

CHAPTER 11

Neuroaesthetics of Literary Reading

David S. Miall

LITERARINESS

Literary reading is an experience that most people probably recognize implicitly. However, it is not easy to say what characterizes it. Are there properties that make it distinctive? Can we, in fact, demarcate it from other kinds of reading, such as our response to a Harlequin romance or a narrative in an advertisement? In this chapter, I focus on the implications of this question for empirical studies of literary reading. This will serve to identify several key processes that appear to be implicated in the experience of “literariness.” A comparison with the findings of neuropsychological research helps to define the processes and indicate directions for further inquiry. While there is, as yet, no explicit body of neuropsychological research on literary reading, a number of studies provide suggestive parallels: these focus on questions about memory, insight, empathy, feeling, and language, and provide a framework for examining some of the constituents of the aesthetic response to literary narrative and poetic language.

For a preliminary sketch of literary reading, I consider the opening two paragraphs of the following short story, by the Irish writer Seán O’Faoláin, “The Trout,” which has been the focus of several of our empirical studies of reading (Miall & Kuiken, 1994; Kuiken & Miall, 2001). The text is divided into segments, indicated by the numerals in square brackets.

[1] One of the first places Julia always ran to when they arrived in G—was The Dark Walk. [2] It is a laurel walk, very old, almost gone wild, a lofty midnight tunnel of smooth, sinewy branches. [3] Underfoot the tough brown leaves are never dry enough to crackle: there is always a suggestion of damp and cool trickle.

[4] She raced right into it. [5] For the first few yards she always had the memory of the sun behind her, [6] then she felt the dusk closing swiftly down on her so that she screamed with pleasure and raced on to reach the light at the far end; [7] and it was always just a little too long in coming so that she emerged gasping, clasping her hands, laughing, drinking in the sun. (O’Faoláin, 1980-1982)

The text is amenable to two main types of analysis, linguistic and narrative. At the linguistic level, certain stylistic features tend to stand out: these include the unusual abbreviation “G---,” the consonance created in phrases such as “damp and cool trickle,” the repeated “ah” sounds in “gasping, clasping . . . laughing,” and the figurative expression “lofty midnight tunnel.” Readers tend to take account of such features, although they may not do so consciously. Typically, readers take longer to read segments that contain a number of such stylistic features, and when asked to judge their effects they report that the segments are striking and that they experience elevated levels of feeling (Miall & Kuiken, 1994).

As narrative, readers recognize the presence of the character named in the first segment and appear to construe the story, at least in part, from her point of view. The story provides indications of place and time, and a consistent sequence of events relating the character’s actions within the world she inhabits. Thus, in the terminology of discourse processing, readers construct a situation model through which they track the unfolding events of the story (Zwaan & Radvansky, 1998). Over the course of a narrative (i.e., beyond the opening two paragraphs reproduced here), readers follow the unfolding plot, experiencing the vicissitudes of the main characters’ actions and desires, often empathizing with a character; they may feel suspense, curiosity, or surprise. In addition, readers tend to form an implicit relationship with the narrator (Bortolussi & Dixon, 2003, pp. 72-77). During the reading or after it is over, readers may reflect on ways in which the meaning of the story resonates with their own experiences, such as their autobiographical memories, their values, or the narrative’s cultural significance.

The influence of some of the linguistic and narrative features can be seen in the following protocol, collected from a reader whom we asked to think aloud while reading the story, segment by segment. I reproduce her response to the opening segments.

1. Oh, I like the name Julia. I wonder why they have dashes after the G. Why don’t . . . why don’t they tell us the name? The Dark Walk sounds very ominous.
2. “Smooth, sinewy branches.” That’s very poetic, I like that.
3. I like the adjectives. They make me think of the forest.
4. That seemed so abrupt, “She raced right into it.”
5. I can picture the sun being behind me when I read that too.
6. And the dusk like, something like a blanket closing around me when I read.
7. Makes me feel happy to read “laughing, drinking in the sun.” That’s really nice.

