Cognitive Science and the History of Reading

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COGNITIVE PSYCHOLOGISTS, LIKE LITERARY CRITICS, HAVE SPENT many years wrestling with the complexities of the reading process. Yet psychologists and critics ask fundamentally different questions about reading because their fields have contrasting methods of defining, analyzing, investigating, and evaluating it. As a result, the terms of one discipline do not apply directly to the other. Creating an interaction between the two requires constant, often skeptical translation across disciplinary boundaries.[1] This essay will concern itself with developing such a translation, using it to investigate the history of reading audiences, and drawing conclusions about the significance of the scientific study of reading for literary critics. I will take evidence from responses to literature of the Victorian period, especially to the poetry of Robert Browning, to reveal microprocesses of reading that apply to readers more widely, across differences of culture and period.

The scholarly subfield of the history of reading and reading audiences has developed an impressive body of work by focusing on such topics as the circumstances of publication, marketing, editing, and dissemination; images of readers in art and literature; the development of reading communities; and the comments of readers about what they read (Price). Less attention has been paid to how they read, in part because literary criticism has been better at developing a vocabulary for describing varieties of interpretation than for analyzing the microprocesses of reading. Cognitive psychologists, in contrast, typically work not with epics, novels, or lyric poems but with much simpler texts. Using these, they have developed descriptions of common strategies involved in understanding texts (such as pattern recognition and storing or retrieving information), of the

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results of those processes (such as inferences or changes to existing knowledge structures), and of the ways that readers with varying goals and abilities modify these processes.

Two cognitive psychologists, Paul van den Broek and Kathleen Kremer, admit that, even though there are many definitions of reading comprehension in psychology, they all

> require that readers construct a mental "picture" of the text: a representation in memory of the textual information and its interpretation. Such mental representations ideally can be easily accessed, manipulated, and applied to any number of situations. Thus they are central to performance on any comprehension task. . . . When reading is successful, the result is a coherent and usable mental representation of the text. This representation resembles a network, with nodes that depict the individual text elements (e.g., events, facts, settings) and connections that depict the meaningful relations between the elements. (2)

For a literary critic, such a passage may dramatize starkly the differences between reading as understood in criticism and in psychology. While those familiar with reception theorists like Wolfgang Iser should not find this vocabulary entirely strange, van den Broek and Kremer aggressively foreground the mechanical aspects of reading in ways that could make many critics uncomfortable (Iser 107–34).[2] Next to the richly complex models of reading found in literary theory, this description sounds reductive, uninteresting, and crude.[3] For critics, much of what is most important and interesting about reading seems to vanish in phrases like a "mental 'picture'" of "textual information," a "network" of "nodes," or representations to be "accessed" and "manipulated."

Yet this machinelike flatness might also work as a salutary challenge. While literary critics prize the complexity of the reading experience, many aspects of this process are indeed routine, automatic, and quasi-mechanical. The very expertise of literary critics may render such aspects invisible because their skills have become so routinized. Far from leading to shallow or superficial results, such routinization enables sophisticated literary-critical readings, since it allows critics to move quickly past many basic processes that occupy less skilled readers and concentrate on more involved ones. Critics for whom a term like *routinization* has negative connotations may be surprised to see it positively valued by psychologists studying the reading process. Such valorization is a reminder that assumptions about reading in literary criticism have often bypassed many of its most fundamental processes by focusing on the interpretation of exceptionally intricate texts, like novels. The mechanistic vocabulary privileged in cognitive psychology shifts attention away from complex interpretive questions to more basic aspects of reading, which ground even the most advanced analysis (Kintsch 213).

Critics not rendered skeptical by van den Broek and Kremer's mechanistic metaphors might find other aspects of their definition unconvincing, such as their confidence in defining what counts as a "successful" reading and in associating success with a "coherent and usable mental representation." A rhetoric that uses words like "successful" and "coherent" sounds reductive or just wrong to scholars whose discipline has long embraced fragmentation, ambiguity, aporia, and paradox. Yet van den Broek and Kremer's wording comes with implied parentheses, which are easy to miss without a larger sense of the disciplinary field. For psychologists, "success" and "coherence" acquire meaning only in the context of individual differences among readers; the terms evaluate the interactions among a particular reader, that reader's mental representation of a text, and his or her goals in reading. Consequently, what for one reader is a successful act of comprehension may look to another like a hopeless misreading; as long as it provides the reader with a usable representation

