LANGUAGE AND THOUGHT: EXPLORING THE IMPLICATIONS OF THE WHORFIAN HYPOTHESIS IN SOCIAL SCIENCE

INAUGURAL LECTURE DELIVERED AT

RHODES UNIVERSITY

on 19th March, 1980.

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INTRODUCTORY REMARKS

In an inaugural lecture there are certain expectations that the lecturer will, in the academic context he finds himself, look forward and back. In looking back, I recall that my first lectures on the theory and ideas of Benjamin Lee Whorf, about which I speak tonight, were given in this University in 1958. These contributed to a single course in General Linguistics which had just been introduced in the Faculty of Arts. As an historical footnote I would draw attention to the fact that that course was the first, in a university in southern Africa, to bear the title of Linguistics.

Coming into the present, my first concern is to record my gratitude to Rhodes University for the opportunity to return to the University which has held my affection through nearly 20 years in foreign fields. As regards the future, my particular position in the Department of Linguistics and English Language requires my contribution to policy and direction, but places decision in the capable hands of others rather more than in my own.

Linguistic relativity, the theme of the Whorfian hypothesis, has fascinated and interested practitioners of language science through two centuries. The upsurge in interest in recent time is due to the fact that Whorf's hypothesis has influenced some important empirical research in the social sciences. My attempt tonight will be to show the nature of this influence and to examine issues in the controversy surrounding the Whorfian hypothesis. I acknowledge with appreciation comments and criticisms made of this essay by Mr A. Traill, Dr J.E. Moulder, and Mr P. Dickens. To these I have undoubtedly not done justice.

The main theme of this lecture and its contents in part, were first presented as the Pienaar Memorial Lecture of 1979 for the South African Speech and Hearing Association.

A glance at the index of many items in the spate of publications on language and society, language and culture, language and mind, in the past quarter-century, shows that the name of Benjamin Lee Whorf has currency lagging not far behind that of Chomsky, Piaget and a few other giants in these fields. This is remarkable for two reasons: First, Whorf died 38 years ago with some 50 articles,[5] but no book, to his name and his stated profession as "insurance engineer". Second, Whorf's hypothesis self-styled as "linguistic relativity" is at best unconfirmed, by some rejected. Whorf wrote on the relation between language and world view, hence language and thought - and thought processes. Whorf was certainly not the first to develop the theme of linguistic relativity. Leibniz, for example, in 1697, suggested that language is not the vehicle of thought but its determining medium. What Whorf did, however, was to philosophize on the basis of data drawn from widely different languages and cultures. He articulated a paradigm presenting the hypothesis sufficiently explicitly and forcefully for it to inspire extensive philosophical debate, empirical enquiry and experimental testing which continue to the present day. Much of the research since Whorf's death has not tested the hypothesis directly, but has resorted to premises in the theory in formulating hypotheses concerning the relationship between language and culture, language and society, language and mind, and similar. Obviously, the results of such research feed back into the theory.

Two significant projects of recent times, having far-reaching humanistic implications, are, on the acknowledgement of their authors, largely inspired by Whorf. The results of research in these projects themselves bring the paradigm to a new stage for testing its validity, or for its reformulation. One research project to which I refer, probably the best known, and certainly highly controversial, is that of Basil Bernstein who created the concept of "linguistic deficit" as a consequence of having been socialized in the lowest stratum in society. The "deficit" vs "difference" controversy regarding language use of the socially disadvantaged, rages on at the

present time. Another project is that of David Laitin, a political scientist to whom I shall return later, who inquired into the insidious effects of a colonial language in Africa retained by newly-independent states as official language, giving rise to change in social values and in the political behaviour which the indigenous culture would predict. The influence of the colonial authority, therefore, lives on long after the colonial presence has disappeared by reason of the retention of the colonial language. The significance of Laitin's research is that it is set up as a test of the Whorfian hypothesis and, in its results, claims to confirm that hypothesis.

Einar Haugen, doyen of modern American linguistics, has pointed out that the way in which Whorf conceived the theory, it is deterministic rather than relativistic. In other words, the nature of the relation between language and thought is cause and effect. Reading one of Whorf's last papers, we agree with Haugen. Whorf stated:

> Study shows that the forms of a person's thoughts are controlled by inexorable laws of pattern of which he is unconscious. These patterns are the unperceived intricate systemizations of his language....every language is a vast pattern system, differing from others, in which are *culturally ordained* the forms and categories by which the personality not only communicates, but also analyses nature, notices and neglects types of relationships, *channels his reasoning*, and builds the house of his consciousness.
>
>   (Emphasis mine, LWL.)

