Anticipation and Feeling in Literary Response

A Neuropsychological Perspective

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Abstract

Anticipation and feeling are taken to be significant components of the process of literary reading, although cognitive theories of reading have tended to neglect them. Recent neuropsychological research is described that casts light on these processes: the paper focuses on the integrative functions of the prefrontal cortex responsible for anticipation and on the contribution of feeling to the functions of the right cerebral hemisphere. It is shown how feelings appear to play a central role in initiating and directing the interpretive activities involved in such complex activities as reading. In particular, a key feature of literary texts that captures and directs response is foregrounding, that is, distinctive stylistic features: these defamiliarize and arouse feeling. Such responses are likely to be mediated by the right hemisphere, which is specialized to process novelty. An analysis of the neuropsychological mechanisms implicated in response to foregrounding suggests how readers discriminate among competing interpretive possibilities, and how other important elements of literary response such as imagery, memory, and self-referential themes and concerns are recruited. Several studies are cited indicating that response to various characteristic components of literary texts is mediated by this hemisphere, including the prosodic aspects of foregrounding, figurative language, and narrative structure. This hemisphere also provides the context for elaborating and contextualizing negative feelings, a process related to Aristotle's notion of catharsis. It is argued that the neuropsychological evidence sketched in this paper provides a more reliable basis for future theoretical and empirical studies of literary reading.

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Author's Notes

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1. Introduction

> In reading with a sense for continuity, for contextual coherence, for wholeness, there comes a moment when we feel that we have 'understood', that we have seized on the right interpretation, the real meaning. It is a process that . . . proceeds from attention to a detail to an anticipation of the whole and back again to an interpretation of the detail. (Wellek, 1960, p. 419)

Wellek's observations on the process of reading a literary text are perhaps commonplace. Most readers will recognize the experiences that Wellek has described: the frequent shifts of attention between detail and envisaged whole, or those moments when details and whole cohere in a sudden sense of what the text might mean. All literary reading seems to involve in some degree a prospective orientation. This is most obvious in the reading of texts that consist primarily of narrative, where we may become intensely committed to finding out what happens (detective fictions provide the clearest example); here response is story-driven, in the scheme of Hunt and Vipond (1985). But reading a literary text is perhaps prospective in a more pervasive and interesting sense that goes beyond the concerns due to plot. It is this sense that Wellek no doubt had in mind: it involves a prospective function present at the level of local textual detail as well as in the reader's feeling about what the final meaning of the text might be. However, both of these prospective aspects of reading, familiar though they are, present significant problems: understanding the constructive, psychological processes involved constitutes one of the more challenging aspects of reader response studies.

In an attempt to arrive at some provisional answers to these problems, I examine a range of evidence from neuropsychological research in this paper. The two main aspects to be considered are the integrative functions of the prefrontal cortex, in particular its anticipatory role in guiding complex sequences of thought and behaviour; and the lateralization of functions to the left and right hemispheres, in which the role of feeling is given close examination. While neuropsychology can as yet give us few answers to the complex problems posed by researchers in the reader response domain, it does offer a framework for formulating some of the key issues. In particular, neuropsychological work of the last decade has highlighted the significant roles of anticipation and feeling, and in this paper I will outline the relevance of these insights to understanding the process of literary reading. The paper thus offers both an introduction to some important facets of recent neuropsychological research, and attempts to formulate clear and well-supported principles that will illuminate understanding of processes specific to the reading of literature. In this respect it is less ambitious, and perhaps less speculative, than the two previous essays in this area by Karpen (1984) and Roy (1988).

2. Anticipation in Literary Reading

How is it that readers can sense a direction, a possible future meaning, from a given sentence? What are its causes, and what are the inferential processes that are initiated? How does the sense of a whole arise, and from what aspects of a text? And what is the relation between these two levels of response, the local and the global? These

prospective aspects of response have not generally received much consideration from psychologists: models of response have either tended to overlook or underplay them, or to propose solutions drawn from non-literary fields (usually cognitive science) that underestimate the nature of the problem. For example, the concept of macro-structure proposed by Kintsch and Van Dijk (1978) seems inadequate as a representation of the kinds of overall understanding at which readers of literary texts aim. Similarly, the discourse structure described by Hobbs (1990) takes no account of the poetic features of literary texts that delight and surprise their readers (see Beers [1987] and Miall and Kuiken [1994a], for some critical discussion of theories of this kind). Moreover, studies in the cognitive tradition have also tended to blur distinctions between literary and non-literary texts, and have provided no purchase on the individual differences between readers or on the personal and often feeling-rich meanings evoked during literary reading (cf. Zwaan, 1993, p. 162-7).

We do not wait until reaching the end of a text before beginning to entertain ideas about what the text means: various aspects of the text, semantic, stylistic, and narrative, provide suggestions upon which a reader is likely to build his or her own anticipations. This can be demonstrated by a brief analysis of the following passage, taken from the opening of a short story by Virginia Woolf, "Together and Apart" (Woolf, 1944/1982):

> Mrs Dalloway introduced them, saying you will like him. The conversation began some minutes before anything was said, for both Mr Serle and Miss Anning looked at the sky and in both of their minds the sky went on pouring its meaning though very differently . . .

The narrative situation at the outset seems to involve a social gathering, such as a party. From the second phrase, "you will like him," we are likely to infer, perhaps without noticing it, that there will be a bias towards the point of view of the female character (which is confirmed by the remaining part of the long second sentence that I have not quoted). The opening phrase of the next sentence, "The conversation began," picks up an obvious expectation that the characters will begin talking, but then thwarts it by stating that nothing was said. What kind of non-verbal conversation are these characters holding? We may already be predicting something like rapport or sympathy, especially as we have been told that she "will like him." In the next phrase we discover that the meeting appears to be out of doors, and for many readers the reference to the effect of the sky might momentarily evoke a romantic aura; however, the appended phrase, "though very differently," could be taken to undermine this. So far, then, a narrative situation has been invoked, in which a woman meets a man with whom she may feel an immediate sympathy: already, readers may be anticipating a romantic scenario. The stylistic features can be construed to support this, given the metaphors of a conversation without words and the sky that "pours" meaning. At the same time, hints of a possible distance between the characters could also be read into the same metaphors, for which the phrase "very differently" provides evidence. Perhaps these are two characters who will in some way fail to relate to each other.