in relation to his or her goals, it counts as successful and coherent. Literary critics interested in historical readers may well be more skeptical than psychologists tend to be about exactly how readers know what their goals are and how larger cultural forces shape their understanding of what is usable. Yet the salient point for the relation of cognitive psychology to the history of readers is that descriptions of successful comprehension do not assume any absolute truth or validity. While literary critics are familiar with Stanley Fish's idea that readers may belong to different interpretive communities, van den Broek and Kremer generalize about reading in ways that attempt to allow for individual choice and ability: within one discourse community, individuals might have widely varying abilities and background knowledge, which will produce different reading experiences (e.g., Kintsch and van Dijk; Fish; Lorch, Lorch, and Klusewitz; Graesser, Singer, and Trabasso; van den Broek, Lorch, Linderholm, and Gustafson).

"Success" and "coherence" for van den Broek and Kremer are aspects not of literary interpretation but of what they call "a representation in memory of the textual information." This phrase introduces a slight but suggestive modification in the way that literary critics are used to understanding relations between text and reader. A standard and much debated polarity in literary criticism is the one between "the literary fact (or the author's text) and the interpretive act (or the reader's construction)" (Freund 152). Psychologists subdivide the second of these two into "online" and "offline" processes. Online processes, such as inferring, elaborating, summarizing, paraphrasing, and integrating information, take place during the act of reading and lead to, or fail to lead to, a coherent memory representation. This representation is modified by offline processes (which occur after reading): for example, accessibility decreases over time, and new sources of background information may be integrated. The exact combination of online and offline processes will vary according to what readers consider important, given different goals, levels of motivation, abilities, background knowledge, and standards.

Psychologists agree that this memory representation resembles a network of "nodes that depict the individual text elements" and the connections among them. To imagine how readers form such a network, researchers have generated various models that, in some cases, can be adapted as computer programs and then tested for their ability to predict actual human performance. Such models are deliberately reductive placeholders for neuroanatomical activities that we are not yet able to describe; they provide a continuous metaphor for how the brain processes textual information (Caplan and Waters; Gernsbacher and Kaschak; Perfetti and Bolger). While there is consensus among psychologists about the value of generating such models, there is no consensus about the best one. I will describe one of the better known and most flexible, the "landscape model," because of its ability to capture both online processes and offline representations.[4]

Literary critics might think of the landscape model more as an architecture than as a theory. It incorporates several assumptions about processes underlying reading but has enough flexibility that it can accommodate different theories about exactly what mental representations might result. As an empirical tool, it provides a conceptual framework in which researchers can test how various aspects of the reading process will influence a final memory representation. As a computer program, it even produces a visual model of readers' activities, which looks like a landscape in constant motion. Its value to humanists interested in the history of audience is that it provides a detailed breakdown not of interpretation but of cognitive processes that precede interpretation.

At the core of the landscape model are the assumptions that the reader's mental net-

work consists of concepts and the connections among them, that different concepts and connections are more or less strongly activated during the reading process, and that degrees of activation constantly fluctuate. What counts as a concept and what kinds of relations might be formed among concepts will vary depending on the organization of the text, as well as on a reader's goals, abilities, and strategies. Psychologists using the landscape model have tended to work with fairly reductive realizations of these terms: concepts tend to be equated with content words, such as nouns and action verbs; connections among them are understood to arise chiefly from causal and referential coherence (van den Broek, Young, Tzeng, and Linderholm; van den Broek, Lorch, Linderholm, and Gustafson). Using this model with a complex literary work would demand considerable expansion of how concepts and connections were actually defined, although both would need to be identified in some form.

The landscape model also incorporates assumptions about the relation between reading and memory that have rarely received attention from literary critics. Arthur Graesser, Keith Millis, and Rolf Zwaan note that many models assume three levels of memory: "short-term memory," which holds "the most recent clause comprehended"; "working memory," which provides resources for processing information; and "long-term memory," which can be a permanent store for information (174). Researchers in text comprehension have focused especially on the second of these three, working memory. It is the mental faculty allowing readers to store, process, and manipulate recently read textual input through such operations as comparison with other parts of the text, retrieval of relevant background knowledge, and the creation of forward and backward inferences (e.g., Graesser, Singer, and Trabasso; Rubin; Kintsch 215–46; Eichenbaum and Cohen 471; Campion). Different kinds of operations in working memory require different levels of effort. According to Graesser, Millis, and Zwaan, "[r]epetition increases the speed of accessing a knowledge structure and the nodes within the structure. Thus, familiar words are processed faster than unfamiliar words. The nodes in an automatized package of world knowledge are holistically accessed and used at little cost to the resources of WM (working memory)" (175).

