not only define external behaviours related to learning and communication but we must also recognise that ' learning is an internal and phychological process and ultimately a psychological explanation for how yolngu [Aboriginal] children learn is necessary.' In his research Harris has sought to demonstrate 'that yolngu students are in the ways their minds function as well as in cultural terms different from balanda [non-Aboriginal] students.'

It is the purpose of this paper to look at the characteristics of Aboriginal cognitive abilities and in particular those abilities which may be involved as Aborigines learn to read. Harris's work

along with other relevant research is considered in the paper. In broad outline the paper takes the following course. Section 1 considers the concept of cognitive ability and seeks to explore the relationship between external behaviour and environments and their cognitive correlates. The theories of functional learning system and cognitive style as taught by several writers are discussed.

Because the present author is primarily concerned with how best to teach Aboriginal people to read, section 2 attempts to find out which cognitive abilities are involved in reading and learning to read.

Having limited our present purpose to exploring reading-related intellectual skills, we proceed in section 3 to look at some cognitive ability of different ethnic groups. The purpose of this section is to enable us to infer, on the basis of the theories of functional learning system and cognitive style, where we may expect to find differences in cognitive skills between Aboriginal and non-Aboriginal people.

The purpose of section 4 is twofold: firstly to summarise the findings on Aboriginal cognition that may be relevant in helping Aborigines learn to read, and secondly to discuss some of the possible implications of these findings in the reading education sphere.

Section 5 attempts, in the light of overseas findings and our understanding of cognitive abilities involved in reading, to delineate areas where further research needs to be done if we are to 'know what we are doing' in teaching Aborigines to read. The paper concludes with a plea for interdisciplinary research, practitioner observation and recording of observation, publication and co-operation in efforts to bring education to Aboriginal people.

At this point I would like to say that the present paper has a number of limitations. Firstly, what is said here can in no way be considered complete but is rather a work paper in an area of interest written as a learning experience for the author. It is an attempt to find out and present in an orderly fashion some facts about Aboriginal cognitive abilities which may guide the writer in his efforts to develop a literacy programme in a traditional Aboriginal community. Secondly, what is presented here ignores much earlier research on the subject and almost certainly omits to take account of some recent studies which were simply unavailable to the author. Thirdly, in this paper I have limited myself to literature from cross-cultural psychology. Psychologists testing Aboriginal people naturally work under difficulties.

So Brislin (1976:29) writes:

> Assume a white psychologist is giving a test, such as the Peabody Picture Vocabulary Test, to Aboriginal Australians. Among such people for whom testing is not common, the performance on the test can be due to any of these factors: real competence which the test is designed to measure; unfamiliarity with the test materials; nervousness in the presence of the test administrator; indifference at working on a test whose relevance is not obvious; total boredom; purposeful efforts to sabotage the research; ingratiation tendencies, leading to responses the test-taker thinks the administrator would like to see.

Clearly the results of cross-cultural cognitive psychological studies need to be taken with caution. This is one of the reasons why I have emphasised later in the paper the need for a multi-disciplinary approach to such studies. There is a real need for the 'light' discovered by one discipline to be used to scrutinise the discoveries of others' research.

For these reasons the conclusions of this paper must be taken as tentative. Aside from the above limitations, factors of a motivational, cultural, social and linguistic nature need to be considered if we are to fully understand problems and effectively design programmes that will advance Aboriginal reading education. This paper, limiting itself as described above, does not consider all these factors. Despite these limitations it is hoped it will help to provoke discussion and prove in this way to be of some use.

In the paper the term 'cognitive abilities' is used in the sense of 'the total profile of intellectual abilities of the individual'. (A more limited use of the term by Guildford is discussed in section 1.1.)

## 1. COGNITIVE ABILITIES, FUNCTIONAL LEARNING SYSTEMS AND COGNITIVE STYLE

In this section we are interested in the basic questions, what kind of cognitive abilities are there and how are these related to or shaped by a person's cultural environment?

### 1.1 COGNITIVE ABILITIES

Factor analytical studies of human intellect have led to the discovery of numerous components of human intelligence. Each

component is a unique factor needed to do well in certain kinds of tasks. There are a large number of components but they can be grouped into bunches which resemble one another in certain ways. J.P. Guildford (1959, 1967) gives a model of intellect which groups the components of intellect along three different dimensions. These are

1. the kind of process or operation performed using these aspects of intellect
2. the material or content processed in these operations
3. the products which result from the processing of content.

About the first of these Guildford writes (1959:470), 'This kind of classification gives us five major groups of intellectual abilities: factors of cognition, memory, convergent thinking, divergent thinking and evaluation.' Cognition in this model is defined as discovery or rediscovery or recognition. Memory is the ability to retain what is cognised. Divergent thinking is one of the two kinds of productive thinking. In divergent thinking the mind searches in several directions looking for new, novel or original solutions to problems. Convergent thinking, the other kind of productive thinking, leads to one 'right answer' or to the recognised 'best' or conventional answer. In evaluation the learner is deciding upon the goodness, correctness, adequacy or suitability of what he knows, remembers or produces through productive thinking.

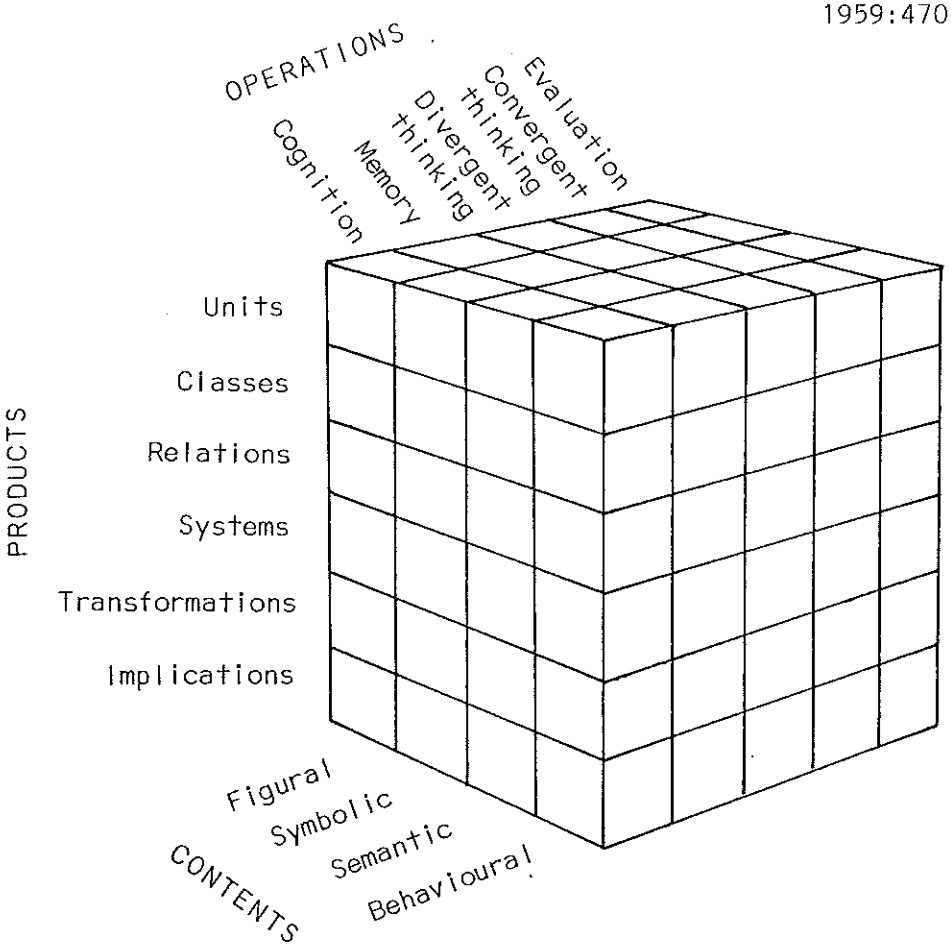
There are four kinds of material which the intellect processes. They are figural, symbolic, semantic and behavioural. Figural content is concrete material perceived by means of any of the senses. It does not represent anything but itself. Symbolic material on the other hand is composed of letters, digits and other conventional signs usually organised into systems such as alphabets or number systems. Symbolic material represents figural, semantic or other symbolic material. The semantic content of operations is material in the form of meanings to which words have become attached. Semantic content is largely verbal thinking and verbal communication. Behavioural material will not be discussed here.

When an operation is applied to a particular content, as many as six different kinds of products or forms of processed information may result. These Guildford calls units, classes, relations, systems, transformations and implications.

Guildford represents these three modes of classification of the factors of intellect in a single solid model which he calls the 'structure of intellect' (figure 2). Each dimension represents one of the modes of variation of the factors.

FIGURE 2

THE STRUCTURE OF INTELLECT (Adapted from Guildford 1959:470)




Guildford (1959:471) writes:

> Each cell of the model calls for a certain kind of mental ability that can be described in terms of operations, content and product, for each cell is at the intersection of a unique combination of kinds of operation, content and product.

He then proceeds to explore the model and give examples of the kinds of tests that he sees as being used to test a person's ability in each cell of the model. The problem with any model of intellect is, of course, that no matter how complex, it is almost bound to be an over-simplification. So for example, the operations of thought do not function on a one-at-a-time basis. There is constant interaction between the ongoing processes of thinking. Thus Wilson,

Robeck and Michael (1969:402-403) write:

> Evaluation operations interact continually with the other operations. Raw data, from the environment and from the body functions or soma, are processed by cognition, which is evaluated, stored in the memory bank and transferred to convergent production or the outcome is added to input from the memory bank and from outside the system, evaluated and run through further production processes, which are also evaluated, stored and modified and removed from the system either to the memory bank or to external output.

