

THE FOCUSING HYPOTHESIS

STUDIES IN SPEECH PATHOLOGY AND CLINICAL LINGUISTICS

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Volume 3

Alison Wray

The Focusing Hypothesis

THE FOCUSING HYPOTHESIS

THE THEORY OF LEFT HEMISPHERE
LATERALISED LANGUAGE RE-EXAMINED

ALISON WRAY

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For my mother

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Foreword

This book concerns the examination of one simple issue: if the right hemisphere of the brain, rather than, as everyone has supposed, the left, were to be the one normally active in routine language processing, would we notice? The answer, drawn from standard definitions of the nature of the hemispheres and their interaction, appears to be no. Therein lies the discussion.

Presenting what are quite complex issues in enough detail to adequately argue the case has entailed some difficult decisions regarding the best structure and sequence for the various parts of the text. At times it has been necessary to put something aside and return to it later (notably in chapters four to six where a basic account of each investigative area precedes an evaluation of its results), in order not to distract the reader from the more central thread of the current discussion. I have endeavoured to make it clear at every point what I am doing in this regard, but I am still conscious that at times a discussion may seem to be left hanging, only to resurface elsewhere without much warning. I have provided a basic outline of the hypothesis in the Introduction, in the hope that this will make it easier to identify and follow the underlying argument in the main text. I am painfully aware of a number of important issues that I have declined to discuss, including some which are apparently central to the argument. These are areas which are too far outside of my domain of knowledge to allow me to be more than blandly superficial about them. I would rather leave others more suited to the task to expand on these and, of course, to evaluate my whole argument in the light of them. In my defence I might argue that it would be rare indeed to find someone who had the necessary expertise in *all* of the areas pertinent to a discussion of language processing in the brain. Whatever I may *not* know in the fields of neurology and psychology I hope I may have compensated for by drawing the reader's attention to some of the *linguistic* issues, the intricacies of which seem to be far too readily overlooked by many psychologists, despite their obvious relevance.

My thanks are due to a number of people who have provided invaluable help through comments on earlier drafts of this book, most particularly Patrick Griffiths, Chris Code, Niklaus Miller and an anonymous reader. I have tried to fairly evaluate all their suggestions but, of course, the shortcomings of the work remain my responsibility. Thanks also to many friends and colleagues, particularly Martin Ball, Bob Le Page and Paul Meara for their heartening words of encouragement.

Notes on Terminology

1. Analytic and Holistic

Analytic processing is contrasted here with *holistic* processing. *Holistic* is used in preference to *synthetic* even though the terms are largely interchangeable in the literature. This distinction is made because, according to its etymology, *synthesis* means ‘the construction of a whole out of parts’, which is at odds with the *holistic* approach to processing described here.

2. Left and Right Hemisphere

References to the *left* and *right hemispheres* are made in lieu of the terms *dominant* and *nondominant*, which are considered inappropriate in the context of the hypothesis presented here. *Dominant* is widely used by others to refer to the left hemisphere, with the *dominance* relating to language (as opposed to any other) functions, but the terms are problematic in any case (Buffery 1974: 229). Not all individuals are *left hemisphere dominant* for language, but it is generally considered that some 96-98% of right handers and 70% of left handers are (O’Leary 1982:55) and, in keeping with current practice, it is this majority which is referred to in the discussion. There is an advantage in the use of the terms *left* and *right* in this way, as it avoids the apparently false assumption (O’Leary 1982:55) that the remaining 2% of right handers and 30% of left handers simply have reversed dominance.

3. Aphasia versus Dysphasia

Osgood & Miron (1963:21) observe that it is exceedingly rare to encounter a total loss of linguistic ability in an adult, and that the term *dysphasia* would therefore, in the main, be a more accurate term in the discussions in which *aphasia* is currently used. However, they and many others (e.g. Sies 1974:4)

bow to the force of convention and use *aphasia* without implying more than a partial loss of language. The same usage is employed here.