Within a few seconds a range of complementary but also contradictory responses has become possible. While some of the inferences that are made may be confirmed or disconfirmed quickly (as happens with the inference of point of view), others may not be satisfied so soon: the reader may need to keep in play several possible meanings that will have a bearing not only on the outcome of the story (the narrative dimension) but also on what it means (the point of the story, or its theme). The reader must, in other words, assess the strength of the different implications, such as those presented in the

second sentence, in the light of subsequent evidence, and decide which offer the best fit to the story as a whole. In fact, the failure of relationship is the implication that the story will emphasize. (A study of readers' responses to this story found that readers tended to shift from a romantic interpretation at the beginning of the story to one involving isolation or inability to communicate: Miall, 1989a.)

Woolf's story is not particularly unusual as a literary text in posing such problems, except perhaps in being unusually compact. The problem, from the perspective of reader response theory, is to account for the processes by which local details, of the kind we have been describing, project the larger meanings. In what form are such anticipations made, and what control processes do readers use to evaluate and monitor their anticipations?

Two reader response theorists who discuss the experience of reading in this way are Stanley Fish and Wolfgang Iser. In "Affective Stylistics" Fish (1980) argued persuasively for the significance of the experience of the reader during reading. The extraction of a "correct" final meaning for a text is not the only reading activity in which we should be interested. Fish pointed in particular to a range of syntactical devices by which readers are led to expect meanings that are then contradicted. At the sentence level, Fish would, for example, recognize the shift in meaning of "conversation" in Woolf's second sentence as a significant strategy from the reader's perspective. He proposed that "the temporary adoption of these inappropriate strategies is itself a response to the strategy of an author; and the resulting mistakes are part of the experience provided by that author's language and therefore part of its meaning" (p. 47). Iser (1978) has offered a comparable account of reading, based primarily on concepts drawn from phenomenology and gestalt psychology. The "gaps" or "blanks" in a text (such as the possible contradiction we noticed in the Woolf passage) require readers' acts of "ideation" and the building of a schema adequate to the text as a whole. Neither Fish nor Iser, however, have undertaken to develop their models in psychological terms; nor have they attempted to test them empirically with readers (and Fish has not continued to develop his model).

A part of Iser's argument is the contention that fiction texts differ from expository texts in terms of the mental processes required for understanding them. An expository text refers to a given object, thus the range of possible meanings of each sentence must continually be narrowed down to make reference precise. During a fictional text "the very connectibility broken up by the blanks tends to become multifarious. It opens up an increasing number of possibilities, so that the combination of schemata entails selective decisions on the part of the reader." (1978, p. 184). In effect, an expository text refers to an object that is specified with increasing precision; a fictional text refers forward to a schema that the reader must bring into being. The two reading processes may roughly be described as retrospective and prospective. An empirical comparison of readers' activities during the reading of an essay or a fictional text by Olson, Mack, and Duffy (1981) showed that while few anticipations were made during the reading of essays, anticipations were characteristic of the response to stories. Readers of essays appear to be engaged in building a model of the text: "Each new element in the essay is related to earlier elements. There is little anticipation of what is coming up, except at the most general level." In contrast, the reader of a story "is looking ahead, trying to anticipate where the story is going. Except at the beginning, where an overall hypothesis is being developed, the story reader tends to relate each sentence to the general hypotheses and predictions that have been developed" (p. 311).

The different orientations are described in the Olson et al. study as retrospective and prospective. Unlike this report, however, accounts of literary reading proposed by psychologists have more frequently tended to embody retrospective models, based on discourse theory or schema theory (e.g., Hobbs, 1990; Simon, 1994). While such theories have been notably successful in accounting for some of the processes of comprehension, given relatively simple prose or stories, the key role of the anticipatory processes of the kind required by literary texts is largely invisible to such models. The difficulty of studying the anticipatory aspects of reading, and the lack of constructive thought about this problem on the part of cognitive scientists, points to the strategy offered in this article. As a way of posing more explicitly and in more detail what specific problems face the literary reader in the anticipatory domain, and to enrich theoretical understanding of reader response, the present focus will be on a neuropsychological model of reading.

The focus of the discussion will thus be on anticipation, and its role in the constructive process by which a reader interprets details in a text and works towards an understanding of a text as a whole. However, several of the neuropsychological studies that will be mentioned point to the role of feelings and emotions in creating and supporting the anticipatory function. Feelings, it will be suggested, probably play the central role in initiating and directing the interpretive activities involved in such complex activities as reading. A glance at recent accounts by psychologists shows that the anticipatory role of feeling in this respect has not received much consideration (e.g., Frijda, 1986; Oatley, 1992; but see Aylwin, 1985, pp. 136-7), although it was recognized by various authors in the last two centuries, such as Coleridge and William James. This points to the need for a systematic investigation of what the neuropsychological research suggests, in order that the hypotheses it provides can be brought to the domains of both psychology and reader response studies for elaboration and testing.

3. The Prefrontal Cortex

3.1 Control processes in thought and action

The reader of a literary text must at one and the same moment recall, respond, discriminate, and anticipate. Literary reading must frequently cope with surprise or contradiction, both on the local level (as the reference to conversation in Woolf's story shows) and more globally; it must deal with narrative switches, shifts of scene, and uncertainties of various kinds. A moment's introspection during reading is likely to reveal a consciousness corresponding to this account of Coleridge: "What a swarm of Thoughts & Feelings, endlessly minute fragments & as it were representations of all preceding & embryos of all future Thought lie . . . compact in any one moment" (Coleridge, 1973: 4057). Why is it that the multifarious contents of consciousness are not merely an indiscriminate confusion? How is it that reading so often takes place in a sustained and uninterrupted manner, when such a rich and constantly changing array of mental contents must be deployed in its support?

This problem corresponds in several important respects to conditions which, it is now known, require the special functions of the prefrontal cortex: whenever a response is required that synthesizes varying stimuli and sustains direction under changing conditions over a course of time. People who have received damage to the frontal cortex from accidents, strokes, or surgery, are found to be unable to orient themselves to solve problems of this kind: their responses may be random, or indecisive, or they persevere

with a specific behaviour that is no longer appropriate. The contents of consciousness under these conditions appears to lack discriminatory control, to judge by reports of the behaviour of such patients.

Damasio and his colleagues (Damasio, Tranel, & Damasio, 1991) describe a patient known as EVR who underwent surgery of the frontal cortex for a tumour. Formerly highly successful both in work and in his social life, EVR's personality and cognitive abilities both suffered considerable impairment. While attempting to make decisions, for example, he is "plunged into endless debate. He is unable to make a rapid choice and, instead, pursues a course of interminable comparisons and successive deliberations among many possible options that become more and more difficult to distinguish" (p. 217). On a number of measures, EVR's intelligence, memory, language, and perceptual abilities, seem unimpaired. But EVR is deficient in forming judgements of other people and in behaving in socially effective ways, another context which calls for discriminatory judgements under changing and uncertain conditions.