Even considering the Guildford model at face value without the above-mentioned interactions and complications, there are 4 x 5 x 6 or 120 different mental abilities. And one may assume that any given individual may have any combination of strengths and weaknesses of these 120 mental capacities as his total intellectual ability. We must now consider how culture and environment may affect the development of an individual's intellect. We will return to Guildford's model in section 2.

## 1.2 CULTURE AND COGNITIVE ABILITIES

Do cultural factors, that is the formal and informal educational influences brought to bear upon the children of a culture from the moment of birth, exert an influence upon that people's characteristic intellectual structure? Or putting it another way, are there characteristic patterns of differences in the combination of strengths and weaknesses of cognitive abilities which distinguish one cultural group from another? No doubt all cultures will train their members to use a variety of cognitive abilities. We certainly do not want to insinuate that any cultural group will be without, for example, any of the operations or avoid the use of some of the types of content or fail to produce any of the various products.

> We are unlikely to find cultural differences in basic component cognitive processes [Guildford's operations], but ... socio-cultural factors play an important role in influencing which possible alternative processes (visual or verbal representations for example) [Guildford's intellectual abilities] are evoked in a given situation and what role they play in the total performance. (Cole and Scribner 1974:193)

Rather we want to suggest that a person's cultural environment will train him to use certain factors or components of cognitive ability to a greater or lesser extent than others. Thus in the process of cognition, for example, we could surmise that some cultural groups

would place greater emphasis upon the development of the kinaesthetic rather than the visual factor of cognition or on the visual rather than the auditory factors of memory, and so on.

If, as we suggest, there are such cultural differences (the reader may want to reserve judgment until evidence of such is presented in sections 3 and 4), how can they be accounted for? Why should culture produce such an effect? Harris says (1977:456),

> If adaptation to the challenges of a person's social and physical environment for the purposes of survival is the most meaningful indicator of intelligence (as Piaget believes), then it is reasonable to expect that different environments and economics and social systems will require different systems of thinking for intelligent adaptation.

This is why when we are comparing mental abilities across cultures it is not very meaningful to look for amounts of intelligence in the western psychological sense but rather to ask the question 'Intelligence for what?' A human being's adaptation to his environment will strengthen or amplify the mental capacities necessary to meet the challenges of that environment. Brunner in *The Relevance of Education* (1974:68) writes:

> What is most unique about man is that his growth as an individual depends upon the history of his species - not upon a history reflected in genes and chromosomes but, rather, reflected in a culture external to a man's tissue and wider in scope than is embodied in any one man's competency. Perforce, then, the growth of mind is always growth assisted from outside . . . the limits of growth depend on how a culture assists the individual to use such intellectual potential as he may possess . . . What a culture does to assist the development of the powers of mind of its members is, in effect, to provide amplification systems to which human beings with appropriate skills can link themselves.

### 1.2.1 FUNCTIONAL LEARNING SYSTEMS

The theory of functional learning systems, first propounded by Vygotsky in the late 1920s in Russia and developed by others since, seems to provide an effective way of explaining the relationship between culture and thinking. The roots of the theory are found in Marxist views that people do not have fixed mental capacities but rather that they transform themselves through actions aimed at

survival. 'Marx's central idea . . . is that man's nature evolved as man worked to transform nature' (Cole and Scribner 1974:3).

Functional learning systems develop within an individual so that he can cope with his physical (economic) and social (mental/emotional) environment.

> The idea is that the social and economic history of a society causes changes in ways of thinking, both in terms of the content of thought and the processes of thought . . . higher psychological functions . . . such as voluntary memory, active attention, abstract thought . . . are organised into different functional systems in response to the different needs of historically and culturally determined practical and theoretical activities. (Harris 1977:458)

So while we may say that children from different cultural groups are born with the same range of genetic potential for intelligent thought, they actively participate in their own mental development by acquiring through cultural transmission the functional tools of thinking they need to shape their own environment. Just as tools and weapons (the making and use of which are culturally taught) determine a person's ability to shape his physical environment, so culturally transmitted tools of thinking, designed to cope with the environment, shape each individual's use of his mental processes in grappling with his surroundings. Harris (1977:459) gives examples of such culturally varying tools of thinking. He includes such things as

> school learning (which deals with other than the here and now), types of children's play (which rehearses future adult roles), use of inner speech (which is a private use of verbalisation for problem solving), literacy (which alters the role of memory and which also trains people to deal with other than the here and now), or training in mathematics (which stimulates the growth of quantitative perception), and so on.

It seems possible therefore that the differing pressures of social and economic survival give rise to different profiles of cognitive abilities which have become known as functional learning systems. Each culture is a repository, devisor and transmitter of amplification systems and devices which mold the individuals within a culture, not only giving them a distinctive set of artistic, literary and economic skills, but a characteristic intellectual profile.

## 1.2.2 COGNITIVE STYLE

The study of the relation between perception and environmental factors is also of importance to us here. This work has led to the concept of cognitive style. (Perception is defined here as that part of the cognitive process by which people organise and experience information that is primarily of a sensory origin; Cole and Scribner 1974:61).

Broadly speaking there are two 'types' of perceptual cognitive style, although these are really the two ends of a range or continuum of perceptual outlooks. These types as identified by researchers (e.g. Witkin 1967; Berry 1971, 1974a; Berry and Annis 1974) are commonly termed 'field-dependent' and 'field-independent'. The former type of perception (also called 'global') focuses on the whole and has difficulty picking out the parts; the latter (also called 'articulated') is analytical, focusing on the parts.

According to Berry (1971, 1974a), the major experiential factors affecting the development of field dependence or independence are child-rearing practices (the social environment), the physical environment in which the child lives and the means by which the child's society wins survival within that environment. As an example of the effect of child-rearing practices Berry suggests that a personally insecure, over-protective mother who treats her child as if he is younger than he really is, controls aggressive behaviour and restricts exploration of the environment will tend to produce a field-dependent child. As an example of the effect of physical environment, people who live in a desert or an ice-land waste which are low-contrast environments would, according to Berry, tend to be high in field-independence.

Berry in one study was able to gain support for a model which relates ecological, socio-cultural and psychological variables as shown in figure 3. The main ecological dimensions explored are those of low food accumulation and high food accumulation. These are, of course, typified on the one hand by hunting and gathering societies and on the other by many agricultural societies. The model predicts that low food accumulation would be associated with field-independence while high food accumulation would be associated with field-dependence. Once again as with earlier discussion we must sound a note of caution. Berry is at pains to point out the limitations of his model. He notes that it depicts correlations and not necessarily causative relationships. Within many societies there is also a tendency to a field-dependent/independent dichotomy between men and women. There is a range of degree of dependency within every society. The most that can be said is that there is a general tendency for cultures to range between these two extremes of perceptual-cognitive orientation.

Broadly speaking, then, if we accept the concepts of functional learning system and cognitive style, we may say that different cultures for reasons of survival 'push' intellectual growth in different directions. But as Harris (1977:456) is at pains to point out, we must ask the question concerning intellectual growth 'Intelligence for what?' Problems mostly arise it seems when people from one culture are forced by circumstances to cope within the framework of another, using a cognitive style and functional learning system not appropriate to the new environment. It would seem, in the light of all this, that if Aboriginal people are to be introduced to skills like reading and mathematics which are foreign to their culture, those responsible need to take account of possible differences in configuration between western and Aboriginal cognitive profiles.

FIGURE 3

ECOLOGICAL MODEL: SOCIAL AND PSYCHOLOGICAL CORRELATIONS
(Adapted from Berry 1974a:171)

| ECOLOGICAL | Low food accumulation | High food accumulation |
|---|---|---|
| SOCIO-CULTURAL | | |
| Population Density | Low | High |
| Social Structure | Egalitarian Atomistic | Hierarchical Stratified |
| Family Structure | Nuclear | Extended |
| Socialisation | Lenient Supportive | Harsh Restrictive |
| Social Relations | Reserved Fragmented | Mutual Dependence Integrated |
| PSYCHOLOGICAL | | |
| Perceptual-Cognitive Style | Field-Independent Analytical | Field-Dependent Global |

## 2. COGNITIVE ABILITIES INVOLVED IN READING

### 2.1 READING AND THE STRUCTURE OF INTELLECT

Which of the numerous cognitive abilities are involved in the task of reading? Edmund Burke Huey in his book *The Psychology and Pedagogy of Reading*, first published in 1908, recognised that

> to completely analyse what we do when we read would almost be the acme of a psychologist's achievement, for it would be to describe very many of the most intricate workings of the human mind . . . (1968:6)

More recently Smith wrote (1971:205-6):

> As more than one authority has observed, the ultimate solution to the question of how reading is accomplished will provide an explanation for human thought.

In 1963 George D. Spache attempted to relate known reading behaviours to the model of the structure of intellect produced by Guildford. He presents his ideas in three charts which have been reproduced in figures 4 to 6 of this paper. The first of these (figure 4) looks only at the symbolic content classification of Guildford's model, which for reading Spache sees as letters, numbers and words. Spache attempts to show how a reader, using each of the five processes, will produce intellectual products that are units, classes, relations, systems and transformations. In general the vertical columns (Unit to Transformations) represent an increase in the complexity of the task of word recognition, although it should be emphasised that Spache's figure has the same kind of limitations as Guildford's model. In point of fact a reader tends to combine various cues from each of the vertical columns as his word recognition skills mature.