4. Masculine Pronoun as the Unmarked Form

In referring to individuals of unspecified gender it is now common practice to systematically interchange *he* and *she*, to use forms like *(s)he* or *he/she* or to extend the use of the plural pronoun to the singular (though, in this case, the reflexive forms leave the writer little scope to defend themselves). In the hope that the important statements about equality have now been firmly made by others, and in keeping with the general tenet of this book, that it is detrimental to the evaluation of the propositions to draw the reader's attention to the language in which they are expressed (which these bisexual forms probably do), the (hopefully relatively) innocuous masculine pronoun is used throughout where an unmarked form is required. This is not intended to imply that males are superior, nor that they are sexless.

Introduction

*If the right hemisphere of the brain rather than the left were to be the one normally active in routine language processing, would we notice?*¹

The obvious and expected answer to this question is *yes, of course we would*, and indeed there is a vast corpus of literature which may be cited in support of the view that the left hemisphere is the one primarily responsible for the minute-to-minute encoding and decoding of language in the normal individual. The kind of evidence which could be considered to support this includes the observation that left-hemisphere-damaged patients often have language disorders, while right-hemisphere-damaged ones rarely do, and consistent findings in experiments on normal subjects that the left hemisphere is quicker and/or superior in a whole range of language tasks. Any counter-claim to such a wealth of conclusive data had better be good!

As the question suggests, the approach which offers a new perspective upon the observations made in neurolinguistic and psycholinguistic research hinges not on any suggestion that left-hemisphere based linguistic processing would *not* look like that, but that right-hemisphere based processing would as well. In other words, given the supposed operation and interaction of the two hemispheres, it is not possible to tell from the evidence available which processing scenario is the true one. That is why it is possible to claim in the same breath as an apparent insurrection, that nothing proposed here need necessarily be considered to undermine the ultimate belief in left-hemisphere based language processing. All the evidence points to it; it's just that we have to be sure that the same evidence does not also point somewhere else at the same time.

In order to illustrate the point, this book presents a single alternative account of how language processing **could** be working to produce the same effect on the abilities and test scores of patients and experimental subjects. The scenario is justified by drawing upon observations and claims already in the literature, thus illustrating that the alternative interpretations have been

there all along, set up and ready for consideration. The account described is referred to as the *Focusing Hypothesis*. The justification for its individual components should be apparent as it is described in the opening chapters. However, the main points which form the background for its construction may be summarised as follows:

1. *The left hemisphere is considered to operate analytically, the right hemisphere holistically* (Levy 1964, Van Lancker 1987).
2. *There appears to be a severe limitation on the number of analyses that may simultaneously occur* (Jaffe 1978², Brown 1983, Sereno & Kosslyn 1991).
3. *Language is structured in a way that suggests it can be analysed in the course of decoding* (Chomsky 1968);
 - on the other hand, language decoding does not appear to compete with the analysis of the ideas it conveys.
4. *Analysis is closely associated with consciousness* (Popper & Eccles 1977);
 - however, it is the ideas conveyed in the utterance, not the linguistic packaging, that the listener is usually conscious of;
 - and competition for effective analysis appears to occur only when the listener is made conscious of the linguistic packaging of the utterance.
5. *Language needs analysing to be comprehended, because each utterance is, or potentially is, novel* (Chomsky 1968);
 - however, the notion that language is novel refers to the creative and spontaneous fitting of lexical items into a closed class of syntactic structures. Thus, once the language has been acquired, the novelty resides in the ideas conveyed by the language and almost never in its structures.
6. *A very limited proportion of the possible grammatical and semantically acceptable structures of a language are actually used by native speakers* (Pawley & Syder 1983).

On the basis of the above, the Focusing Hypothesis proposes that the left hemisphere 'teaches' the right, during the course of language acquisition, standard linguistic patterns (*formulae*) which operate like idioms with lexical spaces (cf. Pawley & Syder 1983). The right hemisphere is thereby equipped

to deal with 'routine' language processing, leaving the left hemisphere free to deal with the ideas conveyed by the language and to intervene, at some cost, where complicated or unexpected structures and sequences occur.