For empirical support Whorf relied extensively on American Indian languages. His knowledge of the language and culture of the Hopi Indians led him to claim that concepts of time captured in the tense system and time words of Hopi would make Einsteinian physics readily comprehensible to them. The Hopi would therefore have been better placed intellectually than the first European physicists who struggled to understand Einstein's relativity. Following this reasoning, the genius of Einstein was in transcending the semantics of the language of

science to think thoughts unthinkable in terms of his established semantic system.

As linguistic relativity the thesis can claim little more than a congruence - a reflection of socio-cultural norms in language. It carries no implications of cognitive limitations or inflexibility in thought processes imposed by the linguistically defined conceptual categories of the language. Thus, English-speakers forced to live in the frozen North would find no insuperable problems in coping with the environment because of being conceptually restricted by only one word for snow, as opposed to five of more different categories of snow defined in Eskimo of the indigenous inhabitants. Cognitive paths around this limitation could be found, creating, possibly, in the process, new concepts and even new words to label them.

Relativity is compatible with a claim that language is the vehicle of thought. Linguistic determinism is obviously the more exciting claim and philosophizing and experimental testing in the Whorfian debate since Whorf's death seem to tacitly assume determinism in a weaker or stronger form. Bernstein and Laitin, if they mean what they say, leave little doubt about this. In 1971 Bernstein[2] wrote:

> Whorf, particularly where he refers to fashions of speaking, frames of consistency, alerted me to the selective effect of the culture upon the patterning of grammar together with the pattern's semantic and thus *cognitive* significance. Whorf opened up, at least for me, the question of the deep structure of linguistically related communication.
>
> (Emphasis mine, LWL.)

In accounting for the differential effect of the Somali language as against English, on the behaviour of bilingual Somalis in his experiments, Laitin[13] suggests:

> A different conceptual framework exists for the same person when he is speaking a different language.

Later he comments:

> Although many observers have noted that
> language is associated with perceptions of
> national identity, it is less often suggested that
> *language helps draw the map* of personal identity.
> (Emphasis mine, LWL.)

This latter statement is, I believe, tantamount to a claim for linguistic determinism.

How has Whorf's theory fared in the extensive philosophical debate and experimental research which directly or indirectly has tested it since his death? In the words of Helmut Gipper (interpreted by G. Steiner[17]):

> Whorf's theses are in their initial form inadequately supported and methodologically vulnerable. But the questions posed by Whorf are of the utmost importance to the understanding of language and of culture. The jury is still out.

Steiner comments further:

> The issues raised by Whorf and the methods he initiated are far from being exhausted or refuted.

In general it is the philosophers (at least some) who have been most inclined to support Whorf. Chang Tun-sun[7], a Chinese philosopher, writing in 1952, observed that Western logic was based upon the form of the subject-predicate proposition which he claimed exists by virtue of the underlying sentence structure in Greek and has been perpetuated because of the same sentence structure in the languages of Western philosophers after Aristotle. Western logic, he claims, is an identity logic. Thus if Y is an attribute then there is always an X to which it is attributed:

An X is a Y.

There is always the "something" X, i.e. a *substance* and this substance becomes necessary in logical thought, but only

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because of the pervasive subject in the sentences which convey the thought. If, therefore, an earth tremor shook this building and many objects, loose bricks and much else fell to the floor, our language would not allow us to say what, apparently, might be quite simply said in a Chinese statement:

A falling.

We are forced to identify what fell, whereas the simple predicate alone seems to be more appropriate.

On the law of identity in Western logic (claims Chang Tun-sun) are based definition, syllogism, conversion and opposition. Chinese logic, however, is a correlational logic finding, in thought, no need for the pervasive equation.

X is Y

except where a relationship of identity or composition between two entities is indeed true. Bertrand Russell, we might note, was also concerned with dispensing with substance in his mathematical logic. We note, too, in passing, that predicate logic (Western) is what Chomsky entertains as the form of the semantics of the sentence. His theory retains its claim as a universal grammar.

I am aware that philosophers will dispute Chang Tun-sun's categoric assertion that Western logic is an identity logic. (Dr. Moulder, formerly of the Rhodes Philosophy Department has made this clear to me.) But we can, with justification, substitute "identity" logic with "substance-attribute" logic and the point of Chang Tun-sun's argument stands.