FIGURE 4

READING BEHAVIOUR IN SYMBOLIC CONTENT (Spache 1963:240)

| Mental Processes | Unit | Class | Relations | Systems | Transformations |
|---|---|---|---|---|---|
| Cognition (recognition of information) | Recognition of printed word as such | Recognition of difference among letters, words and numbers | Recognition by word form and letter details, as *little* | Recognition of phonic characteristics, i.e. initial and final sounds | Recognition of word endings (plurals, or roots and affixes) |
| Memory (retention of information) | Recall of specific word forms, e.g. own first name, house number | Recall of random words, letters and numbers in isolation (reading signs) | Recall by word form and details (sight vocabulary) | Recall of complete word by combined clues, e.g. initial sound, sentence pattern and form | Recall of word endings (s, ed, ing) root or affix |
| Divergent Production (logical, creative ideas) | Neologisms, word form errors | Recognition by distinctive detail as *g* in *dog;* capital letters | Recognition by base word within larger, compound words | Spontaneous phonic and structural generalisations | Experiments with derived and base words |
| Convergent Production (conclusions, inductive thinking) | Recognition by pictorial clues, shape of sign, etc. | Recognition by sheer length, as *grandmother;* or by unusual shape, as *elephant* | Recognition by sentence pattern, word groups | Recognition by word families, common syllables, roots, etc. | Recognition of derived words by base plus ending, or root plus affixes |
| Evaluation (critical thinking) | Comparisons of differences and similarities in gross form | Discrimination of words, numbers, letters | Discrimination by form, details and sentence pattern | Discrimination by form, details and phonic elements and sentence pattern | Discrimination of base and derived words by endings, letter sounds, sentence pattern, root and affixes |

Figures 5 and 6 both deal in a similar way with two kinds of semantic content. Figure 5 looks specifically at the meanings of words while 6 is concerned with sentences and paragraphs.

Spache recognises that none of these figures fully represents reality. All are an oversimplification. All the possible reading behaviours are not included nor would every reader necessarily manifest all of these behaviours. Concerning figure 6 he writes (1963:66):

> This figure oversimplifies the process of comprehension in reading, in that words are not only units, but also form classes, relations and so on. Sentences also certainly form systems, transformations and the like. Moreover, the figure does not include all types of reading behaviour which occur in dealing with words or ideas.

FIGURE 5

READING BEHAVIOURS IN SEMANTIC CONTENT OF WORDS
(Spache 1963:386)

| Mental Processes | Unit | Class | Relations | Systems | Transformations | Implications |
|---|---|---|---|---|---|---|
| Cognition (recognition of information) | Recognition that printed word has meaning | Recognition of word function—naming, action, descriptive, pronominal, connective | Recognition of word associations and relationships, e.g. synonyms, onomatopoeia, alliteration, rhyme | Recognition of implicit comparison in hierarchies of words (temporal, spatial, intensity) | Recognition of inherent meaning in roots, affixes and inflectional forms | Recognition of word connotations, figures of speech and presence of tone and mood |
| Memory (retention of information) | Recall specific word meanings (denotations) | Recalling specific meaning thru recognition of function, e.g. this word is a thing | Recall the associated word (synonym, etc.) and thus recall meaning of given word | Recall of base word and meaning, recall of other degrees in the hierarchy, e.g. recognized *strongest* through *strong* | Recall of meaning of base word or of root and affixes | Recall of specific connotations and meanings of figures of speech |
| Divergent (logical, creative ideas) | Secure meaning from context by inference, guess | Recognizing examples of unusual or new usage, e.g., *Mae West* | Using mnemonics to recall meaning | Using trend of hierarchy to recognize comparison and thus derive meaning for given word | Recognizing words containing new, or assimilated, condensed or related affixes and roots. Discriminating differences in meaning due to variants | Free association to connotations, i.e. daydreaming or imagery; recognizing new figures of speech, new connotations, allegories |
| Convergent (conclusions, inductive thinking) | Meaning from context by sentence structure (appositive, explanation, contrast, definition) | Relating specific meaning to antecedent, to accent and contextual clues to function of the word | Try associated word (synonym, etc.) in context and thus derive meaning intended for given word | Given a group of words, formulates a tentative hierarchy | Use of structural analysis as clues to meanings; dictionary study of derivation | Using connotation, tone and figurative language to interpret context |
| Evaluation (critical thinking) | Critical reaction to author's choice of words | Reacting to author's usage, to use of slang, colloquialisms, etc. | Discriminating differences among synonyms and antonyms; recognizing irony and sarcasm | Reacting critically to shades of meaning, to exaggeration, hyperbole | Reacting critically to shades of meaning imparted by variations in affixes | Detection of author's use of emotionally-toned words, analysis of figurative language, tone or mood |

FIGURE 6

READING BEHAVIOURS IN SEMANTIC CONTENT (MEANING AND IDEAS)
(Spache 1963:67)

| Mental Processes | Unit | Class | Relations | Systems | Transformations | Implications |
|---|---|---|---|---|---|---|
| Cognition (recognition of information) | Recognition that word has meaning | Recognition of sentence as complete thought | Recognition of paragraph meaning (literal idea of paragraph) | Recognition of types of relationships within structure of paragraph | Underline key words of paragraph | Recognize that there are implications in author's main idea |
| Memory (retention of information) | Recall specific word meanings | Recall of thoughts of sentence (reverberations) | Comprehend main idea as summation of sentences (reverberation) | Summarize facts of paragraph in own words with due attention to structure | Combine recall with own associations | Choose possible implications from given alternates |
| Divergent Production (logical, creative ideas) | Meaning from context by inference | Selecting implied meaning of sentence | Choosing implied main idea | Analyze author's reasons for structure | Construct rebus of paragraph; offer new titles for paragraph | Amplify author's implications and ideas in free association |
| Convergent Production (conclusions, inductive thinking) | Meaning from structure of context (i.e. appositive sentence) | Combining ideas into literal meaning of sentence | Evolving main idea as extension of topic sentence | Categorize structure of paragraph; outline it | Choose among alternate titles or statements of main idea | Suggest future applications of author's ideas |
| Evaluation (critical thinking) | Acceptance or rejection of author's diction | Acceptance or rejection of meaning of sentence, as fact-opinion | Acceptance or rejection of main idea as fact or opinion; check author's sources; compare with own experiences and beliefs | Look for fallacies in logic, appeals to reader's emotions, over-generalizations, omissions, distortions | Identify author's viewpoint and purpose; compare with other viewpoints; explore the ultimate outcomes of acceptance of author's viewpoint | Check author's background as basis for viewpoint; react to author's value judgments; examine author's basic assumptions and inferences from these |

## 2.2 PERCEPTUAL ABILITIES IN READING

Spache's categorising of reading behaviour according to the process, content and product of intellectual activities, if it does nothing else, serves to demonstrate that reading potentially involves many of the intellectual abilities postulated by Guildford. It appears also that our understanding of what cognitive abilities are involved in reading is still very much a theoretical one and obviously an incredibly complex subject about which there will be a great deal of discussion for some time to come. Even if we concern ourselves purely with perceptual abilities (part of the process of cognition), a practitioner like A.E. Tansley, long involved in the teaching of reading and remedial reading, can write (1967:11):

> Research has not yet demonstrated unequivocally what perceptual abilities are important in reading. However, we can postulate with some degree of certainty those abilities which appear to be involved.

Turning from the purely theoretical we find that writers like Tansley can claim to have demonstrated, through practical experience, that the following perceptual abilities are important for reading (Tansley 1967:12-26):

1. form perception and classification
2. hand-eye motor co-ordination
3. visual copying
4. visual memory
5. completion and closure
6. appreciation of visual rhythm
7. visual sequencing
8. temporal sequencing (e.g. of pictures)
9. visual discrimination
10. auditory sequencing and rhythm
11. Tansley (1967:39) also distinguishes the abilities associated with phonic analysis as vital in reading. These include:

    a. appreciation of rhyme
    b. ability to discriminate between letter sounds
    c. ability to blend sounds
    d. ability to associate sounds with visual representations

Tansley (1967:91) points out further that 'Reading is not a visual and auditory skill alone but involves the integration of other sensory channels to a greater or lesser degree.' He identifies those channels involved as the visual, auditory, kinaesthetic, motor and tactile-cutaneous (haptic). These channels of perception do not work in isolation from each other, and for this reason he has found it necessary to test the extent to which a student has learnt to

integrate these. The following have been identified as important in some aspect of reading or writing (Tansley 1967:94-97):

1. visuo-motor integration
2. visuo-auditory integration
3. visuo-kinaesthetic integration
4. visuo-haptic integration
5. audio-haptic integration
6. haptic-kinaesthetic integration

It appears that in learning to read, all the senses are utilised. Thus for example haptic-kinaesthetic integration is important for the translation of auditory and visual stimuli into writing but it is also important because memory of pressure and movement in writing strengthens and enriches visual perception (Tansley 1967:67).

In a discussion of tests available for diagnosis of reading problems, Tansley (1967:115-119) examines the Illinois Test of Psycholinguistic Ability (I.T.P.A. See appendix for a brief description of this test.) He indicates that disabilities as measured by this instrument are associated with acute reading problems. The ten subtests of the I.T.P.A. measure ability in the following areas:

1. auditory decoding
2. visual decoding
3. auditory-vocal association
4. visual-motor association
5. vocal encoding
6. motor encoding
7. auditory vocal automatic
8. auditory-vocal sequencing
9. visual-motor sequencing

Dr Winifred Currie, lecturer in remedial reading, is a firm believer in eclectic approaches to reading instruction. She believes that when attempting to help a student to learn to read, there should be careful assessment both by informal observation and formal testing to ascertain intellectual strengths. Reading instruction, Dr Currie says, should use methods which will utilise these strengths. In her assessment of students she considers the abilities listed in figure 7 as the most vital.