EVR's condition is explained by Damasio et al. as a deficiency in understanding and applying *implied* meanings, such as the negative or positive evaluation of events or people, or the imagined consequences of an action. Implied meanings, like connotative meanings in literary texts, are generally much richer than manifest, or denotative, meanings, hence they make greater demands on us in terms of our powers of attention, selection, and synthesis. They necessitate holding in mind over an extended time "highly heterogeneous sets of cognitive components that must be attended effectively, if a choice is to be made." Thus EVR's failure, they suggest, lies in "the *selection of one among many response options*, displayed long after the triggering stimuli were first presented and often even after they are no longer perceivable" (p. 219-220). In terms of the Woolf example, this would be as though a reader were unable to decide which of the two implications of the second sentence to apply to the story: the false implication of the romantic scenario remains as valid as the implication of separateness and failure to communicate. Since readers begin to generalize about more or less probable meanings early in a story, such a lack of discrimination would thus represent a failure in anticipation.

More specific as well as more general deficits are often reported as part of the prefrontal syndrome. A common test applied in assessing such patients is the Wisconsin Card Sorting Test, which involves classifying cards according to a criterion which is changed from time to time (Milner, 1964). Frontal patients tend to perseverate, being unable to shift from their first successful criterion for sorting (EVR, however, was able to perform this test competently). A more pervasive feature that is often noticed is the change in personality that follows frontal damage, and which was also noticed in EVR. A case frequently mentioned in the neuropsychological literature is the first published study, that of Phineas Gage, who sustained a severe injury to the frontal cortex while working on a railroad in the 1860s. From being a hard working, sober, and shrewd character, after recovery from his accident he was said to be boastful, profane, and improvident; he was, as one witness remarked, "no longer Gage." Stuss and Benson (1983), who discuss this case, describe the personality following such damage in terms of "emotional changes characterized by a lack of sensitivity and appreciation, more concrete thinking, more immediate reaction, a simpler and slower intellectual life, and impoverishment of imagination" (p. 119). Frontal damage clearly involves a wide range of skills and behaviours; each, however, appears be related to two principle difficulties: a loss of ability to discriminate between competing tendencies, and an inability to plan and initiate complex sequences of behaviour.

Ingvar (1985), for example, describes the frontal syndrome, paradoxically, as the loss of "memory of the future." He suggests that the primary function of the frontal cortex lies in organizing information temporally, extracting causal relationships from the mass of non-serial and largely random information to which the brain is subject according to a predesigned template (cf. Fuster, 1988, pp. 158-160). Similarly, Shimamura et al. (1991) argue that the roles played by the frontal cortex can be explained in terms of a "prospective memory" and an "executive" control system. For example, free recall is impaired in frontal patients, not because the target memories are unavailable or access is blocked, but because patients cannot form an effective programme for monitoring and searching memory. When we know that we have forgotten something, such as a name, we can usually estimate how likely it is that we would recognize the item if it were presented to us -- a capacity called "feeling-of-knowing." Frontal patients are poor at making such estimates (pp. 191-2).

3.2 Affective primacy in response

Evidence for the central role of feeling in the various thought processes that I have been describing comes from studies of the pathways involved in frontal functioning. The deficits of a patient such as EVR appear to come in part from the loss of an inhibitory function performed by the frontal cortex. Distractibility is a prominent feature of humans and animals with frontal damage; there is an inability to inhibit attention to stimuli whether from the external or internal environment. As Knight has shown, the frontal cortex operates a "gating" mechanism over impulses from the thalamus that mediates sensory inputs. This mechanism, he argues, "provides a powerful neurophysiologic system for early filtering of sensory inputs capable of intra- and intermodality suppression of irrelevant stimuli" (Knight, 1991, p. 141). Knight's study of evoked potentials shows that the gateway operates as early as 25 to 30 milliseconds following the onset of a stimulus. In complementary fashion, enhancing attention to a stimulus increases the amplitude of the evoked potentials at around 25 milliseconds of onset. As LeDoux and others have shown, the gating seems likely to be a consequence of affective evaluation of stimuli.

LeDoux (1986) describes some of the pathways that have been mapped in the brain, from which he draws an important conclusion. Direct projections of the visual and auditory systems to the affective centres of the mid-brain have been found, that is, to the amygdala and hypothalamus; these exist alongside projections to neo-cortical areas in which cognitive processing takes place. This anatomical pattern thus appears to support the parallel processing of inputs, both affective and cognitive. However, Le Doux notes, "The thalamic pathway . . . is several synapses shorter. Input reaching target areas such as the amygdala may therefore prime the area to receive the better analysed neocortical inputs, providing a crude picture of what is to come, narrowing the affective possibilities, and perhaps even organizing possible and actual responses" (p. 345-6). The response in the amygdala may take place as much as 40 milliseconds faster than the comparable neo-cortical response.

Psychological evidence in support of this interpretation is provided by Zajonc and his colleagues. For example, an affective stimulus shown for only 4 milliseconds has been found to influence subsequent liking or disliking of a display. Murphy and Zajonc (1993) flashed a scowling or a smiling face on a screen: although a display of only 4 msec was far too short a time for participants to be aware of what they had seen, it nevertheless influenced their affective response to a Chinese ideogram shown shortly afterwards. Although this influence is only a simple one, consisting either of liking or

disliking, more pervasive effects are likely under more ecologically natural conditions. We might expect, say Murphy and Zajonc, "that emotion-laden stimuli presented outside of conscious awareness may color our impressions and judgements to a degree unparalleled by other types of information" (p. 723).

This suggestion obtains some confirmation from the memory effects described by Christianson (1992), which once again were a result of short exposure times. Here participants were able to see a set of slides of either emotion-inducing scenes or neutral scenes. Each slide was exposed for only 180 msec, that is, the time normally taken in a single eye-fixation. It was found that memory for the details of the slides was consistently better for the emotional than for the neutral slides. Of particular interest, however, is the finding that longer exposure times for the emotional slides resulted in almost the same memory performance. Early affective coding may thus not only be especially efficient, but also involve longer-term effects in directing attentional and memory processes. Christianson, in discussing these issues, suggests that the evidence points to a "preattentive mechanism," that is, a mode of response that is not dependent on conscious awareness or evaluation: "critical characteristics of emotional events may be extracted and processed" which then "act as an emotional prime, and thus trigger attentional selectivity and controlled memory processing" (p. 206).