Division in Western logic, founded on "substance-attribute", consistently applies the rule of exclusion which sets up the dichotomy

X and not -X

Thus the attribute *honest* inescapably implies *not-honest* (dishonest). Chinese logic, apparently, sets up no such dichotomy. So if *honest* is X, then *dishonest* is Y, and there is

probably Z with a reference to what is partly honest and partly dishonest. In place of exclusion there is correlation allowing for differences in degree.

My purpose in referring to logical division is to extrapolate from the discussion on the logician's logic to the logic of everyday thinking to seek for evidence in social behaviour of the consequences of the different orientations in logical thought in the Orient and the West. (We remember Chang Tun-sun's claim that the deep grammar of the respective languages determines logical form.) The general semanticists, concerned with the consequences of language-induced illogical thinking on the fate of man, make much of a fallacy in Western thinking which they term "two-valued logic". Hayakawa[10], a general semanticist, in an argument leading from exactly Chang Tun-sun's rule of exclusion in logical division (X and not -X), claims that we Westerners are forced by this orientation into oversimplified, all-inclusive generalizations which falsify reality. What is "good" is "all-good" and what is "not-good" is "bad". "In real life, however, good and bad are usually mixed and it is seldom possible to impose such simplistic categories upon experience" (Hayakawa[10] quoting Korzybski). General semanticists find their favourite examples in the language of politics in Nazi Germany. The dichotomy, Aryan - non-Aryan, was pursued to the point of lunacy dividing art, books, people, architecture, morals, religion in these terms. The following item came from the Nazi Party News Agency on April 3rd, 1937:

> We request that every hen lay 130 to 140 eggs a year. The increase can not be achieved by the bastard hens (non-Aryan) which now populate German farm yards. Slaughter these undesirables and replace them...

This reference to the consequences of two-valued logic in Western thinking is not intended as a contribution to confirming Whorf's hypothesis. I introduced it because it leads to the kind of significant question which shapes experimental research: Is Nazi political rhetoric a non-existent option for

any Chinese Hitler for the reason that it makes no sense to the Chinese?

To return briefly to the philosophers and their attitudes to Whorfian ideas: John W Verhaar is a philosopher (a linguist philosopher, in fact) contributing to the Whorfian debate in the most recent book devoted to it[15]. The editor sums up his views as: Why *not* the world view hypothesis? Other philosophers inclined towards distinctly Whorfian reasoning are Quine[16] and Kuhn[12].

Among the empirical and experimental researchers testing Whorf's hypothesis have been Eric Lenneberg[3,14], Roger Brown[4] and John Carroll[6]. Carroll and Casagrande tested the reaction of children of different ethnic groups to the shape and colour of a set of objects. They hypothesized that Navajo Indian children in grouping objects would respond primarily to shape because of obligatory verb affixes in Navajo determined by distinctions related to shape. English language and culture, however, would direct children to perceive colour rather than shape differences. From their findings these researchers conclude that while there are differences in the behaviour of children from different ethnic groups, these are easily overcome and recede with age. Carroll and Casagrande's conclusions based on their research sum up more or less the findings of empirical researchers testing Whorf's thesis directly: There *are* differences in language-stimulated behaviour, but this does not imply cognitive inflexibility and language-determined mental structures can be modified. Most researchers report on the major methodological problem facing all inquiry of this kind: we only have language to report on cognition and circularity is difficult to avoid. In other words, the variables, notably thought and language, are difficult to isolate. Haugen[15], probably the most outspoken critic of Whorf's ideas has suggested that a way round this methodological impasse may lie in competent bilinguals:
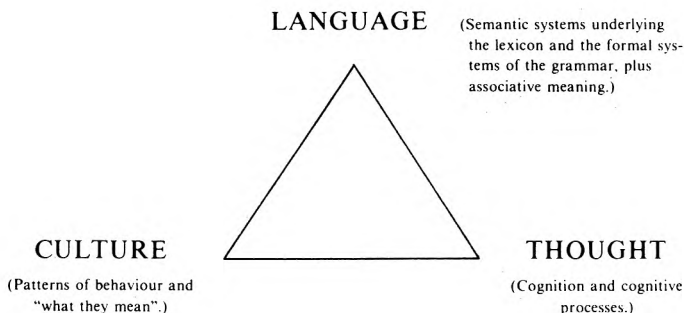
> They are the only ones who can personally testify
> to the differential effect of the "world-view" im-
> posed by different languages, at least if their use

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of them includes actual intimate experience with monolingual speakers of each language.