Thus far we have considered perceptual factors, and to a lesser degree factors of memory, that are of importance in reading. Spache's theoretical distribution of reading behaviours into charts based on the Guildford model seem to indicate that the other intellectual processes, divergent and convergent thinking and evaluation, are relevant in reading and learning to read. Stauffer (1977) seems to show this also in a paper on the teaching of comprehension in reading. In comprehending a written passage a reader apparently uses

FIGURE 7

SKILLS FOR BEGINNING READERS (Currie 1978)

| | |
|---|---|
| Auditory | recognising auditory differences<br>recognising auditory sequences<br>blending individual sounds to wholes<br>reproducing auditory patterns |
| Visual | recognising visual differences<br>recognising visual sequences<br>joining individual parts to wholes<br>reproducing visual patterns |
| Motor | recognising motor differences<br>recognising motor patterns<br>copying forms from model<br>reproducing motor patterns |
| Compre-hension | telling what is happening in pictures<br>choosing appropriate words to complete sentence given orally<br>telling story about teacher-given topic<br>retelling a story given by the teacher |

divergent thinking to assess the possible alternative meanings (using memory of previous experiences as a basis). From this point he proceeds to re-examine available data, testing each meaning, and thus converges upon the most likely meaning of the text. Evaluative thinking enables him to assess whether he has in fact made a hypothesis as to meaning which will match the data. Spache also seems to imply (see figure 4) that even when working on symbolic content (as distinct from semantic content with which we would normally associate comprehension) these thinking processes are involved.

## 2.3 COGNITIVE DEVELOPMENT

A person's intellect is not fixed from birth but is constantly changing. For this reason we must give some consideration to the question of cognitive development. Piaget identifies four stages of

growth which he calls sensory-motor (to 2 years of age), pre-operational (2 to 7 years), concrete operations (7 to 11 years) and formal operations (11+ years). We need only consider the last three of these. (Ages here apply to western societies. They may not apply to other cultural groups.)

In the initial years of the pre-operational stage, thinking is transductive. Children are unable to consider more than one or two factors at a time and cannot reverse their thought to test if conclusions are true conversely. Generalisations thus made are often wildly inaccurate. In reading it is therefore

> not altogether surprising to find children guessing 'they' for 'yellow' and not being able to use the context as a clue to aid identification . . . (Goodacre 1971:22)

Gradually as visual identification becomes more accurate, little words may be observed within bigger ones.

> At this stage, however, it is probably extremely difficult for children to break up the slowly acquired sound pattern of words in order to relate phonemes to graphemes or even to distinguish morphemes. (Goodacre 1971:22)

Reading at this point of development is essentially a whole word process using word shape and perhaps beginning and ending letters and some other word features as identification aids.

Later in the pre-operational phase the child begins to think intuitively. He may be able to make better generalisations using a number of factors and begins to discover for himself the principles of phonic analysis. He will discern, for example, that words begin in similar ways. He may also begin to realise that the same symbols may represent different sounds (e.g. 'g' in 'ginger' and 'g' in 'garage'). It may be some time still, however, before he realises the reverse of this, that similar phonemes can be represented by different letter combinations (e.g. 'seat', 'meet', etc.).

During the concrete phase the abilities of reversibility and conservation develop, making it possible for the child to classify objects and experience on more than one variable, separate like and unlike, and to generalise more or less accurately. He can now see groups within groups — letters in words, words in sentences and identify capitals and lower case letters as members of the same class. At this stage he is able to seriate, order and sequence, and realise the importance of position of symbols (e.g. of letters in 'was' and 'saw', 'bad' and 'dad'; Goodacre 1971:23). By now a child

has begun, by the use of reasoning, to formulate his own phonic rules and may start the transition from beginning to fluent reading behaviour.

At the formal level of development the reader develops flexibility and maturity in reading. He learns to adjust his reading rate to the type and difficulty of material. He is now able to develop new concepts purely from written material without reference to the concrete. Reading matter is mentally organised so as to obtain overall meaning.

As one would expect, the growth of perception, cognition and memory are related to overall cognitive growth. From an early age children are able to visually distinguish shapes but as late as 6 to 9 years of age, still have problems with the spatial orientation of shapes. Younger children often have difficulty with letters that require direction for identification. Ascenders, descenders and angled shapes produce rotation and reversals. The relationship of one shape to another (sequencing and series relationships) are also a problem to young children, as is the development of appropriate and systematic scanning techniques necessary for the left to right process involved in reading. Centration, the tendency to fixate upon one aspect of the visual stimulus, makes seriation and classification difficult for small children. Writing practice (visual-motor, haptic and kinaesthetic integration) and the use of naming through language (visual-auditory integration) is vital for the development of discrimination in reading.

Goodacre (1971:59-60) also stresses the need for the development of visual memory. The whole word or phrase must be remembered while the configuration, length, individual letters and sequences of letters are discerned. Tansley (1967:11) writes:

> efficient reading involves the ability to keep a whole word or phrase in mind while simultaneously attention is paid to parts of the words or phrases. Without this ability there is a failure in discrimination and particular confusion over words which are of similar visual pattern.

Both experience and training enable this ability to develop but this capacity does not usually develop until a child has reached the later phases of the pre-operational stage or the beginning of concrete operations stage.

The perceptual abilities we have been discussing above can be measured by various tests like, for example, The Marianne Frostig Developmental Test of Visual Perception. The various subtests of

this battery give scores for

1. hand eye co-ordination
2. figure ground perception
3. form constancy
4. positions in space
5. spatial relationships

Tansley 1967 (pp. 12-22, 88-129) includes his own diagnostic devices of a non-standardised nature.

Auditory discrimination is also the product of intellectual development. To learn to read a child must, according to Goodacre (1971:72-73), develop the ability not only to

> differentiate each sound of his language from every other sound but also to hold each in his mind well and long enough for him to moderate his speech or make accurate comparisons between the sounds he distinguishes and their representations on the printed page.

Fine auditory discrimination such as is needed to distinguish between word pairs like 'hat' and 'mat', 'ball' and 'beach', and 'butter' and 'buzzer' does not normally develop until a child is 8 or 9. Figure 8 quoted in Goodacre (1971:75) shows the approximate ages at which children master the various speech sounds. It is interesting that these are mastered, as is oral vocabulary, according to usefulness in communication. Thus nouns and verbs are mastered before grammatical particles. The relationship between vocabulary items and their actual meaning develops slowly. A child's apparent vocabulary may be quite large but careful examination may reveal a general lack of understanding.

> The use of language structure by a child is not necessarily a guarantee that the child has the understanding some adults would attribute to him. (Goodacre 1971:74)

Younger children not only find the discrimination of some sounds difficult but may also have problems with blending of sounds and the discrimination of sequences of sounds within words. This has significant implications for the teaching of phonics and 'sounding out' word attack skills. Children in western cultures are not usually ready for such work until a reading age of 6.8 to 7.2. There is also, it seems, a chronologically progressive ability to acquire this kind of knowledge about how to read. Those sounds which are more frequently used in the reading task are acquired sooner. Less useful sounds are acquired at a later age.

Perceptual immaturity according to Singer (1976:307) is a major factor in failure to learn to read. Research has shown that children who are rigid in their perceptual processes, limiting themselves to a particular mode or combination of modes, fail more often in learning to read (Singer 1976:304). It seems also that the capacity to read fluently is closely related to level of intellectual development. To begin to read it is important that the learner has reached the stage of concrete operations (Elkind 1976:335) for it is only as he attains this level that he will have developed the mental abilities needed to read.

FIGURE 8

THE AGES AT WHICH CHILDREN MASTER SPEECH SOUNDS

| | | |
|---|---|---|
| Age 3.5 | Sounds | b,p,m,w,h |
| 4.5 | | d,t,n,g,k,ng,y |
| 5.5 | | f |
| 6.5 | | v,th (as in then),sh,zh,l |
| 7.5 | | s,z,r,th (as in thin),wh,ch,j |

Reading, however, is not only a perceptual skill. Truly fluent reading for meaning is dependent upon the ability to conceptualise and to reason about written material, that is, to make and test hypotheses about letters, words and sentences and so on at the phonological, grammatical and semantic levels. Singer (1976:304) points out that readers are often retarded because of their inability to move away from the concrete. Non-achieving readers often lack the flexibility of reasoning needed to do this. Fluent readers, on the other hand, have attained a level of development (formal operations) which enable them to build concepts and reason with concepts without direct recourse to the concrete world.