There are several reasons for believing that such a mechanism is also likely to be of importance in understanding literary response. Given the speed at which we are normally able to read and the complexity of the processes involved in understanding a passage of literature, such as the Woolf sentences examined above, a mechanism for setting the salience of the various competing stimuli must be in operation. This requirement would be served by a "gating" mechanism in which preferential attention and subsequent processing is given to affective stimuli, whatever their source. From this perspective, one important influence on reading will be foregrounding. Foregrounding tends to be characteristic of literary texts. It is the term applied to an array of stylistic devices that are found at several levels of the language of a text, phonetic (e.g., assonance, metre, rhyme), grammatical (e.g., ellipsis, inversions), and semantic (e.g., oxymoron, metaphor). As Jan Mukarovský noted, in defining foregrounding, language that contains foregrounded features disrupts the normally automatic and economical processing of language and thus tends to stand out or draw attention to itself (Mukarovský, 1932/1964, p. 19). As he also noted, foregrounding evokes feeling (Mukarovský, 1977, p. 73). Our own studies of response to foregrounding have confirmed this suggestion: readers consistently rate passages high in foregrounding as affectively more intense (Miall and Kuiken, 1994b). We have also found that reading speed tends to slow down when readers encounter a foregrounded passage, which suggests that the complexity of foregrounding increases the processing requirements placed on reading. Our studies, as well as those of Van Peer (1986), indicate that response to foregrounding is independent of literary training or experience: all readers competent in the language appear to possess a basic sensitivity to it. Hoorn (1996) has obtained evidence that response to at least one component of foregrounding, rhyme, can be measured by event-related potentials (an EEG measure). Readers in his study encountered a foregrounded feature, the absence of an expected rhyme, which interacted with a deviation from semantic expectations: detectable EEG shifts occurred at the onset of the stimulus. This is a phenomenon which is also likely to be the case for other features that deviate from expectations, such as alliteration or metaphor (as suggested above).

In understanding a literary text, therefore, the process of encoding is likely to be

influenced significantly by foregrounding; in addition, the earliest form of encoding appears to be affective, and an affective influence flowing from it may play a role in subsequent processing. This can be illustrated with an example from the Woolf story that shows an interesting cluster of interrelated foregrounded features, as I will point out. While response to all the subtleties of the affective and semantic meanings in a text such as this cannot yet be measured by any known physiological instrument, Hoorn's study shows that careful assessment of single features is possible, and when correlated with other measures (such as readers' ratings of passages or response times) is likely to yield important information about the reading process.

Later in Woolf's story Mr Serle and Miss Anning find that one thing they have in common is that both have important memories of Canterbury: Miss Anning spent three months in the city one summer a long time ago. The brief description of her memory includes this sentence: "And always she saw Canterbury, all thundercloud and livid apple blossom, and the long grey backs of the buildings." Looking only at the phonetic foregrounding, several features stand out: the repetition of "l" sounds in the second phrase (five occur in just six words), which is echoed in two subsequent occurrences of "l" in the third phrase; the third phrase itself is notable for the unusual concentration of adjacent stresses in "long grey backs" and the alliteration of "b" sounds in "backs" and "buildings." Different readers may have differing perceptions, of course, of the meaning of these features. To my perception, the "l" sounds (being pronounced at the front of the palette) emphasize the ephemeral nature of the thunderclouds and apple blossom: the experience of both is striking but short lived. By contrast -- a contrast launched by the use of "l" in the word "long" -- the three adjacent stresses emphasize the endurance and age of the buildings, with the "b" sound underlining the perception that it is the outside of the buildings that Miss Anning sees; the word "backs" even offers a slight connotation of animism, as though the buildings were animals turned away from the viewer.

Thus an opposition seems hinted here: the momentary is contrasted with the enduring. Moreover, the contrast is not a neutral one: the affective tones of the phonetic patterning seem to connote a positive and negative meaning, respectively, as though the thunderclouds and apple blossom signify excitement and movement, the grey buildings a depressing image not only of things remaining the same but of a life from which we are excluded. The reader of the story, who will take only three or four seconds in reading this sentence, will perhaps absorb much of its meaning and its affective tone in a "preattentive" mode; yet the affective tone, even though it may not be consciously noticed, will occur earlier in processing, if the findings of LeDoux and others are correct, and it will constitute a longer-term influence on subsequent reading. The reader's feelings, arising from passages such as this, will in other words direct the interpretive work of developing an understanding of the story. The two meanings noted in this sentence do, in fact, serve to symbolize the predicament of Miss Anning, as later passages in the story show: either she can seize the moment and find a way of relating to Mr Serle, or she will remain inert and grey behind the shell of her shyness and social incompetence.

The affective tone of phonetic foregrounding has been elaborated by Fónagý (1989). It has also received some preliminary experimental support from a study of Zajonc, Murphy, and Inglehart (1989). In one experiment participants read aloud a narrative with a concentration of either "ü" or "e" sounds: with no awareness of the cause, the former induced a feeling of disliking in participants and the latter a feeling of liking. It was shown that pronunciation influences the flow of blood to the brain (the temperature

of the veins on the forehead was measured during reading), causing either heating (disliking) or cooling (liking). It seems likely that an affective response would also become associated with the silent reading of text. If so, then affective tones, of the kind described in the sentence of Woolf, have a physiological foundation.

The account of their meaning just given, however, presupposes a more elaborate encoding of affective implication than is allowed for by Murphy and Zajonc (1993; cf. Zajonc, 1980). It presupposes such elaboration taking place in the 40 msec following stimulus onset, before the neo-cortical processing of the same stimulus has taken effect. While LeDoux, Christianson, and others, have suggested this possibility, firmer evidence for it is offered by direct studies of the amygdala, which, it will be recalled, provides a way-station in the affective pathway between stimulus and prefrontal cortex. The contribution of the amygdala is suggested by the results of direct electrical stimulation in conscious patients. Halgren (1981) reports that results tend to be unpredictable, but that the main determinant in the phenomena evoked, such as hallucinations, appears to be the personality of the patient. Halgren suggests that the hallucinations embody the current concerns of the patient, "as occurs in normal humans during dreaming. This mode of experience is referred to in psychoanalytic theory as 'Primary Process,' where it functions as one mechanism for discharging emotional tension. . . . The content of the affect, sensation, or hallucination express the current psychological concerns of the patient" (pp. 399-400). If foregrounding receives its affective coding in part from the amygdala, then we might also suppose that at least in some instances the personal concerns of the reader will also be evoked. The "long grey backs" for instance might resonate in the reader's memory with some specific experience that carries that particular affective tone (in my own case, it prompts the recall of walking along a street at the side of one of the London railway stations, a memory with rather negative connotations). Such memories need not be evoked consciously in order for their effects to be felt as an influence over the ongoing experience of the reader (Schacter, 1989). The "preattentive" aspect of response, it may be noted, has been emphasized in Tsur's (1983) model of literary understanding.