The differences between more and less intensive reading processes matter because of a critical fact about working memory: it is not an infinite resource. On the contrary, it is highly limited, though its capacity varies from individual to individual (Rubin 155–61; Kintsch 217–21). Scientists typically measure working memory capacity for text through a reading-span test, in which subjects are asked to read sentences and then recall the last word from each of them (Daneman and Carpenter; Just and Carpenter; Singer and Ritchot). A subject's reading span depends less on the person's amount of mental storage space than on "the ability to control attention" so that the reader can "maintain information in an active, quickly retrievable state" (Engle 20). Readers who are expert in an area have usually developed particularly good attentional strategies for retrieving information (Budd, Whitney, and Turley; Kintsch 217–21). Yet even for expert readers, the more attention that is engaged with one process, the less that is available for others. As a result, "at any given point during reading [a reader] can only attend to a small subset of all elements that are relevant to the text" (van den Broek and Gustafson 22). This finding is a striking one for literary critics, who value the ability to find interpretive significance in a full range of textual and contextual detail. The psychologists' interest in the limitations of working memory capacity underscores that the literary critical effort at comprehensive interpretation is an offline one, existing in tension with online memory processes that screen out large amounts of textual information.

In the light of the constraints on working memory capacity, the landscape model assumes four major sources through which readers activate concepts. The first and most obvious is the text being read, typically understood as a clause or line; the reading of this unit is called a cycle. For example, the first chapter of George Eliot's *Middlemarch* begins, after an epigraph, with the sentences "Miss Brooke had that kind of beauty which seems to be thrown into relief by poor dress. Her hand and wrist were so finely formed that she could wear sleeves not less bare of style than those in which the Blessed Virgin appeared to Italian painters" (29). Depending on the reader, concepts in the first cycle might include "Miss Brooke," "had," "that kind," "beauty," "seems to be thrown," "relief," "poor," and "dress"; in the second cycle, "her hand," "her . . . wrist," "were . . . formed," "so finely," "she," "could wear," "sleeves," and so on to the end of the sentence. English syntax and function words connect these concepts, so that "Miss Brooke" is the subject of the first sentence, "had" is the main verb, and "that kind of beauty" is the direct object. Depending on such factors as the reader's attention, degree of experience with English, and skill at reading, such syntactic connections would be processed more or less automatically.

Second, concept activation may arise from the cycle immediately preceding the current one. When readers come to the second cycle in *Middlemarch*, some concepts from the first will still be present in working memory; how many of these can be retrieved will depend on the individual reader. During the second cycle, if a concept "is already part of the text representation and is reactivated, its trace is strengthened" (van den Broek, Rapp, and Kendeou 306); coactivation of concepts establishes or strengthens the connection between them. For example, because "her" and "she" in the second cycle refer back to "Miss Brooke," the connection between the pronouns and their antecedent may heighten the concept activation around "Miss Brooke." When a reader comes to "finely formed," its activation may simultaneously heighten the activation around the memory representation of "kind of beauty." Simultaneous activation connects the two concepts so that they become a larger joint concept. The strength of such connections increases or decreases continuously during reading.

Third, as a reader proceeds in a text and builds up a network of connections, these form a constantly fluctuating "episodic memory representation." This representation in turn will influence how a reader processes new information. For example, in *Middlemarch*, a reader who has read Eliot's "Prelude" and the epigraph to chapter 1 may already have developed a network of concepts around the potential heroine of the novel, such as the tragic Saint Theresa paradigm. When Miss Brooke is introduced, some of these associations may be heightened as part of the reader's memory representation of her, depending on their potential relevance to the individual reader and the reader's skill at retrieving them from long-term memory.

Fourth, concepts can come from the reader's background knowledge. In understanding the opening of *Middlemarch*, for example, the reader may draw on a host of prior associations for aid in creating the concept of "Miss Brooke"; these come not from *Middlemarch* but from whatever in the reader's experience comes to mind. These concepts from background knowledge connect with concepts from the text to become part of the developing memory representation. Their activation and the strength of their connections will also fluctuate during reading according to their perceived relevance. Whereas Mikhail Bakhtin saw novelistic discourse as defined by its "diversity of social speech types," which disrupted the supposed unity of poetic genres (262–63), in cognitive psychology the presence of the reader's background knowledge renders any text other to itself. The reader's heteroge-

neous knowledge inevitably becomes part of his or her memory representation, though the results it produces will vary widely.