The reader’s references to her feelings are a prominent constituent of her comments. The poetic qualities of the language seem to evoke at least two comments (segments 2 and 3), while it seems probable that at segment 7 the assonance that includes “laughing” and the metaphor “drinking in the sun” contribute to her feeling of happiness. In response to these segments, she repeats two phrases from the story, which suggests that she has found them striking and by repeating them aloud is better

able to savor their poetic qualities. In previous empirical studies, we have found that the tendency to repeat phrases correlates with a higher frequency of stylistic effects. This reader also appears to have a positive association to the name “Julia”; this may indicate a positivity bias to the character, a willingness to endorse the view of reality that the character’s perspective suggests. This seems evident by segments 5 and 6, since here the reader aligns her perspective to that of Julia: she reports experiencing the sun and the dusk as though she were Julia. As Green has shown, readers transported to the narrative world show increased positivity toward sympathetic characters (Green, 2004, p. 248), and they are likely to accept the validity of what they read (Green & Brock, 2000, p. 703).

The only negative feelings in the response occur at segment 1, where the reader questions the narrator’s stance in withholding the full name of G--- (the narrator is referred to as “they”), followed by her immediate response that the Dark Walk “sounds very ominous.” The reader seems surprised at segment 4, “That seemed so abrupt”: probably the segment disrupts the mood instilled in the reader by the previous two segments; at that moment, Julia’s behavior may seem anomalous (the reader may not yet have appreciated that Julia is a child: later in the story we are told she is 12).

There are two standard claims about what makes our reading literary: that it is triggered, first, by our encounter with a rich, organized array of stylistic features (Miall & Kuiken, 1999), or, second, by the (usually empathic) engagement with characters in literary narratives (Oatley & Mar, 2005). This short section of a reader’s response thus illustrates several features that have been considered characteristic of literary response. Given these basic features, we can theorize several other features that will be required for a more complete aesthetic response, including to the story as a whole.

One potential development lies in the contrast of feelings reported by the reader in response to the Dark Walk: it is “ominous” at first, then appears pleasant when the poetic description reminds the reader of a forest. In fact, the contrast motivates this reader’s understanding of the main character at several points later in the story, in particular at the climax of the story when Julia visits the Dark Walk at night. Conflicts of feeling often seem central to the aesthetic complexity of literary texts: they focus the reader’s attention in successive episodes and organize the reader’s understanding of the issues at stake (Miall, 2004). In addition, readers may experience insight into the meaning of their feelings and undergo a shift in understanding as a result (Kuiken, Miall, & Sikora, 2004). Although this may not be a frequent occurrence while reading, such gains in self-understanding can be the most valuable experiences we acquire from literary reading.

Another, shorter-term development of the feelings evoked during reading is what we have termed the *defamiliarization-reconceptualization* cycle (Miall & Kuiken, 2001). At the encounter with a stylistically rich passage that is found striking, the reader’s accustomed schemata may be inadequate for comprehension; we surmise that the feelings evoked by the passage provide an alternative perspective directing the reader’s search for a new understanding. The resulting reconceptualization occurs downstream from the initial encounter (perhaps several segments further on).

A feeling experienced during reading, such as the response to striking passages, often contains a surplus of meaning; it prompts more thought than can be considered within the frame of working memory (readers' think-aloud comments, of the kind reproduced previously, capture only a part of what the reader is actually experiencing). This may indicate that a prototypical feeling has been evoked, linking the present response both to the reader's previous experiences of the feeling and to the laws within which the feeling typically operates. As I will mention later, this may underlie the so-called disinterested aspect of aesthetic response.

On the narrative side, readers have been shown to track character's feelings (De Vega, Leon, & Diaz, 1996; Gernsbacher, Goldsmith, & Robertson, 1992) and knowledge (Graesser, Bowers, Olde, White, & Person, 1999). A literary text, unlike other narratives, can provide privileged access to the minds of characters, building on the capacity that we possess for reading others' minds (Zunshine, 2006). Literary reading thus facilitates investigation of Theory of Mind, providing support for the simulation account rather than the theory-theory account (Carruthers & Smith, 1996). This capacity also provides an important framework for considering empathy, our ability to experience another's feelings as though they were our own.