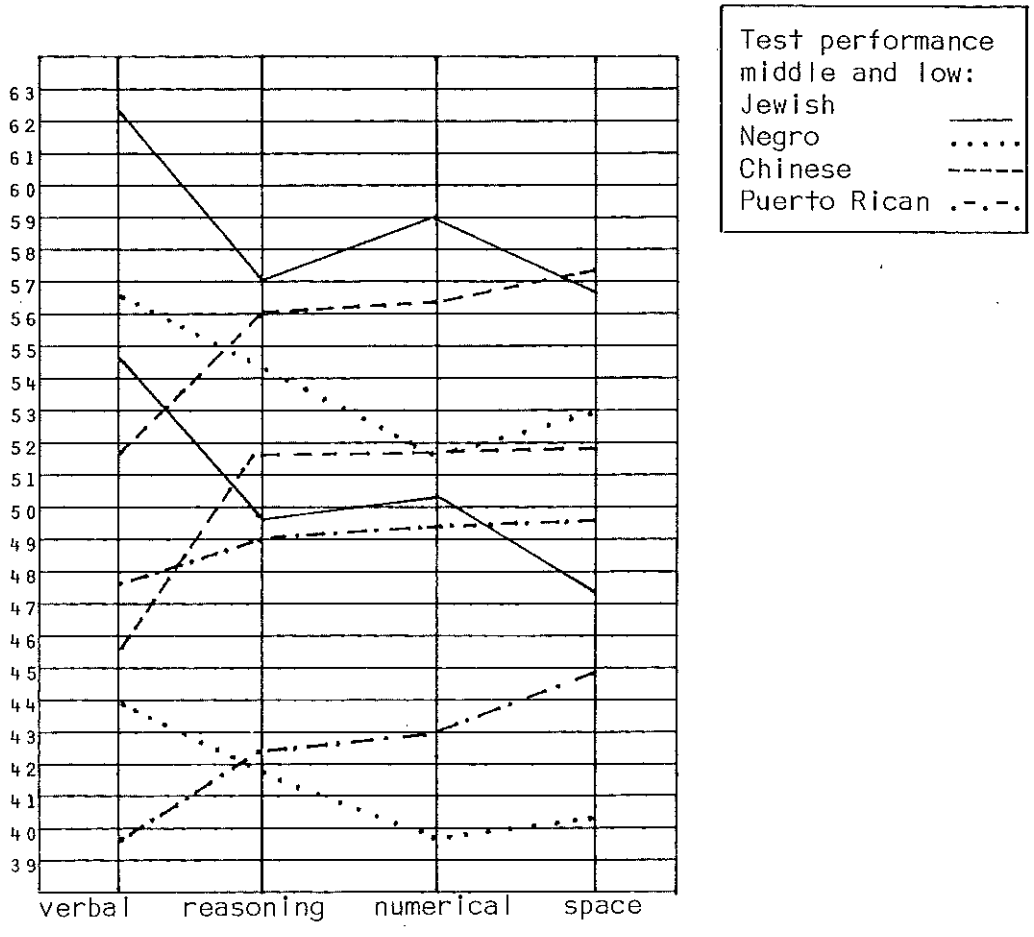
What cognitive abilities are involved in reading? Clearly reading involves all of Guildford's intellectual processes. How many of the separate abilities so classified is still a matter of great uncertainty but especially in the area of cognition it would seem that almost all are directly involved. Many abilities involving the processes of memorising, divergent and convergent thinking and evaluation must also be involved in learning to read and in reading fluently. These are clearly not separate but inter-related capacities which are all subject to ongoing development, and developmental level will greatly affect a person's ability to learn to read and to read well.

## 3. RESEARCH FROM OUTSIDE AUSTRALIA CORRELATING CULTURE AND COGNITIVE ABILITIES

The idea that differing cultural and ecological environments generate distinct patterns (profiles or shapes) of strengths and non-strengths in intellectual abilities has lead to many cross-cultural studies. Miller (1978:152-4) cites a study by Lesser and others which shows on the same graph the profiles of Jewish, Negro, Chinese and Puerto Rican children. The profiles depict scores in verbal, reasoning, numerical and spatial abilities. The graph (figure 9) shows that two groups (middle and low) from each culture have profiles of almost identical shape while each culture has a distinctly different shaped profile from the other.

FIGURE 9

COGNITIVE ABILITIES OF CHILDREN IN DIFFERENT SOCIAL AND CULTURAL GROUPS (Redrawn from Miller 1978:153)



Berry (1974b) suggests that each culture has its own ideal profile of abilities seen as intelligence or brightness. He concludes that what we have been doing with western intelligence tests is to try to squeeze non-western intellects into a western mould. Wober (1974) has written a fascinating paper on the concept of intelligence among the Kigandans (an African group). These people associate words like steadiness, slowness, obduracy, stability, carefulness, active, warm, friendly and sociable with a rare overall quality of man similar, in a way, to the western idea of intelligence.

Because of the variety and number of studies that have sought to compare cognitive abilities cross culturally it has been necessary for the sake of brevity to summarise these in tabular form in figure 10. Our purpose in presenting this table is to provide a background against which we can discuss the question, *What research still needs to be done to enable us to better understand the unique nature of Aboriginal cognitive abilities?* Unfortunately the application of findings in many studies to the everyday practice of teaching reading is often difficult. The workings of the intellect, even in the western world, is still a subject of much conjecture. With the added variables that cultural differences bring into play we are sailing very much in unchartered waters. Even to ascertain the implications of all available material would be a vast task beyond the scope of anything we can attempt here. We have done little more than choose a few relevant studies.

Ideally all the studies listed in the tables below should have been reviewed from the originals. This has not been possible and so some of the entries come from reviews like *Culture and Thought* (Cole and Scribner 1974). Where this is the case, the secondary source has been listed in brackets in the author-date column of the charts. In some cases originals have been available in reprint. In this case, reprint date has been recorded following 'reprinted' in brackets under the original publishing date.

Column one of the charts indicates the topic and in some cases the specific cognitive ability under study. As much as possible these are grouped according to Guildford's process categories beginning with processes of cognition.

Column two lists the groups involved as subjects of research and tries to indicate, where these variables were considered in the study, which extreme of the ecological continuum (high food accumulating vs. low food accumulating) the groups would tend towards. The abbreviations HFA and LFA are used for this purpose.

The third column briefly summarises the results of the study in so far as it could be relevant for the purposes of this paper.

FIGURE 10

SOME CROSS-CULTURAL STUDIES OF COGNITIVE ABILITIES

| Topic of Ability | Groups | Summary of Some of Results | Author Date |
|---|---|---|---|
| Visual and visual spatial discrim-ination | Africa (HFA)<br>Papua New Guinea (HFA)<br>Australian Aboriginal (LFA)<br>Eskimo (LFA)<br>Scottish (Western) | Level of visual-spatial discrimination correlates with ecological demands. Hunters (LFA) strongly orientated toward visual, visual-spatial abilities. (This study also included in figure 11 because of Aboriginal content.) | Berry 1971 (Reprinted Berry & Dasen 1974: 129-140) |
| Eidetic imagery | Ibo (Eastern Nigeria) | Incidence of eidetic imagery dramatically high-er among rural Ibo than among westerners. | L.M. Doob 1964 (Reprinted Berry & Dasen 1974: 197-204) |
| Fine focus of eyes | Various | '. . .fine focusing of the eyes, especially in con-junction with manipulation, may be influenced by early experience.' | Munday-Castle 1974 |
| Audio-visual integration | African European Asian | Audio-visual integration develops at different rates with different people. | Okonji 1974 |
| Interpre-tation of pictures | Bantu Ghanian Western | Ghanian and Bantu groups interpret two dimensionally. Westerners three dimension-ally. Africans draw what they know to be there. Westerners draw what they see. | Hudson 1961 (Cole and Scribner 1974:67-71) |
| Orientation in pictures | African Western | Africans have difficulty in perceiving orientation in pictures. However it is comparatively easy to teach orientation and three dimensional viewing. | Dawson 1967 (Cole & Scribner 1974:83-84) |

FIGURE 10 (continued)

| | | | |
|---|---|---|---|
| Memory | Zumbuku (Zambia) schooled and non-schooled groups | Memory for detail in a story depends upon relevance and experience. School group better at recalling number facts and temporal facts. Social relevance a key factor. | Deregowski 1970 (Cole and Scribner 1974: 124-125) |
| Memory free recall of auditory and visual stimuli | African (Kpelle)<br>American children | Lists of words and a number of objects.<br>American--number and recall and rate of learning improved with age.<br>Kpelle--learned slowly, only slight age improvement.<br>Both groups learned clusters of objects and words better. Americans were more systematic in grouping. Both groups found recall of the concrete easier than just words. Americans still better. | Cole et al. 1971 |
| Memory auditory-visual free recall in association with external cue | Kpelle (Africa)<br>Western | Objects associated with external cues remembered better. Words given with suggested categories remembered better. Story items remembered either by clustering them together or by the context and flow of syntax. Study shows that Kpelle memory is flexible, adjusting according to needs. Memory for story material is apparently not superior to westerners. | Cole et al. 1971 |
| Auditory memory | Ghanian and New York students | Significantly better results in remembering stories among Ghanians if the stories are culturally relevant. | Ross & Millson 1970 (Reprinted Berry & Dasen 1974:205-216) |
| Memory structuring | Kpelle adults | Kpelle people not able to spontaneously organise material to enable ready recall. Others get similar results. | Scribner (unpublished; in Cole & Scribner 1974: 135-136) |

FIGURE 10 (continued)

| | | | |
|---|---|---|---|
| Analytical ability (using various sense data to solve a problem) | Nigerian<br>American (Western) | Nigerians more auditory and proprioceptively orientated in rod and frame test. Americans more visually orientated. Supports functional learning system rather than a cognitive style approach. | Wober 1966 (Reprinted Berry & Dasen 1974:119-127) |
| Inference problem solving | Kpelle (adults and children)<br>American (western children) | A series of studies showed that the poor performance of Kpelle was due to not being able to understand how to begin an unfamiliar task. When the Kpelle were shown how to start they too succeeded. | Cole et al. 1971 |
| Verbal-logical problem solving (syllogistic reasoning) | Kpelle<br>Western | Kpelle attempt to answer problems on an external factual basis, not from knowledge in the syllogism. Western people do not do this. | Cole et al. 1971 |
| Verbal-logical problem solving (syllogistic reasoning) | Kpelle<br>Westerners (Adults and children in both groups) | Kpelle refused to accept the restraints of the text. Westerners kept within limits of the text. Schooling seen as the vital factor. | Gay 1971 (Cole and Scribner 1974: 166-167) |
| Colour vs. form preference in classification | African<br>African School (transitional)<br>Western | Western children classify by colour when young and form when older. Africans show a preference for colour which does not alter with age but does with schooling. | Suchman 1966 Serpell 1969 (Cole & Scribner 1974:92) |