Readers access these last two sources of activation (episodic memory representation and background knowledge) through two mechanisms. The first is "cohort activation." Cohort activation presupposes that, as described above, any encountered concept is not freestanding but, like a Deleuzian rhizome, has been linked to many other concepts, whether from earlier text or from background knowledge (Deleuze and Guattari 3–25). These previous concepts are called up rapidly and automatically from memory during reading. Yet because of the limitations of working memory capacity, the rhizome does not last: most concepts undergo a quick decrease in activation. A few may become part of the memory representation if they are activated during several successive cycles; they may help readers comprehend the text, or they may interfere by introducing perceived irrelevancies that need to be suppressed. For example, in *Middlemarch*, the concept "Brooke" may automatically call up images of actual brooks that readers have encountered. These images are part of the "cohort" activated by the concept "Brooke." For some readers, these images may not be useful in constructing an image of Dorothea and would be suppressed; for others, these may be an invaluable means of understanding her and would remain a part of the cohort around her mental representation.

In contrast, what psychologists call coherence-based retrieval occurs when readers confront a prominent gap, or "coherence break," in their ability to create a mental representation of a text and when this gap consequently impedes their understanding. Such gaps are not in the text: they are part of the reader's effort to represent a text, and hence they vary from reader to reader. For example, readers who know little about art history might find themselves baffled by Eliot's reference to the bare sleeves of the Blessed Virgin in Italian painters. Faced with such gaps, readers begin a "strategic and deliberate retrieval of information" to help them create coherence (Linderholm, Virtue, Tzeng, and van den Broek 168). This retrieval may consist of reinstating earlier material, which could come from concepts in previous text still present in working memory or could be retrieved from long-term memory. Readers may also turn back to earlier sentences or chapters to see if they have missed something that might help; they may see if their background knowledge contains facts or interpretive guidelines that could make sense of the text, such as knowledge of generic conventions; they could consult other sources, such as dictionaries or the thoughts of others; or they could decide that the information is not important to them and that they will skip it, either temporarily or permanently (Goldman and Saul; Spolsky). Unlike cohort activation, coherence-based retrieval is understood as comparatively slow and demanding. Psychologists usually assume that readers want to read as quickly as is compatible with their particular working memory spans, goals, and abilities, so that anything that slows them down and increases reading time deserves notice.

Typically, concepts that recur frequently receive a high and sustained degree of activation, such as "Dorothea" in *Middlemarch*. Yet mere repetition is not the only source of heightened activation. In narrative, for example, across a wide variety of reading goals and abilities, concepts associated with causality are often highly activated, even if particular words associated with them are not repeated (Trabasso and van den Broek; Fletcher, Hummel, and Marsolek; van den Broek). For example, Eliot notes that Dorothea is "enamoured of intensity and greatness, and rash in embracing whatever seemed to her to have those aspects" (30). Since several of the concepts in this sentence help to explain the motivation for many of Dorothea's later actions, they are likely to be included prominently in a reader's

memory representation. Depending on the reader, emotional sympathy with certain concepts or the ability to connect particular concepts with personal experience may also result in heightened activation (Cupchik et al.).

How can such unfamiliar ideas from cognitive psychology be translated to the examination of historical readers? Historical distance seems to render useless most of the procedures of psychology, which depend on the presence of subjects who can be tested in controlled environments. Yet historical distance is an advantage as well. As psychologists are well aware, the procedures necessary to create valid evidence often occur at the cost of creating highly artificial reading environments, such as reading sentence by sentence on a computer screen or wearing optical apparatuses to measure eye tracking. The value of moving to historical literacy is that it presents records of actual reading situations, although the interpretation of such records can never be transparent.

The key concept that I want to use in translating scientific vocabulary to historical reading situations is one described by Tracy Linderholm and her coauthors as "standards of coherence" (Linderholm, Virtue, Tzeng, and van den Broek; van den Broek, Lorch, Linderholm, and Gustafson). These standards "reflect the degree of comprehension that a reader attempts to attain during the reading of a text" and arise from such factors as the reader's purpose, background knowledge, skill level, alertness, sense of the text's difficulty, and relation to internal or external distractions (Linderholm, Virtue, Tzeng, and van den Broek 168). Although psychologists tend to see these standards in terms of individual choice and ability, they are also a border between psychology and sociology. Standards of coherence are the site at which a history of culture intersects with the cognitive processes involved in reading.