Laitin, whose research in Somalia I report on later, adopted Haugen's advocation although apparently unknowingly.

II

At this point I find a need for a model which provides the terms for exploring the dependency relations which are the object of this discussion and axiomises what might be accepted *a priori*. The model is a conceptual instrument in terms of which inquiry and experiment are conducted and conclusions stated. Methodologically its claims are weak because it contributes little to the problem of extricating one variable from the others.

LANGUAGE (Semantic systems underlying the lexicon and the formal systems of the grammar, plus associative meaning.)

CULTURE
(Patterns of behaviour and "what they mean".)

THOUGHT
(Cognition and cognitive processes.)

The triangle is a familiar form for this kind of inquiry; developmental psychologists, for example, have reasoning, language and social context in the extremities. Every side of the triangle is to be explored as a complex relationship (a *dependency* relationship in some form is what we are seeking) between adjacent variables. The following "discovery objective" I have set up in order to identify the kind of evidence

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which contributes to the confirmation of Whorf's hypothesis as he framed it:

> The form and processes of one of the three variables extensively influence the form and processes of another to an extent that a change in one predicts some form of change in the other.

In terms of the model the relationship that Whorf claimed may be represented thus:
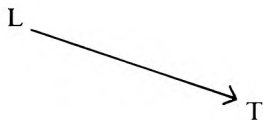
The arrows show determiner ⟶ determinant relationship. First, a brief explication of the variables and a few assumptions.

Culture has many definitions. Here we offer one that sees it as patterned social behaviour: integrated patterns located in and arising from social institutions, the basic social needs of everyday life, and similar. Experimentally, culture is only accessible through behaviour, but behaviour in the kind of inquiry to which we are committed, is not simply activity; thought is implied in the behaviour. Whorf often stated his thesis in terms of "language and world view" and world view implies that meaning is present in behaviour; it is, in other words, motivated - even if it is impossible to externalise the nature of the motivation. For meaning and motivation in patterns of social behaviour, we would identify social values as the major source. Culture, as social behaviour, to be explained in terms of societal values, has no life apart from language which bears entire responsibility for transmitting it from old minds to young; language is the necessary agent of transfer.

Before turning to the variable "language", however, let us reiterate that behaviour implies thought; the behaviours under scrutiny in testing Whorf's hypothesis are goal- directed and purposive and not simply automatic responses. Culture creates

its own symbols apart from those provided by language: thought is stimulated by them and operates on them. The Nazi swastika and the hammer-and-sickle are symbolic of, and create expectations of, behaviour and attitude. These are examples of culturally created symbols with language not directly involved.

Language offers its elements and structures as moulds in which mental representations of the culture acquire shape and are labelled. Without the linguistic means of encoding the culture, it would be subject to progressive attrition in the process of transfer from generation to generation. Language is the necessary agent for transfer in a thousand different kinds of encounter between child and mother, child and child, child and family, child and language text. In our model, the semantic, more than the formal systems of language, are emphasized. In this respect we depart from Whorf's emphasis on closed systems in syntax such as number, gender and tense, as responsible for conveying important aspects of the cultural world view. Uriel Weinreich, shortly after Whorf's death, pointed out that these systems present obligatory choices in small closed sets and this deprives them of great informational value. As linguists, we know that our statements would be surest if our terms of reference as regards semantics were confined to the denotative, i.e. the cognitive or the propositional meaning - as the content of a concept which a word might label. But the very nature of our model and the kinds of data we will eventually be called upon to examine, demand that we include the connotative meaning - meaning by association (associative meanings acquired by long exposure to language in context, i.e. situations in which the using, reading and hearing of words builds up their associative meaning.) Associative meaning is the penumbra of meaning beyond the cognitive core, idiosyncratic (i.e. a product of personal experience) as one works outward from the core, but, nearer to the core, associative meaning is indeed part of the collective consciousness of the society conveyed in language. I am claiming that the way in which language conveys socio-cultural meaning to young minds relies as much on the connotative or the associative meaning of culturally significant words - including the affective force of words and expressions. As an example: in upper and

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middle-class culture in Victorian England one culturally loaded word acting as a powerful agent inculcating cultural values, was *gentleman*. The denotative meaning of this word is trivial alongside knowing what a gentleman did and how he behaved and what gentlemen regarded as right states of the world. Such expressions as "a real English gentleman", "an officer and a gentleman" called compellingly upon young Englishmen to discern the criterial properties of gentlemanly behaviour such as that of Captain Oates walking out into the snow at the South Pole. A good deal of associative meaning defies formalization in linguistics, but we are forced to take it into our model in which language is the vehicle of culture, the essential medium by which culture is conveyed afresh to each new generation.