FIGURE 10 (continued)

| | | | |
|---|---|---|---|
| Classification according to function, form and colour | Wolof (Senegal, West Africa) Village, schooled, city<br>Western | Schooling strongly effects preference for form and function classification. School children are more able to verbalise their reasons for classification. The more schooling the more 'abstract' the classification. | Greenfield 1966 et al. (Bruner et al. 1966:270-319) |
| Classification and re-classification of colour, form and number | Mexican (children) | Ability to classify and re-classify using different variables strongly related to schooling and increasing age. Unschooled children perform about as well as grade three children. Schooling provides the dimensions of re-classification. Unschooled children are less flexible and find reclassification difficult. | Sharp & Cole (Reported in Cole & Scribner 1974:106-108) |
| Classification | Ibusa (Africa)<br>Western (Scotland) | When testing with familiar materials no difference in classificatory ability occurs. | Okonji 1971 (Berry and Dasen 1974: 281-292) |
| Classification of familiar objects | Tiv (Zambia Africa) | Classification and re-classification of familiar objects (animals and plants) much easier for Africans. No consistent difference between educated and uneducated. Abstract and concrete concepts used. Familiarity, not just level of abstraction, is relevant variable. Schooling affects classification of familiar objects. Different dimensions used by schooled and unschooled. | Price-Williams 1962 (Cole & Scribner 1974: 116-117) |

FIGURE 10 (continued)

| | | | |
|---|---|---|---|
| Conservation of liquids | Wolof (W. Africa) Schooled and unschooled | Schooling is a major factor in the developing of conservation. Wolof children lag behind because they start school later. Unschooled children conserve later and some never conserve. Cognitive development may be arrested soon after 9. Reliance upon perceptual rather than conceptual data for conserving is characteristic of those who fail to conserve. Many have an 'action magic' idea. | Greenfield 1966 (Bruner et al. 1966:225-256 |
| Conservation of solids | Mexican (Village children) | Experience with the medium increases ability to conserve. Thus potters' children were able to conserve clay. | Price-Williams et al. 1969 (Berry & Dasen 1974:351-352 |
| Weight conservation | Zambian children | 40-50% of Zambian children cannot demonstrate the ability to conserve weight by the time they leave school. | Heron and Simonsson 1969 (Berry & Dasen 1974:335-350) |
| Conservation of space | Zulu (African children) | Stages of development appear as Piaget has discovered but at a later age. Few achieve the level of concrete operations. | De Lemnos 1974 (Berry and Dasen 1974:367-380 |

# 4. RESEARCH FINDINGS ON ABORIGINAL COGNITIVE ABILITIES AND SOME IMPLICATIONS FOR LITERACY PROGRAMMES

## 4.1 ABORIGINAL COGNITIVE ABILITIES

We will now attempt, once again in tabular form (figure 11) to summarise the research findings or at least some of them relevant to an understanding of Aboriginal cognitive abilities. In this table L.S.E.S. stands for lower socio-economic strata, while H.S.E.S. stands for higher socio-economic strata. Abbreviations in the first column, such as I.T.P.A., refer to tests. These are described in the appendix.

FIGURE 11

SOME CROSS-CULTURAL STUDIES OF ABORIGINAL COGNITIVE ABILITIES

| Topic or Ability | Groups | Summary of Some Results | Author Date |
|---|---|---|---|
| Visual discrimination skills<br><br>Visual spatial skills | African (HFA)<br>Papua New Guinea (HFA)<br>Australian Aboriginal (LFA)<br>Eskimo (LFA)<br>European (Scottish). | Aboriginal groups showed themselves as good as traditional PNG and Africans and as good as non-traditional Africans and Europeans in discrimination skills. On spatial skills Aborigines were as capable as both African and PNG subjects (traditional and non-traditional groups). | Berry 1971 (Reprinted Berry & Dasen 1974:129-140) |
| Visual spatial memory and visual sensitivity (reduced exposure and light) | Desert Aboriginal teenagers<br>L.S.E.S. city white teenagers | Visual memory of Aborigines clearly superior. Perhaps Aborigines possess eidetic imagery. Significantly better visual sensitivity could be due to finer acuity or differing sensory mechanism. | Kearins 1976 (Kearney and McElwain 1976: 199-212) |
| Visual spatial memory (Repeat of Kearins' 1976 study) | Coastal Aborigines<br>City Aborigines<br>Country whites | Study did not show Aborigines to be significantly better than whites in visual memory.<br>(However, his other observations convince him of Aboriginal people's superior ability in visual memory. See 1977:483-486) | Harris 1977 |
| Psycho-linguistic abilities (I.T.P.A.) | H.S.E.S. white children<br>L.S.E.S. white children<br>Aboriginal children | Aboriginal children show a deficit in performance in auditory vocal channels of communication. | Teasdale & Katz 1968 (Reprinted Kearney, De Lacey & Davidson 1973: 149-154) |

FIGURE 11 (continued)

| | | | |
|---|---|---|---|
| Conservation of quality, horizontality, seriation and re-classification<br>Verbal intelligence (P.P.V.T.) | Fostered and adopted Aboriginal children<br>Other Aboriginal children<br>White Canberra children | Aborigines with less contact were less able and gained these abilities later than other groups in all but conservation of weight. In this they fared better than adopted and fostered children. Their scores on the verbal ability test were much lower than standard scores and lower than the high contact Aboriginal group. | Dasen et al. (Reprinted Kearney, De Lacey & Davidson 1973:97-104) |
| Classification. Verbal Intelligence (P.P.V.T.) | Part Aboriginal children from a) reserve, b) town.<br>L.S.E.S. whites | Progressively lower measures of verbal ability, operational (classification) thinking with whites, town Aboriginal and reserve Aboriginal. The degree of contact seems to improve classificatory ability. | De Lacey 1971 (Reprinted Kearney, De Lacey and Davidson 1973:155-159) |
| Classificatory ability | H.S.E.S. whites<br>L.S.E.S. whites<br>High contact Aboriginals<br>Low contact Aboriginals | Results show that in general the less contact with European thought and technology, the less classificatory ability. | De Lacey 1970 (Reprinted Kearney, De Lacey & Davidson 1973:269-273) |
| Cognitive development (rate and level)<br>Conservation--quantity, weight, volume, length; seriation; order--linear, reverse, circular; rotation horizontalism | White (urban)<br>Aboriginal<br>a) Low contact<br>b) Medium contact | Development of Aborigines is slower. Concrete operations is only reached in spatially oriented tasks (seriation, order, etc.) A good proportion don't reach concrete operations stage at all. In the area of logico-mathematical skills most Aborigines don't reach the concrete operational stage. The greater the contact the greater the percentage of conservation and the earlier it occurs. Contact improves logico-mathematical skills. Spatial skills do not deteriorate. Aborigines develop spatial skills before logico-mathematical skills. The reverse of the European order. | Dasen 1974 (Berry & Dasen 1974: 381-408) |

FIGURE 11 (continued)

| | | | |
|---|---|---|---|
| Logico-mathematical operations (Conservation of weight, quantity, volume, length, and seriation of length)<br>Spatial operations (linear, circular, reverse order)<br>Horizontality | City whites<br>Central Australian Aborigines Medium and low contact groups | Stages of cognitive development occur with all groups and in the same order. Development is slower with Aborigines and in a good proportion of Aborigines concrete operations is not reached. No difference was found between part and full Aboriginal people. Spatial concepts developed at an earlier age than logico-mathematical but still behind the non-Aboriginal groups. | Dasen 1973 (Kearney, De Lacey, Davidson 1973: 89-104) |
| Conservation—quantity, weight, volume, length, area, number | Elcho Island<br>Hermannsberg<br>Part and full Aboriginal children | Aboriginal children pass through the same developmental stages as white children but more slowly. In conservation they depend upon perceptual rather than conceptual factors in making responses. Aborigines are more successful with weight and quantity and conserve these before other qualities. This is the reverse of the European order. | De Lemnos 1969 (Reprinted Kearney, De Lacey & Davidson 1973:71-83) |
| Verbal intelligence (P.P.V.T.)<br>Operational thinking (classification ability)<br>Divergent thinking (creativity) | Aboriginal and L.S.E.S. European children | Both groups were equally linguistally retarded. In the area of thinking there were no significant differences. This indicates a relative strength in Aboriginal abilities and shows that thinking ability is not tied to verbal skill. | De Lacey and Taylor 1975. |
| Classification ability<br>Verbal intelligence (P.P.V.T.) | Aboriginal, part and full (NT)<br>L.S.E.S. white, country & city<br>White city H.S.E.S. | Aboriginal children are retarded in verbal ability. Full Aboriginal managed as well as L.S.E.S. whites in classification. | De Lacey 1972 |

FIGURE 11 (continued)

| | | | |
|---|---|---|---|
| Divergent thinking<br>Verbal intelligence (P.P.V.T.) | Aboriginal children<br>European L.S.E.S. children | Despite lower verbal ability there is not significant difference between Aboriginal and L.S.E.S. children on divergent thinking. | Taylor and De Lacey 1973 |
| Classification according to<br>a) function<br>b) general class<br>(e.g. tools, footwear) | Country and city Aboriginal children<br>Country and town Europeans | Aboriginal children both 'city' and country showed a tendency to classify more according to function than abstract class. | Harris 1977 |
| Conservation--quantity, length, area, weight, volume, number<br>Psycholinguistic ability (I.T.P.A.)<br>Verbal intelligence (P.P.V.T.)<br>Language competence<br>Basic concepts | Victorian Aborigines<br>White Australians<br>Migrants | Slower initial development of conservation but by the end of primary school have no significant difference between Aboriginal and other groups. Overall results show that Aborigines have a serious deficit in linguistic and conceptual skills. These tests correlated with reading ability. | Bruce et al. 1971 |
| Verbal-logical thinking (syllogistics) | Aborigines (country and town)<br>Whites (country) | Country Aborigines showed a strong tendency to rely upon experience rather than given information to answer logical problems. Town influence caused Aborigines to be less prone to go beyond verbal information. | Harris 1977 |

FIGURE 11 (continued)

| | | | |
|---|---|---|---|
| Pre-causal and para-causal thinking | Aboriginal children and some adults (Elcho Island) | Aboriginal children are pre-causal in their thinking. Older people develop a para-causal mode which allows the simultaneous holding of logically conflicting ideas by using analogy and metaphore. Western elements can be included in their ideas. | Nurcombe 1970 (Reprinted in Kearney, De Lacey & Davidson 1973:105-123) |

## 4.2 SUMMARY AND IMPLICATIONS FOR LITERACY PROGRAMMES

By now it will be apparent that there are vast gaps in our knowledge concerning the reading-related cognitive abilities of Aborigines. In our final section (5) we hope to show where some of those gaps exist. Here we are concerned about the implications of what is already known.