3.3 Affective anticipation

Thus, from what is known of prefrontal functions, the primacy of affective coding of stimuli, and the effects of foregrounding, it is possible to sketch a model in which the anticipatory role of feeling plays a central role in guiding readers' responses to literature. The "executive" functions of the frontal cortex in initiating and directing both thought and action are now well understood from a range of studies with intact and brain damaged patients. The role of feeling in guiding the executive function has not been so often recognized. Yet, several leading authorities on frontal functioning have assigned feeling the pre-eminent role. For example, Nauta (1971), in reviewing the evidence from studies of frontal cortex damage and the close connection of the frontal cortex with the affective centres of the brain, concluded that the contribution of the frontal cortex lay in particular in pre-setting the mechanisms for dealing with information both from outside and inside the brain:

> Such a pre-setting could be thought to establish a temporal sequence of affective reference points serving as 'navigational markers' and providing, by their sequential order, at once the general course and the temporal stability of complex goal-directed forms of behavior. (p. 189)

A similar view has recently been put forward by Damasio (Damasio, Tranel, and

Damasio, 1991; Damasio, 1991, 1994), who refers to "somatic markers" as the guide to the ultimate consequences of a behavioural option. By somatic, Damasio has in mind in particular the pre-setting of the autonomic system, which suggests the involvement of bodily feelings in complex and planned behaviour. According to Damasio et al.,

> The first effect of the somatic marker would then be to provide the subject with a conscious "gut feeling" on the merits of a given response, and force attention on the positive or negative nature of given response options based on their foreseeable consequences. (p. 220-1)

The neural and chemical systems that facilitate approach or avoidance behaviour would also be activated, even if the somatic state was not experienced consciously. Damasio et al. go on to argue that although such a mechanism must have evolved for guiding behavioural responses, it is plausible to see it being adapted for the assistance of intellectual functions as well. Somatic markers would provide "an attentional mechanism . . . to direct, in effect, the go, stop, and turn signals necessary for much decision making and planning on even the most abstract of topics" (p. 226; cf. Damasio, 1991, pp. 405-6).

During literary response such affective or somatic markers provide an essential mechanism, helping the reader to navigate through the complexities of an extended act of reading. Feeling is central to determining response: from the encounter with foregrounding and other textual aspects feelings are projected relating to the issues invoked for the reader by the text. This account also suggests that through such feelings reading draws on a reader's memories and personal concerns, endowing the act of reading with that sense of intimate personal significance that readers often report, even when they know of no explicit connections between the topic of the literary text and their own lives. Readers of Woolf's "Together and Apart," for example, may bring into play (whether consciously or unconsciously) prior experiences of parties, or their feelings about attempts at communication with strangers, or memories of cities, summers, or apple blossom of their own; the feelings evoked by the story may resonate with current concerns about forming relationships or coming to terms with past loneliness.

It is important to note, however, that the affective or somatic markers that initially guide reading derive their significance from prior experience (Damasio, 1994, p. 180): the act of reading evokes them, but does not create them. At the same time, a story such as Woolf's serves to place such feelings within a critical context, so that, for example, readers' first ideas about the story pointing to a romantic encounter soon prove inadequate. Readers are thus invited to reassess the feelings and memories they bring to such a story; the story may impel them to place their first feeling within the context of a second that modifies or limits the first in some way. As a result, an affective marker that, prior to the act of reading, guided a reader's understanding, may be transformed or replaced as a result of reading. While a reader may respond in a more or less personal way to a literary text, that encounter can initiate critical and productive rethinking about what the reader's accustomed feelings mean.

4. Laterality of Emotions and Feelings

4.1 Emotion and the right hemisphere

One suggestion of Damasio (1991) is that the somatic markers mechanism he proposes is probably dependent in particular on the right cerebral hemisphere (p. 405). The specialization of the hemispheres is perhaps the best known finding of the neuropsychological research of the last three decades, with language functions known to be located predominantly in the left hemisphere (in right-handed people) and spatial and imaginal functions located in the right hemisphere. Although recent research has tended to qualify this picture in some respects (e.g., Kosslyn, 1987), it still seems generally accepted that analytic and linear processes take place in the left hemisphere, and synthetic or analogue processes take place in the right. What is less well known, and still partly in dispute, is the location of emotion processes in the right hemisphere. While earlier studies tended to place emotion in the right hemisphere, with the possible exception of anxiety (see the review of Tucker, 1981), other studies have proposed that negative emotion is predominant in the right hemisphere and positive emotion in the left (Davidson, 1984, 1992). While the issues are too complex to be discussed here, studies of the role of emotion in right-hemisphere functions generally offer further persuasive evidence that feeling almost certainly plays a key role in the constructive aspects of literary response.

Issues that will be examined include the ability to perceive emotional stimuli in visual or linguistic materials, studies of deficits in functioning consequent on right-hemisphere damage similar to those required for literary understanding, and a specific role for negative emotion in literary response. While the basic model of literary response that was elaborated in the previous section will not be significantly extended, it will be elaborated and enriched by reviewing these three types of evidence of right-hemisphere functions.

It is interesting to note that the first observation that emotion was lateralized to the right hemisphere was first published in 1866 by the distinguished neurologist J. Hughlings Jackson. He found that patients who suffered from aphasia still retained the expressive functions of language. Although they might have only one or two words remaining to them, they used them to convey different emotional states, accompanied by appropriate gestures and expressions (Jackson, 1915). The involvement of the right hemisphere in understanding emotional aspects of language has been indicated in a number of more recent studies. Ley and Bryden (1982), for instance, describe a study with normal participants in which sentences were heard either in the left or right ear. The sentences were intoned with a happy, sad, angry, or neutral expression. A left ear advantage (i.e., right hemisphere) was found for the emotional expression, but a right ear advantage for the verbal content. Similarly, Ley and Bryden (1979) showed that following the brief exposure by tachistoscope of pictures of faces with various emotion expressions and asking subjects to match the expression with a second face, a clear advantage was found for the left visual field. Studies with brain damaged patients point to similar conclusions. A recent set of studies comparing patients with either left or right hemisphere damage following strokes, showed that right hemisphere damage correlated with poor comprehension both for the expressive (or prosodic) aspects of spoken language and for facial expressions (Blonder, Bowers, & Heilman, 1991). Interestingly, the patients with right hemisphere damage were able to infer emotion states from verbal descriptions, which suggests that the deficit from which they suffered was not a verbal (i.e., semantic) one. The deficit is "specific to nonverbal signals of emotion rather than

emotional knowledge in general" (p. 1120). The analysis of the feelings in response to phonetic foregrounding, described above, can thus be conceptualized as a right hemisphere function: the affective salience of alliteration or stress patterns both belong to the prosodic rather than the semantic dimension of language.