Turning to the question of empirical evidence of dependency relations, we take first, language and culture; the focus of our inquiry is, remember, on "change in one causes change in another". In this regard, Friedrich's study[9] of the effect of the Bolshevik revolution on the Russian language is of significance. The enormous complexity of Russian kinship terminology in the last century reflected ritual, economic and authority relationships within village communes integrated with familial relationships in a vocabulary of over 250 kinship terms. Taking the basic core vocabulary Friedrich finds, over a period of 100 years, a loss of 50% of these terms involving processes such as: a complete loss of certain terms together with any culturally patterned concern with their referents; other terms entirely lost among some, or employed by a few in sporadic or contradictory fashion; contractions of the referent category; a more inclusive set of denotations. While social change would appear to have brought about linguistic change, Friedrich claims, in fact, that they evolve together, the one consistently influencing the other. As to the influence of language on culture, he states:

> The covert design and audible stimuli of language function primarily as a conservative stabilizing force, as a peripheral feedback system.

Another interesting observation of his is:

> ....no new forms in Russian kinship vocabulary
> have appeared; from one point of view the term-
> inology is eroding away and is running out.

As we turn now to thought and the relationship between language and thought (which is our prime concern), we would assert that what is meaning from the point of view of language is thought from the point of view of mind. Heise[11] has defined a word as:

> a cognitive category which is linked through
> denotative meaning to a referent category
> (representing a class of perceptions) and each
> category typically is bound with affective
> associations or attitudes.

"Associations and attitudes" coincide broadly with the associative meaning of our model. Roger Brown[4] has referred to a word as a "lure to cognition" - specifically at a stage where cognitive development and language development are mutually influencing. As I understand it, he intends this to mean that a new word entering the experience of the child is a call to identify the criterial attributes of referents in the referent category. May I develop the theme further and say that there is an active as well as a passive aspect to this learning. Words also become "plans for action" - ways of behaving - accepting, naturally, that action may on occasions remain at the ideational level. Thus, learning the words *ball, wheel* invites action involving rolling, turning, bouncing - even finding a wall to bounce against. Following this theme into later life, we could claim that certain words *per se* could be programmes for cognitive operations, from simple to complex - programmes for behaviour resorted to in reasoning solutions to problems. For an example let me turn to the game of Bridge and the thought processes involved. To learn what "finesse" is and what it achieves in learning to play Bridge is to set up a reasoning strategy in problem-solving resorted to much more frequently than one of a large variety of other possible ploys which are linguistically unlabelled. In other words, it is

mentally more readily at hand. At least we believe this to be true in the stages leading up to becoming a seasoned Bridge player.

Nothing of what has been said so far should be taken as supportive of a deterministic hypothesis, merely that there is evidence that words as concepts are integrated with cognitive processes of such types as identifying, reasoning and finding relationships; and that they play a role in cognitive development. As symbols they have the power to evoke familiar thought processes, but thought processes do not lie dormant awaiting a word to lift them to conciousness. Compatible with this viewpoint is the acceptance that cognitive operations easily rise above inadequate linguistic resources in solving new problems or adjusting to change in society or natural environment.

III

At this point we leave the model and turn to Laitin's research inspired by Whorf (about one third of his book is devoted to this source of his inspiration). He provides interesting contributions to reformulating Whorf's hypothesis - which at this stage seems more important than validating it. Laitin[13] claims to have demonstrated experimentally that "the language a person speaks influences the way he perceives and acts in the world". Laitin's evidence relates to the influence of language on political behaviour and in this regard we have already suggested that he actually entertains a deterministic hypothesis. Two incidents he cites puts us into his mind as to the train of thought that led him to Whorf. He refers to Nutting's description of the 1952 *coup d'etat* in Egypt when, on the eve of the coup, Nasser is said to have come to one of his close associates, overflowing with emotion and said to him in English, "Tonight there is no room for sentiment, we must be ready for the unexpected". His associate asked him why he had spoken in English, and Nasser replied with a laugh that Arabic was not a suitable language in which to express the need for

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calm. Laitin also cites Pratt's comment on the differential effects of the use of Swahili versus English as the language of cabinet meetings in Tanganyika. He noted that the use of English facilitated clear, precise decisions and the decisions were therefore more "bureaucratic in tone". Swahili, on the other hand, the language of political life, with "an expansive style of exposition which was often imprecise" led to less clear decisions, more political in tone.