In general terms we would predict from the cognitive style of Aboriginal people and the findings of Harris (see Introduction) that they are non-verbal and perceptually analytical (probably visual) in their approaches to learning. Harris's emphasis on repetition and trial and error would also indicate a possible tendency toward a strong motor learning mode.

An aspect of cognitive style thus far unmentioned and somewhat beyond the scope of this paper needs airing briefly here. The analytical-global dimensions of the intellect are related in cognitive style theory to the personality dimensions of reflectivity-impulsivity. If these dimensions hold good in the more general classification of cultures using the cognitive style theory, then Aborigines should, it seems, tend toward the reflective end of the spectrum. Reading research (Athey 1976:371-372) seems to indicate that reflective individuals learn to read more easily than impulsive individuals. This may indicate a strength in Aboriginal people for reading--or is this too broad an application of the theory of cognitive styles?

From the research studies (figure 11) we can see that Aboriginal people have strengths in visual discrimination and visual memory predictable from Berry's ecological model (see section 1). Psycholinguistic testing using the I.T.P.A. shows that Aboriginal children

have a deficit in auditory and vocal communication skills. Is this due to the largely non-verbal nature of their learning systems? Results of tests of verbal intellectual ability could be interpreted as supporting this conclusion. However, in their own languages Aboriginal people show no obvious deficits in auditory-vocal skills. Probably the best interpretation of these results is simply that those tested did not understand English well. Other factors which may have affected test results are discussed by Brislin (1976:29. See Introduction).

Evidence from several different studies of classificatory ability is conflicting. It is apparent that Aboriginal children may have difficulties in some classification tasks and classify according to function and other non-abstract features far more than non-Aboriginal groups. The ability to be more abstract seems to develop as there is greater contact with schools and western ways.

From the research it seems probable that Aborigines have comparative strengths in the divergent and convergent thinking processes but that there is a strong tendency to depend upon a concrete non-verbal approach to problem solving.

Tests of conceptual development and language competence only serve to show that many Aboriginal people, even those in relatively high contact situations, are severely disadvantaged by current approaches to education in standard English. This is a fact that is already patently obvious in practice.

Work which has looked at the various types of conservation ability has shown that Aboriginal children develop along the same lines as non-Aboriginal children with a minor variant in that they conserve weight and quantity before volume, area, length and number. However other work has shown the rate of development of Aboriginal children is slower and the level of concrete operations is often only reached in spatially orientated tasks. These latter develop before logico-mathematical skills which is the reverse of non-Aboriginal children. A good proportion of children, and by inference adults, it seems never reach the stage of concrete operations, although there is some evidence that increased contact and education rectifies this matter. Logico-mathematical tasks, largely irrelevant in Aboriginal culture, remain beyond the majority of Aboriginal children. Many do not proceed beyond the pre-operational stage although once again increased schooling and contact with logico-mathematical concepts 'pushes' up the profile in this ability area.

One study at least (Nurcombe 1970) indicates that Aboriginal thinking is pre-causal or at most para-causal which means that 'causes' as understood in 'scientific' western thought may not be 'the causes' to the Aboriginal way of thinking. Cause will often be attributed to

anthropomorphic, spiritual or animistic forces. Aborigines may also hold para-causally both western and Aboriginal ideas about the 'cause' of something by using an analogical or metaphorical framework. Such an outlook makes western logico-scientific thought very foreign to the Aboriginal mind.

What are some possible implications of all this for literacy work with Aboriginal people?

1. Aboriginal strengths in visual discrimination and visual spatial orientation, along with superior visual spatial memory, indicate that methods of teaching must be strongly biased, at least in the beginning of learning, toward the visual. If we allow ourselves to take account of the action orientation of Aborigines (as suggested by Harris), we may postulate, although we have no psychological studies to support this idea, that Aborigines have a strongly developed motor and perhaps kinaesthetic-haptic cognitive orientation. This means that we must look for methods that major on visual and visual-motor skills as well. What we seem to be looking for then is a method of teaching reading which strongly emphasises sight (a look and say approach) and motor skills (a multi-sensory approach with a lot of writing of words, sentences and stories). Approaches to reading education like Breakthrough to Literacy (see Mackay et al. 1971) and various language experience approaches may be the answer. The Neurological Impress method, described by Sparber (1979:220-224) may also be very helpful.

2. If Aborigines are to read fluently they are going to have to master the phonic skills necessary to attack the unfamiliar words they encounter. I have already indicated that I believe test results showing that Aborigines have problems in the audio-vocal area are biased because tests have been conducted in standard English and disadvantage Aborigines in other ways. However if further research shows that there are real problems then this will necessitate work being done in the audio-vocal area beginning at the pre-reading stages and continuing on even while beginning reading lessons are majoring on visual-motor skills. The aim of such exercises would be to develop the functional capacities of the Aboriginal intellect to include the necessary audio-vocal strengths. Work would need to be done in auditory sequencing, auditory patterns, rhythm, rhyme appreciation, letter-sound discrimination, blending, association of sound and visual symbol, and auditory memory. Tansley (1967: 12-26, 38-55, 93-98, etc.) has some suggestions along these lines. Because many Aborigines first attempt to learn to read in standard English, they will obviously need prolonged, extensive exposure to this kind of English if they are to succeed.

3. The possibility that a good percentage of any given Aboriginal group may never proceed beyond the pre-operational stage of cognitive development has several implications for a reading education programme.

a. It makes the learning of phonic skills, which are dependent upon the ability to classify symbols on a variety of different variables, unattainable. This fact highlights the need for a pre-reading programme which will help to 'push' classificatory and other skills and so enable the attainment of concrete operations.

b. It also means that work with adults may be extremely slow and could fail in a good number of cases to take them beyond the sight word stage. Many older adults may have lost the flexibility necessary to allow their cognitive abilities to be reshaped to allow for non-cultural skills like reading. For this reason some may never become fluent readers.

c. It seems that even moderate fluency is dependent upon a reader reaching concrete operations. Real facility with critical analysis from the written page, that is the learning of new concepts and then integrating into the total conceptual system, is dependent upon the development of formal operations. For many Aboriginal readers we may need to be content therefore with only moderate fluency. Those involved in Aboriginal education will need to realise that even 'fluent' readers may not find it easy to comprehend new concepts from the written page. Community wide, 100 per cent literacy, it would seem, must be a very long term goal which will be dependent upon far more than the development of a literacy programme. What is really needed is a programme designed to enable Aborigines, whilst maintaining their present cognitive strengths, to develop other skills which are essential for reading — in other words to re-shape their functional learning profile.

d. For all Aboriginal people an orthography which is designed with a one symbol, one phoneme correlation will be far more successful than more complex orthographies like the English one. A simple orthography will reduce the number of variables that need to be handled by the new reader and make the development of phonic rules a much simpler process. When fluency is attained with such an orthography and a reader has the 'idea of how it's done' the transition to a more complex orthography will be far easier for him. Clearly initial reading instruction will be more likely to succeed if it is in the mother tongue of the learner whether that be an Aboriginal language, creole or non-standard English. Orthographies for the first two of these are usually prepared with a one symbol, one phoneme correlation. If non-standard English is to be used, perhaps an alphabet like the i.t.a. would be useful at the beginning stages. (i.t.a., initial teaching alphabet devised by Sir James Pitman and first used in England in 1961, is an attempt to

represent the spelling of English phonemically. It uses an alphabet of forty-four letters.)

e. Because Aboriginal children attain concrete operations later than non-Aboriginal children (if they attain it at all), then they should begin to learn to read later. Work in reading should not begin until 7 or 8 and even then should concentrate upon sight learning whole word approaches with the use of motor reinforcement of visual patterns. Phonic skills should not be expected until later, say 9 or 10 years of age, as they are also dependent upon the child obtaining concrete operations. A great deal of work may be needed before the child can attain these abilities. This will be especially true if standard English is the language being used.

f. Studies seem to show that whilst Aboriginal divergent and convergent processes are comparative strengths in their intellectual system, they are heavily dependent upon concrete sensory data, especially visual data. This again seems to suggest that people will find phonic analysis, which depends upon the comparison of visual and auditory data for the formation of concepts, very difficult.

4. Looking now at studies in verbal intelligence and comprehension, these studies were certainly not 'culture fair', but show us, nonetheless, that if Aboriginal people are to succeed in comprehending what they read it must be written, to begin with at least, in the language they best understand. This is in most cases either a vernacular, creole or a non-standard English. The use of standard English makes comprehension very difficult for the Aboriginal learner, many of whom do not grasp the basic word/concept correlation or the grammatical patterns needed for understanding.