The role attributed to feeling above, in organizing and directing response, is also supported by some observations of Tucker (1981). He points out that limbic system connections, that is, the links between the affective centres and the frontal cortex, appear to be stronger in the right than in the left hemisphere (p. 36). He also notes that a higher proportion of white matter in the right hemisphere indicates greater interconnectivity of this region. Thus information appears to be distributed in the two hemispheres in ways that correspond to the analytic and holistic distinction. In terms of the role of feeling, this also corresponds to the model described earlier with, as Tucker remarks, "the right hemisphere's global ideation leading to a more diffuse and expansive emotional experience" (p. 38). As Mounoud (1988, p. 41) has argued, the right hemisphere seems particularly specialized to deal with novel information, while already acquired information is processed in the left. This view is substantiated by a study of Kutas and Hillyard (1982), in which sentences with anomalous last words were presented aurally to subjects while measures of electrical activity were taken from the two hemispheres. It was found that a greater and more prolonged event-related potential occurred in the right hemisphere when the anomalous last word was heard, as though processing switched from the left to the right hemisphere at that moment.

This model seems appropriate for accounting for the way readers are likely to deal with foregrounding, which is characteristically experienced as novel, or defamiliarizing. Monoud's conception seems a more general and perhaps more productive way of accounting for the left-right hemispheric difference than the approach/avoidance systems proposed by Davidson (1992). Although it may generally be the case that novel information is more likely to possess negative than positive qualities and hence require an avoidance system of the kind described by Davidson, it is inappropriate to literary response, where we seek out and welcome novel aspects, such as foregrounding, and enjoy exploring what they mean.

4.2 Understanding metaphor and narrative: the Gardner studies

These studies of the lateralization of feeling, by relating it to right-hemisphere functions, help to support and enrich the view elaborated earlier of feeling as integrative, holistic, and anticipatory. A more specific view of deficits in function in right hemisphere damaged patients, each approximating some of the skills relevant to literary response, is available in a series of studies by Howard Gardner and his colleagues -- studies that perhaps deserve to be better known.

In *The Shattered Mind* Gardner (1975) reviewed much of the evidence then available for various types of brain damage, which already suggested a view of the right-hemisphere as the site of emotional response and expression. Gardner noted the curiously concrete and inflexible level of understanding shown by right-hemisphere patients: "the patient is responsive chiefly to linguistic input, to the denotations of words and not to their nuances or connotations; he is glaringly insensitive to such factors as tone of voice, the spirit in which a query is put, and other environmental cues that might suggest one as against another response" (p. 372). In a series of studies of patients with right hemisphere damage, Gardner and his colleagues went on to map in more detail some of the deficits in connotational understanding from which they suffered.

Metaphor provides one domain in which connotational understanding appears to be crucial. Winner and Gardner (1977) devised a series of simple metaphors to test for different types of brain damage. For the metaphor "a heavy heart can really make a difference," for example, patients were asked to match it to the most suitable picture: a depiction of a crying person, a person literally carrying a large red heart, a 500 lb weight, or a simple picture of a conventional red heart. Patients were then asked to provide a verbal explanation of the metaphor. Those with left hemisphere damage chose correct pictures, such as the crying person, much more often than the literal pictures (58 to 18 percent); but those with right hemisphere damage chose the correct about as often as the literal (43 to 40 percent) and, the authors note, "typically saw nothing strange about the literal pictures," whereas the left hemisphere patients "tended to emphatically reject the literal picture, often laughing at its absurdity" (p. 723). On the verbal test, however, left hemisphere patients (who suffered from aphasia) generally had problems explaining the correct interpretation of the metaphor, and often spoke in literal terms; right hemisphere patients, on the other hand, generally offered a suitably metaphoric explanation, although they seemed undisturbed by the dissociation between their pictorial and their verbal responses. Thus the right hemisphere patients can still access their verbal knowledge to generate a correct explanation of a metaphor; however, they seem less able to recognize how the metaphor would apply to a particular context or situation. The verbal ability of the right hemisphere patients seems predicated in part on the emotional understanding suggested by the metaphors, and in this respect the finding of Winner and Gardner has some similarity to the report of Blonder, Bowers, & Heilman (1991) mentioned earlier: here it was concluded that the right hemisphere deficit lay in failing to understand the non-verbal signals of emotion. It seems likely that a test with more novel metaphors might rule out the knowledge of conventional meanings on which Gardner's patients probably depended.

Right hemisphere patients were also unable to recognize an appropriate structure for a joke, in a study by Brownell, Michel, Powelson, and Gardner (1983). Given four different possible punchlines for a joke, correct, nonsequitur, straightforward neutral, and straightforward sad, right hemisphere patients were able to reject the last two. They knew that a joke was supposed to have a surprise ending. But they were unable to distinguish correct from nonsequitur punchlines: they were unable to construct "a second level of interpretation that ties the ending coherently to the body of the joke" (p. 25). A joke provides an example of a miniature narrative structure in which material understood one way usually has to be reconfigured another way when the punchline is understood. In this respect, jokes represent a process that appears to occur frequently, albeit less dramatically, during literary response: it occurs, for example, in many of the responses to "Together and Apart" that were studied (Miall, 1989a), where material interpreted in the light of the romantic scenario had to be reinterpreted to fit the theme of incommunicability. The study of jokes by Brownell et al. is one of several suggesting that this ability is specific to the right hemisphere.

Finally, Gardner, Brownell, Wapner, and Michelow (1983) report a series of studies with left and right hemisphere damaged patients in which several tests were administered: these involved paraphrasing or recalling short, fairly simple stories, some of which included "bizarre" elements, and arranging a set of sentences in narrative order. The findings point once again to several significant aspects of literary response that appear to be mediated by the right hemisphere. For example, when recalling the stories, right hemisphere patients showed a lack of abstraction. At recall they tended to produce segments of prose in the form originally given "without recoding it into more concise or abstract form," in contrast to other subjects who tended to provide paraphrases. Their

"flat mode of delivery" was also noticed, indicating their loss of ability for prosodic understanding. And in describing the emotions of characters, they tended to elaborate reasons for an emotion which, while logically possible, varied from the emotions implied in the stories: "Characteristically, the patients made inferences about how a character *could* have felt but not how he/she actually felt" (p. 178). The bizarre elements in stories were usually greeted with surprise by normal (i.e., intact) or left hemisphere patients, and at recall they tended either to challenge such elements or to regularize them. The right hemisphere patients, on the other hand, accepted the bizarre elements as given, "frequently adding explanations to justify their inclusion in the story" (p. 179). Right hemisphere patients also showed a lack of understanding of the "moral" or point of each story; and they made more errors in arranging the set of sentences in the correct sequence.