Laitin's experimental research is set in a school in which there were a substantial number of Somali-English bilinguals in a relatively isolated Somali population in north-east Kenya. Laitin postulated that

> any change in values or beliefs or actions that emerged from the use of the English language that were different from what emerged from the Somali language could well be attributed to language as a social institution.

I will cite only one facet of political behaviour in which Laitin gives apparently convincing evidence: "the understanding and deference to authority". Laitin demonstrates convincingly that egalitarianism is a dominant social value in Somali society having few parallels in Africa. He reveals that there are "no defined roles which give a person special authority". His most convincing results emerge in a role-playing situation in which a teacher in a secondary school and the headmaster confront each other regarding an examination in English set by the headmaster which the teacher regarded as too difficult. When role-played in English, the rights and privileges of the headmaster in an authority role were the justification, the confrontation tending to terminate in conflict and, in some cases, strong language. In the Somali language the encounters were mostly resolved quite differently and discussion hinged on whether a difficult or an easy test was better pedagogically. Laitin concludes "...both 'teachers' and 'headmasters' were seeing different people and making different claims depending on what language they were speaking" (p 207).

Laitin claims that the differences in language determined the major differences in behavioural responses. In a review of

Laitin's book I posed the question: Why in fact did the headmaster's role played out in English not produce more conciliatory behaviour which a knowledge of Somali culture would have predicted? It is entirely within the competence of English to allow for this kind of behaviour. Laitin claims that it was the English language which predisposed his subjects to behave in an authoritarian way. As devil's advocate we might offer an alternative interpretation having no Jekyll and Hyde implications and not involving language directly as the independent variable. For most of his presence in Northeastern Kenya and Somalia, the Englishman existed mainly as an authority figure - as policeman, soldier, colonial officer, even as a headmaster. What the use of English might have evoked in Laitin's role-playing experiment was the behaviours of the stereotype well-remembered by the Somali. His subjects were not, therefore, compellingly directed to authoritarian behaviour by English as language (i.e. by English words), but by English as a socio-cultural identity closely linked with well-defined stereotypic behaviours and attitudes.

IV

Now I turn to some of my own thoughts on Whorf's hypothesis. A line of inquiry that I have recently followed relates to Bushman language and culture. Numeration is a complex cognitive structure acquired very early in life. Language is the necessary agent for its acquisition, but later in life it is brought into operation in problem solving and reasoning either through language or numerical symbols. Surely few other cognitive structures are, in our everyday life, involved as frequently as numbers in solving minor and major problems. But what of a language and culture in which there are only vestiges of such a system? The !õ Bushman language has only the numbers 1 - 3 and no system of compounding. The information I needed about Bushman language and behaviour was to hand in the knowledge of the !õ language and life possessed by Mr Tony Traill and Mr Patrick Dickens of the Department of Linguistics and Phonetics of the University of the Witwatersrand, who have both spent long periods with the

Bushmen in the Kalahari. Mr Dickens spent a year in an experimental settlement where an attempt was being made to provide the knowledge and skill which would help the Bushmen cope with twentieth century society. Mr Dickens has had the peculiar experience of teaching decimal numeration so that Bushmen should understand money and money transactions. I asked him whether there was any evidence in the behaviour of the desert-bred Bushman of a lack of cognitive malleability when it comes to conceptualizing numbers and also how problems involving quantification were solved in the absence of numbers higher than three. His replies I give more or less verbatim: "The idea that numbers greater that three might exist was not strange to them. I used English number words phonologised in !õ and from thirteen years of age on they quite quickly learned to count and to multiply. There was no apparent difficulty in grasping tens and units and to see 100 in ten piles of ten sticks". Developing numeration conceptually had to be supported by non-linguistic experience and Mr Dickens supplied the references for numbers beyond ten on the toes of the children. Numeration as an abstract system must obviously have a foundation in real-world experience. Mr Dickens did give thought as to how in their previous nomadic food-gathering life, his Bushman adults solved quantification problems in which we would automatically resort to numbers. In the dry season water is stored in ostrich eggs buried in the sand at recognisable spots which Bushman bands pass in their wanderings. This water supply provides the barest minimum for existence. Isn't there a need to know how big a band such a water supply will sustain? Mr Dickens concluded: "Counting would certainly have been useful, but where need demands, it is apparently possible to tell what is enough or too little without counting." What the experiment of teaching decimal numeration to Bushmen amounts to is a finding similiar to Carrol and Cassagrande's experiments[6] with object sorting in Navajo:

There are difference in behaviour between Navajo and English speakers but these are easily overcome and recede with age.