It is suggested that the individual has a range of strategies for approaching a task and that these require different balances of left and right hemisphere involvement. The preferred strategy in a specific circumstance is determined by the required result with, at one extreme, a total automation of linguistic decoding in order to focus on a complex semantic content and, at the other, an attention to the 'linguistic packaging' to the total exclusion of comprehension. A main argument emanating from this is that if such a range of strategies is available and *does* entail a varying level of right hemisphere involvement in language processing, then it is *not* appropriate to assume, as many have, that any old stimulus, provided it is spoken or written, can be used in a psycholinguistic experiment to construct a controlled representation of what happens in everyday verbal interaction.

The predictions of the Focusing Hypothesis, examined in chapters 4-6, home in on the tendency for experimental subjects and speech-impaired patients to be *aware* that their linguistic skills are of primary interest, which might lead them to monitor their language more, in turn requiring the selection of a strategy that gives a greater rôle to the left hemisphere than it would have in normal conversation. This would mean that the results of psycholinguistic and clinical tests would (correctly) indicate a primacy for left hemisphere function, but that this would be relevant only to these test circumstances; such results could *not* justifiably then be used as the basis for observations about language processing in non-test circumstances.

The implication is, of course, that the right hemisphere's rôle in language processing would be inordinately difficult to measure, because the unnaturalness of testing would prevent the selection of the strategies of most interest.

It follows from this, and I deliberately state as much clearly here, that there is no primary experimental evidence that can be cited in this book to support the Focusing Hypothesis. This is because I do not know of any (psycholinguistic) experiments that one could administer without defeating the experiment's object in the very process of doing so. For this lack I do not apologise – the Hypothesis after all predicts it! But I do acknowledge the way in which this makes the Hypothesis impossible to evaluate within the bounds of the currently preferred psycholinguistic research methods. Yet an idea is not invalidated, I venture to contend, simply by our lacking, at the moment at least, the means to test it.

Notes

1. Despite the wording of this question, the discussion in chapter 1 deals, until the final section, not with the notions of left and right hemisphere, which are problematic, but with those of an analytic and a holistic system, which may or may not be associated with specific areas of the brain. See chapter 1:10 for discussion of this.
2. Jaffe (1978) recounts the following:

While listening to a news broadcast on the radio, I began to tell an interesting story aloud. This 'split attention' task yielded an eerie experience. When I tried to speak fluently, the broadcast was reduced to gibberish, like the babble of peripheral conversation at a large cocktail party. It was unquestionably speech but was as meaningless as a poorly understood foreign language. Conversely, if I made a concerted effort to follow the gist of the newscast, my own speech became halting and repetitious and I lost the thread of my story. (p.55)

Jaffe focuses on the incompatibility of simultaneous decoding and encoding (where the utterances are 'novel') rather than the more general proposal made here, that *any* analytic tasks will be in competition. But the general tenet is the same.

Chapter One

The Focusing Hypothesis

1.1 Defining Terms

1.1.1 *The Dual System*

The account which follows will be referred to as the *Focusing Hypothesis*. This is because, within it, the selection of language processing strategies is seen to be determined by the *FOCUS* of the individual's attention.

The dual system to which the account will refer is one which is well recognised in the field of psychology. This is the opposition between *analytic* and *holistic* processing (see, for instance, O'Leary 1982:64, Bogen 1969 and Bogen & Bogen 1969, cited in Van Lancker 1987:65). Some types of information which the brain routinely deals with appear to require a specifically analytic approach (e.g. calculation, temporal order processing (Van Lancker 1987:64)). We may define *analytic* in terms of the breaking down of large units into smaller ones and/or the building up of large units from smaller ones¹. This leads to an understanding and/or identification of a large unit in terms of the relationships between its constituent units.

An analogy of analytic processing might be the construction of a mechanical device. The pieces of the machinery must fit together in a specific way in order for the machine to work. And it can be dismantled, too, by removing the pieces in reverse order. The whole machine is complex, but it can be 'understood' in terms of the presence and function of its components.