It is these aspects of literary reading—defamiliarization, feelings, empathy—that I will discuss in relation to a number of neuropsychological studies. The model of reading I have outlined presents an aesthetics that builds in important respects on several previous essays in this area, including recent neuropsychological contributions by Julie Kane (2004) and Raymond Mar (2004). Kane argues that the right hemisphere (RH) controls a distinctive set of language processes that are characteristic of poetry. These include imagery, alliteration, synaesthesia, synecdoche and metonymy, paradox, irony, prosody (i.e., emotional tone), and story relationships. As I suggested in an earlier review (Miall, 1995), feeling appears to be a central component of such RH phenomena; the unresolved issue is how feeling in this context participates in or evokes a distinctively literary experience, since all the features that Kane cites can also be found occurring without literary effect in nonliterary language. Kane itemizes an essential part of the literary toolkit, but the aesthetic power that incorporates them into a literary experience remains to be demonstrated. Mar (2004) outlines the components of narrative and examines a range of candidate neuropsychological mechanisms that might instantiate them. For instance, Baddeley's episodic working memory model provides a framework for developing the hypothetical scenarios of narrative (see Miall, 2006, pp. 148-150); the work of Beeman and his colleagues demonstrates RH "coarse" semantic coding, appropriate for the poetic features examined by Kane; the Theory of Mind that allows inferences about characters in narrative appears localized to several RH structures. Mar also points to the sensitivity of brain scanning, which can demonstrate differences in response (mostly RH) between a story presented either with or without a title (Mar, 2004, p. 1421), a finding that suggests the fine discrimination of literary from nonliterary experience should now be within reach of brain-scanning technology. Again, however, Mar's work, while illuminating a range of narrative features and showing their probable neuropsychological mechanisms, stops short at the boundary beyond which the distinctive experience of literary narrative occurs.

How to go beyond this limitation is another question. The primary problem in pursuing the topic (as with empirical studies more generally) is a theoretical one: how to specify what is distinctive to literary response, and to do so in sufficient detail that we can isolate the psychological processes that are implicated. If we find a difference due to literary processing, can we understand what it means, that is, how it contributes to a conception of literariness? Here, neuropsychology provides what may be reliable grounds for research, since the resolution with which scanning occurs should enable us to discriminate the structures that distinguish a literary from a nonliterary response. In contrast, empirical methods that call for an explicit response from the reader, such as a rating or a verbal comment, are liable to distortions of the literary experience when participants provide socially desirable responses or because the task of verbalizing interferes with the experience. While brain-scanning technology itself is intrusive and may militate against the absorption typical of a powerful literary experience, the measures it provides are not liable to direct influence by the participant, nor are they limited to the verbal domain. In the remaining sections of this chapter, I outline two approaches to the issue of literariness and point to neuropsychological studies that may help illuminate its components.

FOREGROUNDING

Foregrounding, as I noted earlier, appears to initiate a cycle that begins with the response to stylistic features: for instance, the alliteration and metaphor that occur in this phrase about the Dark Walk near the beginning of “The Trout”: “a lofty midnight tunnel of smooth, sinewy branches.” These are found striking (i.e., defamiliarizing), and arouse feeling; feeling, in turn, provides a context within which over time the unfamiliar aspects of the phrase are recontextualized. In response to the term “midnight” in this phrase, for example, a reader might go to experience a Gothic atmosphere in the Dark Walk; or the bodily hint of “smooth, sinewy branches” might suggest the animation of the Walk (either of these connotations provides a valid context for understanding what will occur later in the story). This sequence of responses is undoubtedly dependent on right-hemisphere processes, as Kane (2004) shows; what makes it distinctively literary appears to be the richness of response—the number of potential meanings sensed within the short timespan of normal reading—and the evocation of feeling with the power to instantiate a subsequent shift in meaning for the reader (the reconceptualization process). Several neuropsychological studies provide support for this interpretation of the response to foregrounding.

It seems probable that the initial response to a foregrounded passage will activate the amygdala (as Robinson has proposed: 2005, p. 71). As Davidson, Pizzagalli, Nitschke, and Kalin (2003) observe, in a comment that corresponds well to the challenge of foregrounding, the amygdala plays a critical role in “co-ordinating cortical arousal and vigilant attention for optimizing sensory and perceptual processing of stimuli associated with underdetermined contingencies, such as novel, ‘surprising’ or ‘ambiguous’ stimuli” (p. 15). This first, rapid response (the “low road” rather than the slower “high road” of cognitive processing: LeDoux, 1996,

p. 161) may then connect to emotional memories (Hogan, 2003, p. 156) that provide alternative frameworks for assigning significance to the experience. These first responses need not be “primitive,” as Robinson (2005, p. 151) suggests, as the studies I will mention next help to show.