Mr Dickens had another quite different observation which quickly drew my interest. His success with teaching numbers coincided with failure to get the Bushmen interested in making gardens, growing the food which had become part of their diet. He failed entirely to arouse any interest in the early stages of gardens - tilling the soil, planting seed and tending young plants. In attempting to find a reason for this he advanced a linguistic explanation. In this Bushman language there is inherent ambiguity in many terms which in English are named and conceived of differently when in the incipient or process state as distinct from the realised or completed state. Thus there is in !õ only one word for

animal (edible)	and	*meat*
firewood	and	*fire*
bark	and	*quiver* (made from bark).

Linking the phenomenon with experience with gardening, Mr Dickens formed the following hypothesis for Bushman semantics:

> If X gives rise to Y in time
> then X will have the same name (word label) as Y
> provided X alone give rise to Y and the time span
> separating them is known.
> (X = firewood; Y = fire).

With tests of the Whorfian hypothesis in mind I framed this somewhat differently. The analysis of English semantics seems to require the semantic component "realization". This is the main or only criterial difference separating, for example:

look	and	*see*
aim	and	*hit*
pursue	and	*·catch*
study	and	*learn*

Not all languages encode "realization" linguistically, however. Lee Ballard writes as follows on Inibaloi, a language spoken by

a small group living in the high mountains in Luzon, Philippines:

> The *realization* component (is) unusual in that its presence is not overtly marked (in language); it is only discerned in context (of the text) or the extra-linguistic context or both.

Similarly we can assume that in !õ *fire* and *firewood* are disambiguated in terms of non-linguistic context. One can hardly claim, though, that there is no conceptual grasp of the difference, simply that the difference is not represented in linguistic structures. The problem with gardens and gardening seems to be that it is an unfamiliar cultural experience - a pattern of behaviour having little meaning. Until the total experience becomes familiar, Bushman participation and initiative in this respect cannot be established.

But this happy prediction does not dismiss the possibility that at this moment a linguistic lacuna precludes the adoption of a need-filling behaviour. "Realization" represented in "fire" as the achieved goal of "firewood" and "meat on the plate" as the purposively derived outcome of "meat on the hoof", might be conceptually bound to these specific experiences, hence "achieved goal" as a synthesis and abstraction has not yet a well-defined, independent representation mentally. This condition precludes it from entering into mentally constructed future worlds; gardens as the calculated outcome of seeds and cultivating are, for the desert-bred Bushmen, in a future world. Possibly, therefore, we have a case of an "impossible thought" by reason of a particular semantic property - a limitation imposed by the medium by which life-experiences are encoded. This is no more than speculation on a possible line of inquiry. I must not press the Bushman case too far; as so often happens in linguistic inquiry, the apparently obvious disintegrates into obscure complexity as knowledge increases. But we currently lack experimental sites for testing the hypothesis and I cite this as the kind of case in which language (in Whorf's terms) "causes a person to notice or neglect relationships in his world".

Before taking my own thinking to any form of conclusion, may I cite another experiment providing interesting evidence: Cole *et al*[8] investigated differences between cultures in ability to compute measurements. The cognitive abilities of Yale University students were tested in this respect. They were found to be superior to Kpelle rice farmers in West Africa in the estimation of a number of different types of measurement. When, however, it came to estimating amounts of rice, the rice farmers were found to be significantly superior to Yale students.

V

Finally, my own view of the issues raised by Whorf's thesis; issues which, I believe, have considerable import for all humanistic research and inquiry in any way concerned with thought and thought processes. I will introduce this with a quote from a recent text in developmental psychology - a study of language and cognition as developmental processes in childhood. There is currently a new-found emphasis on the role of context which is at the same time critical of Piaget's apparent disregard for the role of language. Walkerdine and Sinha[18] stated as follows:

> It is through a coding of the situational context that the child or adult perceives a problem and therefore sets up solution strategies. The formal system of language is *one way in which we code the attributes of situations.* Language serves to draw attention to features of a situation. A child's or adult's understanding of the referential rules of application coded in a lexical item in a particular situation determines the way attention will be focused....since the child (or adult) uses strategies which are dependent on his interpretation of the context, and since the interpretation is overlaid by his understanding of the identifying terms, according to the meanings attributed to them,

from his previous experiences his performance
will, to some extent, reflect the dynamic character
of the relationship between cognition, language
and context.