Many, though not all, of the factors listed by Linderholm and her coauthors as shaping standards of coherence are affected by larger cultural imperatives that influence the individual reader. For example, a reader's purpose is not simply an individual choice: it is a choice conditioned by the same cultural expectations as any literacy event. It is potentially overdetermined by any number of sociological factors, including race, class, gender, region, religion, profession, and education. To assume that a given human purpose can be met by reading is already to engage a highly specific set of circumstances about the availability of information, the social distribution of literacy, and the effects of education (Bourdieu 440–51; Street; Brandt; Smagorinksy). Likewise, although psychologists discussing standards of coherence tend to use "background knowledge" to mean simply how much a reader knows about a given topic, background knowledge, like purpose, comes weighted with a reader's historical setting. If readers are reading for information, as when reading a newspaper, an entire social network lies behind their ability to decide if they indeed have relevant background knowledge, are truly being informed, or know what counts as information. Research in the history of literacy by historians and literary critics has been particularly sensitive to such issues (e.g., Ferguson). As a result, the concept of standards of coherence provides a valuable juncture between the cognitive operations of the individual reader and the evidence of history. It enables the linking of cultural and cognitive analysis called for by Edwin Hutchins: "Instead of conceiving the relation between person and environment in terms of moving coded information across a boundary, let us look for processes of entrainment, coordination, and resonance among the elements of a system that includes a person and the person's surroundings" (288). Although we may not be able to reconstruct the eye tracking or reading time per word of historical readers, we can use available evidence to reconstruct certain aspects of their standards of coherence and use this reconstruction to interpret their local

reading strategies. We can also recognize moments at which their standards of coherence broke down and examine how they responded to the resulting challenges.

The success of re-creating historical standards of coherence depends on the availability of evidence. Sometimes evidence represents online processes, as in some marginalia or records of reading times, but most historical evidence represents offline processes, as in comments about reading that appear in diary entries, letters, and reviews. Such offline evidence provides clues about aspects of online reading processes. The Victorian reception of Robert Browning offers a useful test case in the applicability of cognitive models to the history of audience because of the richness of the surviving offline evidence from his critics. He was widely agreed by his contemporaries to be the most difficult writer of the age. In grappling with his difficulties, his Victorian critics foregrounded what psychologists call metacognition, the self-awareness of goals and strategies during reading (Garner). This high level of metacognitive discussion in reviews of Browning enables close attention to the microprocesses underlying the differing standards of coherence used by reviewers. Nevertheless, although this essay concentrates on evidence from the nineteenth century, many of the basic strategies used by the readers I discuss can be found in readers from other historical settings (Cavallo and Chartier). What vary across history and cultures are not the strategies themselves but such factors as how they are combined, which ones are considered especially important, which ones are used most intensively, and which kinds of background knowledge are viewed as relevant.

I focus on four readers who reviewed Browning's masterpiece, *Men and Women*: Margaret Oliphant, Thomas McNicoll, George Brimley, and William Morris. These Victorian reviewers were not equivalent to the average reader because their goals demanded reading Browning with enough attention that they could write detailed analyses of him. They acquainted the public with his chief characteristics, his relation to other contemporary poets, and his aesthetic faults and successes. Like most Victorian reviewers, the four shaped their opinions to accommodate the moral, religious, and political outlooks of the journals for which they wrote (Woolford; Brake). While Browning's *Men and Women* announced no straightforward political program, it belonged to a well-established tradition of liberal aesthetics, which biased Browning's reviewers even when they did not respond explicitly to his political sympathies (Armstrong 284–317; Slinn 32–55).[5] It was to be expected, for example, that George Brimley, a conservative, pro-Tennysonian reviewer at Trinity College, Cambridge, writing in the conservative journal *Fraser's*, would dislike Browning, while William Morris, in the circle of Browning's young, radical admirers at Oxford, would admire him (Clark; Cramer).

Yet my goal is less to unmask the reviewers' ideological biases than to analyze how their aesthetic positions affected their microprocesses in reading. Since they all understood enough about Browning to be able to write their reviews, their comprehension was successful. Yet Oliphant's, McNicoll's, and Brimley's reviews bear witness to a prior reading moment, in which their goal was to get meaning out of Browning in a way comparable with their experience with other poets: here their standards of coherence broke down and resulted in anger and frustration. In contrast, Browning offered Morris a different experience. Unusually among contemporary reviewers, he claimed to understand Browning, and doing so involved for him generating new standards of coherence and new reading strategies.