The richness of meaning evoked by foregrounding appears to occur early in the response. As Posner and DiGirolamo (2000) have shown, while awareness of an object depends on processes occurring in the first 100 msec following input, they note that the “difference between the activation caused by novel and familiar objects can be shown in ventral visual areas within 155 msec after input.” Moreover, they show that processing of unattended stimuli may occur to a high level: “Selecting one stimulus over others does not mean that unselected items will not produce a reorienting of attention.” In other words, the richness of meaning in foregrounding need not be apprehended consciously in order to influence subsequent processing. As Eckstein and Friederici (2006) found, the prosodic aspects of language, which would include foregrounded aspects, are taken up early in processing: they report that incongruities in prosody are detected 300-500 msec after word onset, which suggests “the immediate influence of phrasal prosody during the initial parsing stage in speech processing.” Their findings demonstrate an early interaction of syntactic (LH) and prosodic (RH) features.

To compare these response times with readers of “The Trout” (data from Miall & Kuiken, 1994): mean reading times per syllable are 258 msec with a standard deviation of 96 msec; thus, responses within the normal range vary from 354 msec for passages high in foregrounding to 162 msec for passages low in foregrounding (response to highly foregrounded passages thus takes roughly twice as long). These times indicate that complex processing of stylistic aspects is likely to be occurring prior to the window of consciousness. As Damasio (1999) puts it, “We are probably late for consciousness by about five hundred milliseconds” (p. 127). Since one syllable can embody several foregrounded features, the initial occurrence of feelings outside of awareness may often be rich and complex (i.e., far from the initial “quick and dirty” processing on which Robinson [2005, p. 50] bases her response model; see Hogan [2003, p. 176], who rules out the possibility for literature of the “low road” of “direct emotive stimulation”). At the same time, this initial response is likely to be unreportable. Fiore and Schooler (1998) report a study with two problem-solving tasks, one an incremental, logic task, the other an insight task. It was found that verbalizing interfered with the insight task but not the logic task, suggesting that “insight problems may rely more on nonreportable processes that are vulnerable to verbalization” (p. 352), and (paradoxically, since foregrounding is a linguistic phenomenon) “depend on the ability to avoid the inherent constraints of language-based thought” (p. 368).

Thus, once the response to foregrounding becomes consciously available to the reader at around 500 msec, a reader will experience a richness of felt meaning already in train, yet one that may have evoked unfamiliar meanings that remain to be resolved. In the terms of Owen Barfield (1964), the “*interior* significance” of defamiliarization “must be felt as arising from a different plane or mode of consciousness” (pp. 170-171). This, in itself, is a recognizable and characteristic

effect of literariness. A literary reader often has the sense that the literary text is in control of the self and directs response from some intimate yet strange quarter of the mind. The further development of the response toward reconceptualization may be compared with the process of resolving insight problems, studied by Beeman and his colleagues.

The work of Beeman is based on the premise that the right hemisphere provides coarse semantic coding in contrast to the left hemisphere. Thus, the more distant associations of words are better recognized when presented to the left visual field (RH) (Beeman, 1998, p. 267). The interesting aspect of this research, however, and its relevance for understanding the processes of literary response, is that while the LH tends to select close associations early in processing, RH capacity for more remote associations only shows its advantages over time in relation to insight problems of a kind for which LH processes are unsuited. Bowden and Beeman (1998) asked participants to solve insight problems in which three words were presented; participants then had to find a fourth word that would pair with each of the three to create familiar phrases. For example, given *high*, *district*, and *house*, the solution word was *school*. After 7 or 15 seconds, it was found that the RH had greater priming than the LH for the solution word: participants pronounced the solution word faster when it was presented in the left visual field; at earlier intervals (1.25 or 2 secs) no RH advantage appeared. They suggest that in initial processing, LH interpretive processes dominate, while after several seconds the more connotative RH processing shows its advantage. This research also argues for the greater predictive powers of RH processing during connected discourse, such as a narrative: "When a coherence break is encountered, a [RH] search ensues for potentially connecting information that has been previously activated by explicit mention, by close relation to input words, or by overlap from distantly related input words" (Beeman, Bowden, & Gernbacher, 2000, p. 328). As Grafman (2002) puts it, the RH may thus be "adept at integrating or synthesizing information across events in time," such as finding the moral of a story (p. 301). The role of the RH in insight problems is confirmed by an imaging study: Bowden, Jung-Beeman, Fleck, & Kounios (2005) report that "fMRI results revealed an increased signal in the right anterior superior temporal gyrus for insight relative to non-insight solutions" (p. 325). In a parallel study, Coulson and Wu (2005) studied responses to jokes and found a "frame shifting" response attributable to RH processing, suggesting RH facilitation of distantly related meanings. Such shifts in meaning are more characteristic of literary than nonliterary texts, as an empirical study of readers by Meutsch and Schmidt (1985, p. 566) demonstrated.