For various reasons which will be described and in some cases challenged later, it has been widely assumed that language is and must be analytically processed. Language has been described in terms of complex wholes which consist of combinations of simple constituents. The approach to language both of traditional grammars and, more recently, of syntactic theory, has been to divide sentences up into smaller units and/or to build them up from smaller units. Alongside this, however, most accounts now recognise an aspect of language-related processing that is not analytic. This concerns prosodic aspects

of language including intonation and emotional colour (for recent comment on this see Van Lancker 1987:53-54). Making the customary associations between analytic processing and the left hemisphere and between holistic processing and the right (see section 1.10), Van Lancker (1987) thus states that, roughly speaking:

the unit-and-rule kinds of phenomena described by generative grammars are lateralised to the left hemisphere whereas complex patterns, not reducible to component parts, are specialised to the right hemisphere. (p.50)

The left hemisphere knows *what* is being said while the right hemisphere knows *how* it is being said (with what kind of affect, mood, or attitude) and *who* is saying it (what sex, age, and in some cases, which person). (p.54)

In addition, some now consider certain units of language, especially empty phrases and idioms, to be non-analytically processed. Indeed, as Van Lancker observes, "the idiom ... must *not* be analysed in those [i.e. analytic] terms" (p.67), because this will lead to an inappropriate, literal interpretation.

The account presented in the Focusing Hypothesis will not attempt to deny that language is ordered according to a constituent structure. Neither will it deny that language can be and often is processed according to analytic strategies. But it will be argued that the analytic processing of language does not usually occur.

Holistic processing involves a very different approach to information. Because there is no *analysis*, it is inevitably difficult to describe its operation in analytic terms:

The only 'explanation' of how you recognize something as a *Gestalt* is that you recognize it as a *Gestalt*. (Marshall 1981:72)

One type of information which appears to be processed holistically is visuo-spatial input (e.g. Harris 1978). The appreciation of a three-dimensional form, of a route or a location is not achieved by a dissection of the input information into constituent units. Similarly, the recognition of a face (e.g. Levy 1974:155-56) does not appear to proceed via the separate recognition of the individual features².

Although the existence of parallel analytic and holistic systems is not generally disputed, no in-depth consideration appears to have been given to the possibility of their both being involved in linguistic processing. O'Leary

(1982) summarises the general viewpoint extant in the psychological literature as follows:

It seems reasonable to conceptualize the human brain as a dual channel information-processing device. One channel (the left hemisphere) processes information in a sequential and linear manner, while the other channel (the right hemisphere) processes information in a wholistic [*sic*] and parallel fashion. The interaction between the two channels has not yet been studied in detail. It is not known, for example, whether both channels simultaneously process all incoming information, or whether some executive mechanism selectively activates the two channels. (p.65)

1.1.2 *Focus and Information Processing*

Focus can, with one exception (described in section 1.9), be taken as an abbreviation for *focus of attention*. This is in keeping with others' definitions, such as Brown (1983):

to cognise an object in an analytic mode requires a discrete or selective type of attention. The perception is built up around object features. Conversely, holistic or global perception accompanies a more diffuse attention which is distributed over the object field... The attentional state of the left hemisphere can be characterized as focused, and that of the right as diffuse... (p.48)

Thus references to *focus* directly relate to what the analytic mechanisms are occupied with. The conscious individual is probably always focusing on something or other. Thus his analytic mechanisms are always operating. If one opts to view analysis in this way, i.e. as an exclusive operation, then it becomes clear that the way the world is viewed will be highly dependent on what attracts focus; other aspects of the input than the focal one must either be processed in some non-focal, non-analytic way, or ignored.

One axiom of the Focusing Hypothesis is that focus on language inhibits focus on anything else. Yet, quite apart from the numerous other things that are competing for our attention at any given moment, language itself consists of many 'layers' of information, from the basic acoustic or visual signals right up to the complex ideas which it is employed to express. It is proposed that there is a considerable limitation on the capacity for more than one of these levels to be focal at any one time (see Brown 1983, Sereno & Kosslyn 1991).