Oliphant, writing for the traditionally Tory journal *Blackwood's*, adopts one of the oldest and most familiar standards of coherence for poetry: transportation. For Oliphant, good poets, like those who

achieve the Longinian sublime, "arrest and overpower their audience as the Ancient Mariner fascinated the wedding guest; and we all know how helplessly, and with what complete submission, we have followed in the train of these enchanters, wheresoever it pleased them to turn their wayward footsteps" ("Modern Light Literature" 129). The core of such submission is emotional sympathy. Oliphant reserves her highest praise for the psalms, because they create sympathy by portraying "the overflow of the grand primal human emotions to which every living heart resounds" (126). Whereas Wordsworth imagined such "overflow" as a prerequisite for the successful writer of poetry, Oliphant finds it central instead for the reader.

In the cognitive terms of the landscape model, the sympathy described by Oliphant depends on sustained cohort activation, a relatively automatic linkage between concepts as they are read and experiential knowledge. The greater the emotional weight attached to the background knowledge, the greater the potential affect created by the reading experience. Oliphant finds that Browning's poetry inhibits a meaningful incorporation of cohort activation into her memory representation because too much attention goes into decoding his syntax: "It is very hard to make out what he would be at with those marvellous convolutions of words; but, after all, he really seems to mean something, which is a comfort in its way" (137). Syntactic difficulty is not an intrinsic barrier to comprehension, since the effort needed to create coherence might for some readers increase engagement with the material. Yet intensive decoding of syntax can inhibit the ability to make meaningful connections through cohort activation; because working memory capacity is limited, too much mental effort devoted to syntax can limit the attention that might enable the re-creation of emotions "to which every living heart resounds." The only Browning poem Oliphant likes, "Andrea del Sarto," is the one that her experience (of the artistic compromises involved in sustaining family relationships) allows her to sympathize with (*Autobiography* 50).

Unable to create such online connections with most of Browning's poetry, she rescues her standard of coherence through what the landscape model calls coherence-based retrieval. Oliphant transforms her incomprehension by retrieving from her background knowledge an image of the poet as an artist struggling genuinely, if not successfully, for expression:

> There is an unmistakable enjoyment in this wild sport of his—*he* likes it, though we are puzzled; and sometimes he works like the old primitive painters, with little command of his tools, but something genuine in his mind, which comes out in spite of the stubborn brushes and pigments, marvellous ugly, yet somehow true.
> ("Modern Light Literature" 137)

This coherence-based retrieval occurs for Oliphant only after she is finished reading. Oliphant claims that her online experience of reading Browning is confusion: "we are puzzled." Her offline experience, aided partly by the production of her review, depends on imagining Browning the author as conforming to her image of "old primitive painters." She then can sympathize with this image in a way that she did not sympathize with the actual poetry; the poet-painter's work is "marvellous ugly, yet somehow true." This image of Browning preserves her standard of coherence, though at the cost of having to admit that most of the individual poems are, to her, little more than "marvellous convolutions."

At first glance, McNicoll, writing in the *London Quarterly Review,* seems to concur with Oliphant's standard of transportation: "True poetry has no equivalent; we are borne along with it notwithstanding,—it does not leave us where we were, but carries us whithersoever it will." Yet McNicoll reveals an interesting fact that cognitive psychologists have not yet acknowledged: transportation

may have differing emphases. Because Victorians typically associated transportation with feminized, degraded reading, reviewers like McNicoll revised their standards of coherence in new, implicitly more masculine directions. Although McNicoll values transportation, the key to it for him is not emotion but intellection. While he expects to be "borne along" by poetry, he praises Tennyson, for example, because "his verse has gradually become the pure transparent medium of his thoughts" (496). The mapping of thought, not emotion, guides his standard of coherence for Browning.