The neuropsychological work reported here supports the theorized function of foregrounding in literary response, suggesting that RH processes facilitate a reconceptualization, analogous to the solution of an insight problem, that occurs downstream from the initial response. We (Miall & Kuiken, 2001) previously described this model in three phases: the neuropsychological studies discussed here provide evidence for phases one (defamiliarization) and three (reconceptualization). We proposed that in phase two, feeling directs a search for an appropriate context to locate the unfamiliar aspects of foregrounding (such as the "midnight" metaphor

or the *s*-alliteration). Our empirical findings suggested that shifts in meaning were inhibited during this phase. Preliminary support for this proposal is also provided by Beeman's studies. Beeman (1998) reported that during response to narrative, immediately following the point where an inference was possible, the RH may have been inhibited since "participants did not show priming in reaction time for inference-related targets in the lvf-RH at the time when the inference should be selected for incorporation," while "they did show priming in accuracy at this same time, suggesting that the information was activated above baseline, but not easily (rapidly) available for output." This is evidence for what he calls a "tentative inhibition hypothesis" (p. 276). We might speculate that the temporal interval indicated here allows feeling some scope for hypothesis testing, enabling it to locate the most appropriate context for interpretation. In literary reading, the most dramatic example of such an interval occurs during response to the sublime: here we might suggest that LH processing is disabled while the temporary RH inhibition corresponds to the experience of the momentary suspension of thought and feeling often reported—what one witness referred to as "a sort of annihilation of self" (Williams, 1798, I, p. 60).

Confirmation of the significance of feeling in phase two is provided by a study of narrative response. In a functional magnetic resonance imaging (fMRI) study, Ferstl, Rinck, and von Cramon (2005) showed that RH activation in response to affective incongruities in short stories lasted up to 14 secs from word onset. Their mapping of responses to the stories showed a nonverbal, emotional dimension of response: "Elicited by the emotional target information, the orbitofrontal and ventromedial prefrontal activations, including the extended amygdala complex, clearly show that the affective component of the stories directly induced processes beyond language comprehension. Thus, the situation model for these stories includes a nonverbal, nonpropositional representation of the affective dimension" (pp. 733-734). In a literary context, such as the encounter with foregrounding, it seems likely that feeling would provide the primary vehicle for developing an interpretation of foregrounded elements.

Foregrounding thus appears to initiate a rich response prior to awareness: as early as 155 msec, the detection of unfamiliar stylistic features may initiate a response process that includes prosodic, affective, as well as semantic aspects. This is followed by an inhibitory phase during which feeling is contextualizing the unfamiliar, leading to emergence of new meanings or shifts in perspective a number of seconds downstream from foregrounding onset. Several neuropsychological studies, such as those on coarse coding, help elaborate the mechanisms required for this model. In the next section, I examine some bodily and affective aspects that are also central to literary response.

EMPATHY AND IMMERSION

Among the more salient features of our response to narrative, perhaps the most prominent is the sense of "being there" or "transport" (Green, 2004). The absorption we experience while reading may occur in relation to a vividly imagined setting (e.g.,

the moorland in *Wuthering Heights*) or the sense of a character's presence (e.g., Heathcliff), and at times it may enable us to empathize with the feelings and motives of a character and to share his or her goals. This effect was first described in the eighteenth century by Lord Kames: he termed it "ideal presence" and characterized it as a "waking dream" (Kames, 1762, I, pp. 108-112). Such experience, as if we saw and felt events unfolding before us, can be powerful enough at times to cause bodily symptoms, influencing heart rate, sweating, or muscular tension (Auracher, 2006). It has also been a problematic issue, since it is hard to explain how we can experience what feels like real emotion in relation to fictional events and characters (Walton, 1990). Nevertheless, it is a familiar response not only to literary texts, but also to subliterary and other art forms such as movies. I will describe first the neuropsychological work that enables us to understand the efficacy of texts in this respect, then offer a view of how this provides the basis for a distinctively literary experience.