In what will be termed *propositional focus*, a process of *evaluation* compares one idea with another in the same discourse sequence (e.g. to see if an argument follows logically) or with ideas from elsewhere (e.g. our knowledge of the real or some other relevant world). As ideas require such evaluation in order to make any contextual sense, they can *only* be handled analytically. If some other level of the input is focused upon (e.g. the linguistic form) or if focus is upon some other unrelated input (e.g. a co-occurring event), then the analysis (and therefore appreciation) of the ideas cannot occur. In the terms of the Focusing Hypothesis, ideas cannot be assessed in relation to each other by means of the holistic mechanisms. Therefore, those to which attention is not paid (i.e. upon which there is no focus) will not be evaluated at all.

In the process of dealing with ideas conveyed in language, our attention is focused upon the nature and interrelationship of the ideas, not the form and sequence of the language itself. Thus, an assessment of the validity of ideas is most effective when the form of the language used to convey them is not permitted to intrude into our consciousness, because any such intrusion will cause a temporary hiatus in the evaluation of the ideas.

What, then, is happening to the language when the ideas it conveys are focal? It is somehow being decoded into large semantic units (*ideas or propositions*) without drawing any attention to itself. It would be fallacious to claim that it *follows* from this observation that the language processing is not analytic but holistic. Any number of other accounts could be submitted. These might invoke a semi- or unconscious analytic mechanism³ or a system of parallel analyses in terms of which *focus* was a misleading term.

However, it is not the purpose of this discussion to explore and evaluate *all* the possibilities; the one in hand will suffice to argue the case.

1.1.3 *Formulae*

Formulae, according to which the holistic system is considered to operate, are *not* to be equated with clauses. They are *templates* for clauses, which specify the syntactic and semantic relationships between constituents. How many of them there are available to an individual will depend upon the productivity of the analytic mechanisms in constructing them (see the discussion of acquisition in section 1.8). The selection of a formula is effected by the use of a scanning procedure (see section 1.2) which recognises but *does not decode* constituents. Specifically, it assigns a formula to the clause, using word order and lexical clues, particularly so-called *function words* like gram-

matical particles, some morphological patterns and, probably, the verb⁴. It is not new to suggest that verbs might be marked in the lexicon for details such as transitivity etc.; a formula might look something like (1), recognising many essentially 'novel' (i.e. spontaneous) strings including (2)-(5):

- (1) NP – speak-TENSE – to-NP – about-NP⁵
- (2) I've spoken to Henry about the new carpet.
- (3) Have you spoken to the gasboard about the leak?
- (4) She's going to speak to the committee about Dr.Peterson's conduct.
- (5) The Prime Minister will speak to the nation about the state of the economy.

Clearly, much more needs to be said about the mechanisms of formula selection and decoding (see, for instance, section 1.6.1 below). At present, however, the precise nature of the formulae is of secondary importance. Formulae of this kind also figure in Pawley & Syder's (1983) account of processing, described in chapter 7.

It is not only clause-sized units that can be decoded. As clauses are made out of smaller constituents, these too can be individually decoded. In this way, semantic (or indeed phonetic or phonological) representations of individual words or phrases *can* be accessed, but at a cost. Once the holistic mechanisms have decoded and passed on to the analytic mechanisms units of the selected size, holistic processing can play no further part. Therefore, the smaller the individual units in relation to the whole sentence, the more work the analytic mechanisms will have to do to complete the processing.

To **recognise** rather than **decode** these smaller constituents, therefore, and to save them up until a whole clause is accumulated, enables the bypassing of costly analytic decoding in early stages. The Focusing Hypothesis proposes that it is less expensive in processing effort to gather a number of constituents and decode them all at once than to decode each separately and incorporate it into the accumulating clause before the next one is decoded. This is because that 'incorporation' is achieved by means of evaluating each constituent's value in relation to that of others, which requires *juxtaposition* (see 1.3 below). *Juxtaposition* is an analytic process, and analysis is more costly than holistic processing. The larger the constituents that are finally evaluated, the better, assuming that the ultimate aim is indeed to evaluate, in one way or another, those largest constituents (i.e. propositions). If, on the other hand, the very focus of interest is the relationship between some phonological or syn-