While McNicoll is willing to expend the online effort to create a memory representation based on tracking thought, he finds that Browning makes doing so impossible:

> He disdains to take a little pains to put the reader at a similar advantage with himself,—to give a preparatory statement which may help to make his subsequent effusion plain and logical. He scorns the good old style of beginning at the beginning. He starts from any point and speaks in any tense he pleases; is never simple or literal for a moment; leaves out (or out of sight) a link here and another there of that which forms the inevitable chain of truth, making a hint or a word supply its place. (498–99)

Whereas Browning's syntax overloaded Oliphant's working memory capacity, McNicoll's difficulty is the absence of adequate background knowledge. Admitting that his own background knowledge is insufficient, McNicoll complains that Browning does not provide a "preparatory statement" to make his poems "plain and logical." He turns to two microprocesses to enable coherence-based retrieval: connecting inferences, which would explain a passage in terms of the immediately preceding material (the "link" that forms the "chain of truth"); and reinstatement inferences, which would use material even earlier in the text (the desired "preparatory statement") to explain the content. Through such inferences, the parts of the poem that do not seem to make sense might become more comprehensible. Without them, breaks in coherence overwhelm McNicoll's ability to create a meaningful memory representation. As he admits, Browning's work is not intrinsically unreadable, but it is written for "the student, and not the reader." The student who could, for example, undertake substantial library research might be able to understand Browning. But such offline efforts would be at odds with McNicoll's desired online experience, which depends on being "borne along" by poetic thoughts. A reader like McNicoll hoping for such an experience will find only "impatience and fatigue" in reading Browning (499).

Yet not all reviewers assumed, with Oliphant and McNicoll, that the microprocesses of reading should produce transportation; other reviewers adopted other standards of coherence, though not necessarily with more success. Brimley, the reviewer for *Fraser's*, might seem to be the model student reader called for by McNicoll. As the librarian of Trinity College, Cambridge, Brimley was supposed to have had an unusual degree of time to devote to "careful study and elaborate analysis" of the works that he reviewed (Clark viii). He produced, for example, one of the longest and most insightful essays on Tennyson written during the poet's life (Leighton 58–60). Not surprisingly, given Trinity College's longstanding association with Coleridgean thought, Brimley's aesthetics valorizes what, in his essay on Tennyson, he calls the ideal of a "whole composition" that is "grouped and coloured by a dominant idea" ("Tennyson's Poems" 8; Preyer). Whereas Oliphant and McNicoll looked for transportation, Brimley adopted a newer, more elite standard of coherence: Coleridgean organic unity.

If, according to Brimley, all details of a work should be understood in the light of "whole composition" and a "dominant idea," then virtually all textual input would become a source of unremitting coherence breaks, which must constantly be repaired through

reference to background knowledge or prior textual information. Brimley's standard of coherence downplays the more automatized aspects of textual comprehension and promotes instead the most intensive cognitive activities. While the landscape model assumes that concept activation fluctuates during the reading process and that most concepts receive little activation, Brimley's reading strategy forces the reader to keep many concepts at an exceptionally high degree of activation so that new ones can be linked to previous ones, in accordance with the standard of a "whole composition." Nothing could be further from the transportation described by Oliphant and McNicoll, in which readers imagine themselves carried away by a text. Brimley's enormously intensive standard would almost immediately overwhelm most readers' working memory capacity and would consequently demand considerable rereading.

Working with this standard of coherence, Brimley finds Browning frustrating. He complains of Browning's "favourite plan of writing a poem that, so to speak, leads to nothing, has no end, is but a fragment of versified talk, as if the very essence of art was not to present things completely from a particular point of view" (Rev. of *Men and Women* 110). For Brimley, Browning's words lead to "nothing": Browning frustrates the desire to attain what psychologists have called global coherence because nothing is presented "completely" (Albrecht and O'Brien). Brimley chooses "Childe Roland to the Dark Tower Came" to demonstrate Browning's difficulty. He searches his background knowledge for a literary genre traditionally associated with difficulty and comes up with allegory. On the basis of his generic knowledge, he expects to be able to make predictive inferences, which anticipate what will happen in the text. Whereas McNicoll's connecting and reinstatement inferences look backward, connecting present material with text that came before, Brimley's predictive inferences look forward, building up expectations of what will come. Yet, during his online reading process, Brimley is unable to make these inferences because he can "discover no hint as to what the allegory means": we "find only description preparatory to some adventure which is to disclose the symbol of the 'dark tower'—but the adventure never comes off in the poem" (110). Having kept the poem's descriptive information active in memory so that it could be causally linked to the appearance of the dark tower, Brimley finds that his genre-based predictive inferences do not lead to any meaningful connections, and his effort at comprehension fails. Brimley's standards encourage him to read for global coherence in terms of allegory, but Browning proves too much for him.