The main proposal I discuss here is that brain regions responsible for interpreting perceptual input are also those that represent an imagined perception. For example, the primary visual areas are activated when an object is merely imagined, a process that involves "running perception backward," or top-down, as Behrmann (2000) put it. Behrmann points out that there is also evidence that the size or distance of an image is also represented; for instance, when a participant imagines a larger image, relatively more parts of the visual area are activated (p. 51). In the light of such evidence, Zwaan (2004) put forward the proposal that a reader is an "immersed experienter," using descriptions of situation and characters in order to construct an experiential simulation. Thus, "comprehension is the vicarious experience of the described events through the integration and sequencing of traces from actual experience cued by the linguistic input" (p. 38). Zwaan is describing reading in general. Aesthetic experience during reading may involve more vivid imagery or more intense feeling, but probably requires an additional dimension, as I will suggest shortly.

Related to Zwaan's model of reading is the discovery of mirror neurons. First observed in the monkey, single neurons were found to fire either when the monkey carried out a specific action (e.g., reaching out the hand to grasp an object) or when the monkey observed another monkey performing the same action. The neurons were found to be quite specific: if the hand reached without grasping an object, the neuron was not activated. More recently, mirror neurons, including neurons performing a wider range of functions, were also found in humans. Gallese and Goldmann (1998) suggest that the function of mirror neurons is to facilitate "mind reading," that is, they enable an observer to represent another's goals and purposes, helping us to anticipate whether the other's intentions are friendly or hostile. Rizzolatti (2005) points out that the monkey's mirror neurons in the superior temporal sulcus are responsive to various bodily movements; this region is also linked to the amygdala and other emotion centers. This suggests that simulation of emotional responses can also occur.

The mirror-neurons finding thus also provides a mechanism for helping to understand social cognition, the Theory of Mind module that enables us to read

others' minds. Of the two standard explanations of Theory of Mind, mirror-neuron activity supports a simulation view in contrast to the theory-theory view (Gallese & Goldmann, 1998). The theory-theory approach argues that we use causal and explanatory laws to relate external events to inner states, that we reason in relation to tacitly understood causal laws. Simulation theory argues that people use their own mental mechanisms to calculate and predict what others think, feel, or do; that is, we put ourselves in the place of the other person and figure out what their experience means. If this is correct, the mirror-neuron system also underlies the experience of empathy, which is often an important component of our response to narrative (Keen, 2006, p. 211).

Evidence for the role of mirror neurons during reading, and their activation of empathic and other affective responses, is available from several studies. Boulenger, Roy, Paulignan, Deprez, Jeannerod, and Nazir (2006) report an interaction between reading and the motor system within 200 msec of word onset. In their study, when a particular reaching movement was taking place while the participant concurrently processed an action verb, interference occurred when the movement called on different effector muscles than implied by the action verb. This finding suggests that "the perception of an action word and not the perception of the action *per se* would be sufficient to trigger the mirror-neuron system" (p. 1607). The language and motor systems thus appear to share neuronal representations. Hauk and Pulvermuller (2004) found that while reading words relating to actions by face, arm, or leg, topographical, location-specific neuronal activity occurred within 210 to 230 msec. This finding also points to mirror neurons in the premotor cortex. They propose that "action-related neurons are activated early when words are being processed and that they play a crucial role for identifying these words" (p. 199). Similar findings, relating response to language to mirror-neuron systems for specific motor actions are reported by Garbarini and Adenzato (2004), Grafton, Fadiga, Arbib, and Rizzolatti (1997), Oliveri, Finocchiaro, Shapiro, Gangitano, Caramazza, and Pascual-Leone (2004), and Tettamanti and colleagues (2005). Iacoboni (2005) points out that mirror neurons occur in humans in area BA 44, representing hand and mouth movements, an area that is also part of Broca's area, responsible for language (p. 89). This area in humans thus plays an important role in imitation, in addition to responsibility for language, suggesting "an evolutionary continuity between action recognition, imitation, and language" (p. 91).