<div align="right">(Emphasis mine; LWL.)</div>

Linguistic structures and cognitive structures are fleshed out mentally with some form of representation of the variables that occur in real-world situations (contexts). Language and context (coded as categories of experience) co-exist in our minds and are mutually supporting and mutually evoking. Language may "code the attributes of situations", but situations are mentally stored in terms of those attributes - not the words that label them. Quantification as language and quantification as thought flowed smoothly in the minds of Kpelle rice farmers when rice was physically present in the context; the same subjects did nothing like as well, however, when, for example measuring distance. Through experience and possible inducement to participate in gardening, Mr Dicken's Bushmen might, in time, begin to think, behave and even speak in new words in an area of experience which at present has no significance for them. I offer the opinion that it is not language alone which limits them cognitively, not language alone which will ultimately release them, but a total experience in which thought, language and behaviour are interactive and interdependent in terms of mental function.

Laitin's experiments did not, in fact, disengage language from social context, or from thought, because it is not possible to do so. His error was a failure to see that language entered into his experimental settings in two ways: in the experiment I described, English words were the means of conveying ideas and attitudes between participants; but English *per se* was also a situational feature or attribute defining and distinguishing a situation type. "Thought" therefore derived more from situation than from English words.

I suggested the notion of "change creating change" as a principle in setting up experiments to test Whorf's hypothesis. The evidence I have introduced into my discussion suggests that change begins in the situations of real life; but language,

thought and the mental coding of context are all present in the minds of those involved in these situations. The stimulus for change seems normally to come from real-world encounters and consequently to be taken up into the collective social mind in the categories of language, and into cognition generally and the mental representation of context. These in an integrated way, constitute the response to a stimulus perceived in the world of our experience.

In essence therefore: It is indisputable that deep-seated differences exist between cultures in the manner in which they interpret, hence think about and manipulate, the world ot their experience. It is an interesting and important academic exercise to isolate language from other mental representations of our world and it can be done because language as a mental structure is so richly labelled and explicitly structured. But in doing so we falsify the true state of symbiosis between the symbolic systems of the mind. I believe, therefore, that causal relations between language and thought will not, in any substantial way, ever be revealed experimentally.

BIBLIOGRAPHY AND REFERENCES

1. Ballard, D.L. 1977. The semantic component *realization* in Philippine languages. *Philippine Journal of linguistics.* 8, 1 and 2.

2. Bernstein, B. 1971. In: A.S. Abramson, *et al.* (eds.). *Current trends in linguistics 12.* The Hague, Mouton.

3. Brown, R.W. and Lenneberg, E.H. 1954. A study in language and cognition. *Journal of abnormal and social psychology,* 49.

4. Brown, R. 1958. *Words and things.* The Free Press.

5. Carroll, J.B. 1956. *Language, thought and reality.* Wiley.

6. Carroll, J.B. and J.B. Casagrande. 1958. The function of language classification in behaviour. In: E. Maccoby, T. Newcomb and E. Hartlet (eds.). *Readings in social psychology.* New York, Holt.

7. Chang Tun-Sun. 1952. A Chinese philosopher's theory of knowledge. *ETC,* IX, 3.

8. Cole, M., J. Gay, J. Glick, D. Sharp. 1971. *The cultural context of learning and thinking.* Tavistock.

9. Friedrich, P. 1966. The linguistic reflex of social change : From Tsarist to Soviet Russian kinship. *Sociological inquiry,* 36, 2.

10. Hayakawa, S.I. 1974. *Language in thought and action.* George Allen and Unwin.

11. Heise, D.R. 1967. Social status, attitudes and word connotations. *International Journal of American linguistics,* 33, 4, Part II.

12. Kuhn, T.S. 1970. *The structure of scientific revolutions.* University of Chicago Press.

13. Laitin, D.D. 1977. *Politics, language and thought. The Somali experience.* University of Chicago Press.

14. Lenneberg, E.H. 1953. Cognition in ethnolinguistics. *Language,* 29.

15. McCormack, W.C. and S.A. Wurm (eds.). 1977. *Language and thought. Anthropological issues.* The Hague, Mouton.

16. Quine, W.V. 1969. *Ontological relativity and other essays.* Columbia University Press.

17. Steiner, G. 1978. *On difficulty and other essays.* Oxford University Press.

18. Walkerdine, V. and C. Sinha. 1978. In : Markova (ed.). *The social context of language.* Wiley.