5. Literature must also be carefully prepared so as not to deal with causal, scientific, mathematical-logical and non-cultural concepts until schooling and experience has enabled the learner to develop the necessary skills to cope with these ideas. Literature for adults who may never have a chance to develop facility in these non-Aboriginal modes of thinking may need to avoid such topics altogether if it is to really communicate and thus be useful as teaching/learning material.

All this gives strong support for the use of the language experience approach in teaching Aboriginal people to read and shows also the need for the use of Aboriginal-authored materials dealing with familiar subjects. Translated material should not be used until later in a programme, with fluent readers, and then only when the translator has been careful to write from a cultural point of view. For this reason translators should ideally be native speakers of the language.

All in all we may assume that many Aboriginal people, children and adults, will find western type schooling difficult if not impossible. They may also find the approaches taken by teachers threatening, rude or foreign. Reading will be, in all probability, more difficult and the subject matter about which they read unfamiliar, and the task therefore largely unrewarding. If Aborigines are to succeed, literacy programmes will need to capitalise on Aboriginal cognitive strengths and build Aboriginal non-strengths. But more than this they will need to attend to a multiplicity of other factors which might come under the heading of motivation. Literacy workers dare not neglect the concept of functionalism. Unless people can see some value in learning to read they simply will not attempt this formidable task. Any literacy programme must provide something for the people to read that they want to read, present it in a way that is attractive, and aid the would-be learner by giving him the help to learn that he as a unique individual from a unique culture needs.

It appears that attempts at reading education have by and large failed Aboriginal people. What is needed is a culturally, intellectually and functionally relevant approach to reading education. Behind such an approach there will need to be extensive research. I believe that there are real dangers in educationalists relying too much on research based on a cognitive or developmental psychological model to provide the basis for their programmes. More and more the work of anthropologists, linguists, sociologists and others needs to be closely considered along with psychologists from various theoretical backgrounds. More and more professional researchers need to consider the intuitions and experience of teachers and literacy workers who have learnt by 'bitter experience'.

## 5. SOME AREAS FOR CONTINUED RESEARCH

From the material presented in this paper it is apparent that Aboriginal people, whether it is due to their functional learning system, cognitive style or some other factors not yet uncovered, are different from non-Aboriginal people in their profile of cognitive abilities. It is likely that these differences will make learning to read by the typical approaches taken in most schools and adult education programmes difficult, if not impossible, for a good proportion of Aborigines. While considerable research has been done into Aboriginal cognitive abilities, much of this is of a theoretical nature and the practical application of the results of this work is still far from clear. It is necessary now for a great deal of research to be directed toward practical rather than theoretical ends if we are to know the best ways to teach Aborigines to read. What topics need to be researched? What investigatory model should be used? Who should undertake this work? These are some questions that need answering now.

What do we mean by practically orientated research? The present writer believes that we need not only a strong emphasis on research directed towards supporting psychological theory, as for example the work designed to explore cognitive styles or cognitive development, but there is also a need for work which sets out with the express purpose of looking at reading-related intellectual ability with the aim of helping the teacher and literacy worker better understand the people he is teaching. Careful, well designed studies are needed, but so also is less formal, less controlled research which will give the practitioner and researcher ideas now. Experienced teachers and other personnel involved with Aborigines need to be observing, recording their observations and writing them up in a publishable form for others to read. People who are teaching Aborigines need to stand on each others shoulders, as it were, and not go on discovering and rediscovering and re-rediscovering without sharing the results of their labours.

There seems to be a real case for the use of a variety of investigatory approaches in research. Steven Harris, using a non-psychological approach for the bulk of his work, has pushed educationally orientated research for Aboriginal programmes in a different direction. Many teachers, linguists, literacy workers and adult educators could well emulate Harris's approach to research in other communities.

If we take the materials presented in sections 2 to 4 of this paper, comparing the studies done overseas with those done in Australia in the light of the apparent abilities needed to succeed in the task of learning to read, we may be able to pinpoint some of the more specific areas where research is needed. We have attempted to list some of these below.

1. In the visual-perceptual area, research into Aboriginal visual and visual-spatial abilities of a specifically reading-related nature is needed. So, for example, form perception, visual copying, visual rhythm, visual sequencing, visual discrimination, visual decoding and part-whole relationships should be put under scrutiny. Some informal observations described by Joy Sandefur (see paper in this volume) suggests that there may be real differences between Aboriginal and non-Aboriginal perception of illustrations.

2. Studies in the audio-vocal area are essential if we are to discover the extent, if any, of Aboriginal problems here. These should include work on auditory decoding both in English and the vernacular, auditory vocal association, vocal encoding, auditory sequencing and rhythm, appreciation of rhyme, blending and discrimination of letter sounds. The ability to reproduce auditory patterns should also be tested.

3. The possible motor strengths of Aborigines need exploration. Such abilities as the recognition of motor patterns and differences, copying from a model and many others need to be carefully examined.

4. Sensory integration including the visual, auditory, kinaesthetic, motor and haptic spheres are almost wholly untouched by research into Aboriginal abilities. Overseas studies suggest that there are differing rates of development of integration between the senses for different cultural groups. If this is so then it is possible that work is needed in this sphere.

5. Of particular importance is the need to ascertain what is the optimum age at which reading education should begin for Aboriginal children. Both with children and adults there is a need to be able to decide when intellectual growth has proceeded to a point where reading is possible. Without such information there are likely to be disastrous and discouraging failures. Pre-reading material and reading readiness tests sensitive to Aboriginal needs must be developed. These should be based fairly and squarely on our knowledge of Aboriginal cognitive profiles.

6. Memory is a key factor in reading and is obviously another important topic. We need to know how general Kearins's (1976) findings in visual memory are and perhaps how they are related to any abilities in eidetic imagery. We need also to explore the structuring of Aboriginal memory. How can memory in Aboriginal people be aided? What kinds of groupings, associations and so on will help them to remember best? Clearly there is need to explore not only visual memory but also the auditory and other abilities in memory used in reading.

7. A flexible approach to thinking using a variety of thinking abilities seems to be necessary to develop reading fluency and even to grasp phonic rules. This whole area needs careful exploration. What are Aboriginal strengths in reading-related thinking processes? The practical experience of some who are working in the field of reading education for Aborigines seems to suggest that there are problems, especially for children, in using analogical inference to arrive at conclusions. (This statement is based upon information gleaned in a series of interviews of Summer Institute of Linguistics personnel in 1978 and from personal discussions with teachers of Aboriginal children). We need to know if this is a general problem with all Aboriginal groups or only with some. We also need to know if this is a problem for adults or if it is related to cognitive development or a later pattern of cognitive development and therefore only a problem for some. Studies give evidence of a high dependence upon perceptual data in thinking and also of a preference for known rather than given data. We need to know to what extent this will stop the Aboriginal reader from building new concepts from information he reads.

8. Studies in conservation, classification and so on leading to conclusions about the level of cognitive development are fairly plentiful. What is not clear is the extent that a low level of cognitive development will restrict an Aboriginal person from learning to read if he really wants to.

9. Then there is the vast subject of encouraging cognitive development. What right have we to push for a change in cognitive profile which will ultimately mean that an Aboriginal will develop a more western style of thinking? If we allow it to be a morally acceptable thing to do, how can conservation, causal thinking, logico-mathematical concepts and abstract classification be built into the Aboriginal functional learning profile and his other strengths still retained?

10. It is not within the scope of this paper to consider vital non-cognitive factors such as motivation. This is also a question very much in need of research. What factors will motivate Aboriginal people to learn to read? How much do apparent non-strengths in cognitive abilities for learning to read really matter to a person who is highly motivated to learn?

11. Another important subject is that of the matching of mental abilities, approaches to learning and cultural DOs and DON'Ts to the teaching methods used in reading education. Clearly if socio-cultural and socio-linguistic factors are ignored no amount of psycho-educational understanding is going to help.

Perhaps the most important question that needs to be answered is simply, 'Why should I teach Aboriginal people to read?' Unless the reading educator can give his Aboriginal students a convincing answer to this question then he is probably wasting his time.

## FOOTNOTES

1. Since this paper was written, Harris's 1977 dissertation has been abridged and published as *Culture and Learning: Tradition and Education in Northeast Arnhem Land* (Northern Territory Department of Education, Darwin, 1980). While the dissertation gives a much more detailed account of Harris's research, the material referred to in this paper (often from Harris's 1978 summary) is fully presented in the abridgement.

# APPENDIX

## TESTS REFERRED TO IN THIS PAPER

*Illinois Test of Psycholinguistic Abilities (I.T.P.A.)* This test was designed by J.J. McCarthy and S.A. Kirk and first published by the University of Illinois in 1961. The test uses a case study approach. It gives a psycholinguistic profile showing comparative strengths and weaknesses in the ten different subtests. These are:

| | |
|---|---|
| Auditory reception | Manual expression |
| Visual reception | Grammatic closure |
| Auditory association | Visual Closure |
| Visual association | Auditory sequential |
| Verbal association | Visual sequential |

According to Tansley (1967:115-119) these subtests measure nine different reading-related abilities (see section 2.2 of this paper).

*Marianne Frostig Developmental Test of Visual Perception (F.D.T.V.P.)* is published by Palo Alto, California: Consulting Psychologists Press. This has five subtests (see section 2.3 of this paper) which are designed to identify the level of achievement of younger children in each of the subtest areas.

*Peabody Picture Vocabulary Test (P.P.V.T.)* is an auditory verbal test that has been shown to be valid in both the United States and Australia. The test yields a measure of verbal intelligence. As with many tests that have been administered to Aborigines, there are problems in knowing just what is being measured. Brislin (1976) lists some of these problems (see Introduction). The test is published by the American Guidance Service, Inc., Circle Pines, Minn.

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