Mirror neurons also appear to underlie our capacity to simulate the experiences of touch, feeling, and emotion. Keysers, Wicker, Gazzola, Anton, Fogassi, and Ballese (2004), in a fMRI study, showed activation of the secondary somatosensory area (SII) both when participants observed another person being touched (on the leg) and when they were touched in the same place. A previous study also found a response in SII when participants only had the expectation of being touched (p. 341). Gallese, Keysers, and Rizzolatti (2004) show that a mirror mechanism also underlies understanding and experience of emotion. For example, the human insula is activated by the sight of the face of another person experiencing disgust; electrical stimulation of the insula also produces feelings of nausea and disgust. Through simulation, mirror neurons thus appear to provide experiential knowledge

of others' emotions, not just a conceptual knowledge of them. A physiological basis for empathy is discussed by Jacoboni (2005). An fMRI study found substantially similar activation in anterior sectors of the insula during both observation and imitation of emotion, although in several areas, activation was higher during imitation; this emotional response also correlated with increased activity in the amygdala. Jacoboni notes that anterior insula also appears responsible for monitoring agency, that is, the ownership of actions (p. 97). Other studies demonstrating a mirror-neuron system for empathy are described by Singer, Seymour, O'Doherty, Kaube, Dolan, and Frith (2004) and de Vignemont and Singer (2006).

Empathy in literary response thus may involve not only simulating the feeling experienced by a character about which we are reading, but also such embodied experiences as touch or motor activation. The responses of the reader I cited earlier suggest such a response: she experiences the same visual imagery as the character she is re-creating: "I can picture the sun being behind me when I read"; she appears to experience the setting kinaesthetically, since the dusk of the Dark Walk is "something like a blanket closing around me when I read"; and the character's emotion appears to be contagious, making her "feel happy to read 'laughing, drinking in the sun.' That's really nice." The mirror-neuron system thus appears to support a wide array of empathic responses during reading.

A study by Becchio and Bertone (2005), also involving mirror neurons, suggests that the initial response during reading involves a type of disinterest, where the experience portrayed is considered in its own right, independent of agency. Aesthetic disinterest, a concept that originates with Kant, is described by Iris Murdoch (1970) as a response that points "away from self" (p. 66), is "impersonal" (p. 75) and "unselfing" (p. 84); bad art in comparison is like a "selfish daydream" (p. 86). Murdoch's account would be modified in an important direction if the Becchio and Bertone study is correct. These authors report that certain mirror neurons are amodal, activated whether the event in question is visual or aural; that is, they are activated whether watching, performing, or merely imagining doing an action. They go on to claim that these "audiovisual mirror neurons not only discriminate between actions in all modalities, but map actions in a *multisubjective* neural format neutral with respect to the agent." How would this apply to reading? "When two agents socially interact with one another, the activation of mirror networks creates shared representation, i.e. representations simultaneously activated in the brains of the two agents" (p. 23). In the asymmetric case of reading, while a character is not physically present but imagined, mirror neurons represent the character's experience in the reader, replicating his feelings or motor actions. But, Becchio and Bertone ask, if the same representation is active in two brains, how do we distinguish the "I"? (p. 24)—a question that also applies to the situation of reading. They suggest that "Motor intentions are first shared, and only in the second place attributed" (p. 28). This perspective suggests that as readers, we experience, even if only momentarily, a schema for action or feeling that makes its own demands on us for understanding. Its status as a vehicle for reflection and anticipation orients us, independently of the self, toward the implications of the narrative we are reading, although it may subsequently be linked to our own intentions, goals, or feelings.

The mirror-neuron framework thus helps provide an account not only of how the body is implicated while reading, or how empathic responses to character are possible (thus pointing to a solution of the problem of how we can have real feelings for fictional characters), but also seems to provide a foundation for the disinterested response to literary art, not by explicitly pointing away from the self, as Murdoch claims, but by presenting experience without agency. Experience only later, downstream, becomes a token for explicit self-reference through activating the reader's feelings, and (perhaps) the reader's autobiographical memory. While the implications of disinterestedness remain to be worked out in more detail, they provide another avenue for considering how literary response may be distinctive. Moments of foregrounding, or surprising turns in a narrative, provide the grounds for disinterest, situating the experience in question as a prototype with its own distinctive laws of being and development. The two claims to literariness I have made in this chapter thus come together in such moments. Although their topics are familiar from aesthetic theory—stylistic aspects and disinterest both have a long critical history—recent neuropsychological studies provide fruitful grounds not only to reaffirm but also to reconceptualize them.

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