In reviewing the meaning of these findings, Gardner and his colleagues suggest that the deficiency of the right hemisphere patients lies in what they term a "plausibility metric." This consists in a kind of metaknowledge, or "gestalt," which normally enables us to judge the appropriateness of an element within a given context. But the right hemisphere patients "seem unable to appreciate the relations among the key points of the story . . . . Without an organizing principle, the patients are consigned to undirected rambling, unable to judge which details matter, and what overarching points they yield" (p. 187). This describes from another perspective, of course, one of the specific contributions to mental functioning attributed to the prefrontal cortex. In the affective or somatic markers said to guide the temporal course of behaviour, Nauta and Damasio propose a mechanism that would sustain a "plausibility metric" and guide the kinds of narrative judgements that Gardner and his colleagues have analysed. Given that the deficit occurs with right but not left hemisphere patients, it also seems likely, as Damasio suggested, that the deficit is primarily an affective one, and should be located in the right hemisphere -- or, to be more precise, located in the connections between the right frontal cortex and the amygdala, hypothalamus and other affective centres.

Although none of the materials used in the studies of Gardner were of literary quality, several important implications for understanding literary response arise from their findings. Judgements about the appropriateness or fit of elements within a narrative, shown by the response to bizarre elements or to the endings of jokes, suggest that the distinctive contribution of the right hemisphere is required for a range of interpretive aspects that go beyond the level of literal understanding. These include foregrounding, such as the phonetic aspects that relate in part to the deficit in prosodic meaning found in right hemisphere patients, and figurative meaning where this goes beyond the general verbal knowledge of the right hemisphere patients, as in the metaphor study of Winner and Gardner (1977). Other aspects include the range of constructive processes that appear to be involved in transcending the initial schemata applied to understanding a literary story, drawn from semantic knowledge, such as the conventional romantic scenario which readers of the Woolf story eventually found inadequate. Each of these skills draws in some way on the roles that have been attributed to feeling in right hemisphere functions, and this, of course, suggests a more central and productive role for feeling than is generally considered in accounts of literary response.

4.3 Negative feelings: Catharsis in literary response

One finding from neuropsychological studies that so far has been less well established is the location of negative feeling in particular to the right hemisphere. This points to another aspect of literary response, although in the present state of our knowledge, one

that must remain somewhat speculative. Discussion of the cathartic role often attributed to literature begins with Aristotle's brief account of the two emotions said to be the result of experiencing a tragic play: pity and fear. However, catharsis may involve the experience of other negative emotions besides these, and may also operate in a less dramatic fashion in response to other types of literature than tragedies. If the experience of negative emotion belongs to the right hemisphere, the cathartic model of response gains in specificity and obtains a better rationale by virtue of what is known of right hemisphere processes. The argument centres on the role of literature in enabling us to clarify and understand negative emotions rather than, as the interpreters of Aristotle have usually claimed, either eliminate them or bring them into some kind of balance. And it involves stepping outside the domain of neuropsychology for a moment.

One observation that has been made by several students of daydreaming, is that daydreams often seem to centre on negative experiences rather more often than they do positive. Aylwin (1985), for example, found that in the verbal stream of consciousness, critical remarks of the self or of others were common, a feature that she compared to Freud's notion of a superego function (p. 54). She also noticed that examining and adjusting the social persona of the self provided much of the content of daydreams, and that negative situations predominated in what she called "enactive" fantasies, where "disease, death, handicap, physical or emotional injury" were central themes (p. 58-9). She suggests a cathartic role for such thought: daydreams are "a process of emotional digestion which people use to cope with some of the harsher aspects of reality, and which involves a rather literal assimilation of emotional trauma to the self" (p. 61). In another study by the anthropologist Caughey (1984), transcripts of daydreams were collected from a sample of some 400 American students. He found a general bias toward negative, self-related issues, with "a particular emphasis on 'hurts,' slights, humiliations, mistakes, and embarrassments." But the daydreams also sometimes embodied a cathartic process in which a negative experience was worked through and resolved in some way. In addition, Caughey studied night dreams, almost all of which appeared to involve social situations of one kind or another. Here too he found a prevailing negativity: "The vast majority of my informants regularly experience unpleasant dreams, and for many this is the dominant mode" (p. 89).

As Caughey points out (p. 105), what we may be observing here is the problem that Freud analysed in *Civilization and Its Discontents* (1930/1961): a sense that interactions in modern society are inherently frustrating, that they frequently require the suppression of negative emotions (an issue discussed in neuropschological terms by Davidson, 1992, p. 255-8), and that repair of the self concept thus becomes a major task, as shown by the work usually carried out in dreams and daydreams. A study of naturally occurring mood states by Parrott and Sabini (1990) provides a further suggestion: they found paradoxically (and in contrast to laboratory studies of mood states) that when people are in a happy mood they tend to recall negative events, whereas in a negative mood people attempt to recall happy events. They suggest that this finding can be characterized as a mood-repair function. However, while this might explain the response to negative moods, it seems more likely that in positive moods people feel more robust and better able to contemplate and process their memories of negative events. A similar process may be at work in literary response.

It may be assumed that people generally take up literary texts to read because they anticipate pleasure from the experience; and, no doubt, a number of aspects of a literary text may often be pleasurable, such as the play of foregrounding, the induction of vivid imagery, or the surprises and satisfactions that arise from plot. At the same time it is

apparent that many texts, and tragedies in particular, often deal at length with predominantly negative situations. Readers may be engaging with such experiences in order to allow a text to fulfil a similar function to that of the daydreams or dreams described by Caughey: that is, the text induces, whether explicitly or less consciously, the reader's memories of negative feelings and the self-concept concerns that these raise. But the constructive process of reading also places negative feelings in a critical context, allowing them to be brought into relation with other feelings and ideas so that the feelings at issue become better understood.

While Davidson (1992) has recently argued for seeing the left and right hemispheres as predominantly approach and avoidance systems respectively -- hence the evidence for locating negative emotions in the right hemisphere (except for depression: pp. 262-3) -- this account must be considered in conjunction with the known facility of the right hemisphere for the spatial aspects of imagery (Kosslyn, 1987), and its role in understanding metaphor and narrative, as the studies of Gardner and his colleagues showed. The right hemisphere, by virtue of its synthetic and analogue functions, provides the appropriate neurological context for elaborating the negative implications of a feeling rather than eliminating them. Just as Gardner's intact subjects were able to move, where necessary, beyond a literal and linear approach to a story, in offering a paraphrase of it or when criticizing the bizarre elements, so the reader of a literary text is able to engage in abstraction, comparison, and analogy: in particular, the reader can be prompted by the internal logic of the text to place the literal meaning of a given negative feeling within a wider context provided both by other feelings encountered in the text as well as by her sense of prior and anticipated meanings. In this way, negative feelings, and the concerns of the self that may be implicated with them, can be relocated in a wider perspective. Such a relational process seems peculiarly the prerogative of right hemisphere functioning. In literary response, negative feelings are contextualized or transformed rather than avoided: in comparison with the usual notions of purging or balance, this is perhaps a more appropriate way of understanding how a cathartic process might operate while reading.

4.4 The self concept and literature

One final aspect of right hemisphere functioning that also seems indicated by several studies is its role in mediating the self concept. While it has been well established that damage to the frontal cortex results in dramatic changes to the personality, as cases such as Gage or EVR show, there is also some evidence that the right hemisphere is particularly implicated. For example, in a large scale study of left and right hemispheric damage involving 160 patients, Gainotti (1972) found high anxiety or depression with left hemisphere lesions (termed the "catastrophic" reaction), but euphoria, joking, indifference, and inappropriate social behaviour with right hemisphere lesions (the "indifference" reaction). In the latter case, the reaction included a lack of insight into the patient's condition, often including denial of illness. In a direct study of self concept issues, Vanderhaegen (1986) administered questions about the self to patients with damage in either hemisphere. Patients with right hemisphere damage were found to answer inconsistently, and to be poor at discriminating between possible descriptions of their own personality.

The "indifference" of the right hemisphere patients thus appears to signify a loss of concern about the self. This suggestion accords with the allocation of negative feelings to this hemisphere, if, as the studies of daydreams show, the processing of concerns about the self that takes place in daydreams is marked by a predominance of negative

feelings. What the "self" means, and how it is represented in neurophysiological terms, is a question fraught with considerable difficulties beyond the scope of the present paper (cf. Miall, 1989b, for a discussion of some of the psychological issues). Nevertheless, it can be postulated that the involvement of the right hemisphere in literary response also provides a forum within which the concerns of the self are mediated. In this respect literature may offer one of the most significant vehicles for development and change in the self.

5. Conclusion

Literary response has been the topic of extensive theoretical study, especially within the last two decades (Freund, 1987), during which competing and often radically opposed views have been put forward about the processes involved. In the same period empirical studies of literary reading have begun, but they have yet to make a perceptible impact on the problems of reader response theory, and the approaches they embody also tend, not surprisingly, to be driven by competing theories. In this paper a step has been taken towards grounding reader response issues on a firmer basis, on functions of the cognitive and emotional system about which reasonably clear neuropsychological evidence is now available. The discussion has pointed out certain features of the literary experience that may be especially salient, such as the encounter with foregrounding, and the anticipatory and constructive role that has been attributed to feeling.

While the aim of the present essay has been to draw an outline of those aspects of current neuropsychological thinking that may illuminate the nature of literature and literary response, the scope for empirical study of such questions should also be pointed out. Broadly speaking, empirical studies of the neuropsychological issues can be designed that deal with either brain-damaged or normal participants. The studies of Gardner and his colleagues, described above, provide several suggestive models of the first kind, where the materials to be used would, however, be drawn from genuinely literary sources (rather than being experimenter designed). For instance, the study of response to metaphors by patients with right-hemisphere damage (who were unable to offer an account at an appropriately symbolic level) suggests that the whole range of foregrounded features may be misunderstood or overlooked by such patients. Since our studies of foregrounding (Miall and Kuiken, 1994b) have shown that normal readers systematically rate foregrounded segments of a story more highly for strikingness, uncertainty, and affect, we would expect left-hemisphere damaged patients, but not right-hemisphere patients, to be able to make similar discriminations, if the response to foregrounding depends specifically on the capacities of right-hemisphere processing. In another paradigm, involving empathy, readers can be biased to adopt the perspective of one of two characters while reading a narrative (e.g., Wegner and Giuliano, 1983). If the effectiveness of this manipulation depends on feeling, particularly its anticipatory function, it can be predicted that it will fail with right-hemisphere but not left-hemisphere patients.

Working with normal participants, it should also be possible to identify when lateralization of response occurs, whether in relation to foregrounding or to other aspects of reading that involve feeling or self-concept issues. Where reliable indicators of these dimensions exist, their neurological correlates can be assessed using EEG and EMG (electromyographic) measures. Left and right temporo-parietal EEG parameters enable an index of relative right hemisphere activation to be constructed, which can be expected to indicate response to affect-laden imagery while reading; EMG measures of the activation of facial muscles will serve to indicate negative affective involvement

(Kuiken and Mathews, 1987). (Some suggestive, although flawed, findings related to this proposal are reported by Nell [1988], pp. 186-192.) Another research technique involves shadowing. If the processing requirements of reading foregrounded passages are heavier, as we would suppose, a reader hearing a story in one ear and asked to respond to a tone in the opposite ear, should respond more slowly during highly foregrounded segments; but this effect should be more marked when the story is heard in the left ear (i.e., when interpretion is controlled by the right hemisphere). These suggestions for empirical study will indicate how various methods developed for neuropsychological research may be adapted in order to test hypotheses about literary reading.

Why, in conclusion, would I wish to advocate such research? Discussions of literature, particularly in the academy, are now enmeshed with various related debates on political, social, and gender issues. The value of such debates is self-evident, drawing attention as they do to many hitherto neglected influences on the literary system and on the ways in which we construe what is literary. But I would also argue that we are in danger of overlooking some of the more salient and long-standing functions that literature performs in human culture, especially its power to defamiliarize and as a result to assist readers to reflect on and reshape their cultural identity (Miall, 1993). The anticipatory function of literature provides degrees of freedom in our thinking and feeling that are perhaps only rarely available elsewhere. An approach to literary response derived from neuropsychology not only points out one way in which such issues can be placed at the centre of attention, but also provides a needed framework of ecological validity absent from much debate on literary response, which occurs at a purely theoretical level and which remains unilluminated by the findings of recent empirical research. Employing the principles of neuroscience, we may be in a better position to carry out empirical studies that will offer genuine advances in our understanding of what literary experience means.

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