Given the frustrations of these reviewers when faced with Browning, William Morris's reading standards, which lead to a far more positive assessment, deserve close attention. The success of his standards has two aspects. The first is suppression. Whereas the reading strategies of Oliphant, McNicoll, and especially Brimley are overwhelmed in part by the sheer amount of material in Browning, Morris chooses a standard of coherence that allows him to block out large parts of Browning's text by treating the poems as a series of character sketches, of the kind perfected by a writer like Charles Lamb. For Morris, what matters in the poems is information directly relevant to creating an image of the protagonist. All else can be given a low degree of concept activation, such as the mass of descriptive material in "Childe Roland" that defeats Brimley. This strategy significantly lessens demand on working memory capacity because it filters the onslaught of Browning's language and allows Morris to manipulate the material he notices more effectively.

Second, Morris borrows another technique found in writers like Lamb: rather than treating the character sketches as isolated monads, Morris links them to each other through comparison and contrast. Browning's volume includes no explicit comparison

and contrast of the characters, except possibly in the final poem "One Word More," and the poet generally arranged his book so as to avoid contiguous thematic sequences. To enable such comparison and contrast, Morris works against Browning's arrangement: he finds common topics in the poems and groups them together, in ways that allow him to understand the poems in light of each other. As he says about Browning in the first sentence of his review, "The poems do fall naturally into some order, or rather some of them go pretty much together" (259). In a way, his critical approach to Browning might be seen as prefiguring his later work as an artist, especially in his wallpaper, in which a particular design becomes most meaningful when seen as part of a larger network of patterns.[6] Through this strategy of seeing the individual item as part of a larger network, Morris develops a new source of background knowledge and a new source of information for coherence-based retrieval. He decides, for example, that "An Epistle . . . of Karshish" and "Cleon" are both about "the desires and doubts of men out of Christianity" (259) and that the characters in the poems are meant as a contrast: "The Arab is the more genial of the two, less selfish, somewhat deeper too, I think; Cleon, with his intense appreciations of beauty . . . is yet intensely selfish" (269). Whereas McNicoll blames Browning for not providing information in a prefatory statement, Morris effectively reconstructs such a statement by treating certain poems as partial prefaces for others.

Morris's moment of triumph comes in his comments on "Childe Roland." Morris responds directly to Brimley's review and ridicules his failed allegorical reading: "Some reviewer thinks it an allegory, and rates the poet for not having told us what happened to Childe Roland" (275). Morris's standard of coherence, with its privileging of the mental representation of character, inhibits the move to global coherence characteristic of allegory. Instead, he understands "Childe Roland" as belonging to a thematic group that includes "Before," "After," "The Patriot," and "A Light Woman," which all describe men committed to bad or hopeless causes, even to the death. By putting "Childe Roland" in this group, Morris creates a new reference point for the poem's coherence by moving from one inside the poem to one that arises from its connection to other poems that, for him, are similar. This new reference point, together with his standard of coherence, allows him to read "Childe Roland" in a way that Brimley cannot: "The poet's real design was to show us a brave man doing his duty, making his way on to his point through all dreadful things. . . . He will be slain certainly . . . yet he can leave all this in God's hands and go forward."

On the basis of this sense of character, Morris reintroduces the element of emotional sympathy that McNicoll and Brimley exile from their readings. Morris claims to feel deeply for Roland: "Do you not feel, as you read, a strange sympathy for the lonely knight, so very, very lonely, not allowed even the fellowship of kindly memories?" (276). Such emotional bonds seem to return Morris to the sympathy characteristic of Oliphant's standards of coherence. Like Oliphant, Morris suggests that his online and offline experiences of reading have been different and that, also like Oliphant, the strong emotional bond happens offline, as he reflects on the model of character that he has developed. Indeed, it seems as if part of the purpose of his review is to enable emotional bonds with the characters that his actual reading experience may not have provided.

Yet, as if concerned that he might seem to be too close to Oliphant's standards of coherence, Morris in his review loudly distances himself from her and what he imagines she stands for. He attacks her discussion of Browning directly near the end of his review: Browning's "obscurity . . . would indeed be very objectionable if, as some seem to think,

poetry is merely a department of 'light literature;' yet, if it is rather of the very grandest of all God's gifts to men, we must not think it hard if we have sometimes to exercise thought over a great poem" (287). The quotation marks around "light literature" refer to the title of Oliphant's article in *Blackwood's*, "Modern Light Literature—Poetry," which contained her discussion of Browning. Morris's dismissive comment allows him to appear as a reader who can "exercise thought," while he positions Oliphant, implicitly, as a familiar Victorian stereotype, the superficial female reader.

Yet Morris mischaracterizes Oliphant and himself. Her standard of coherence, transportation, involves considerable cognitive effort, although it prioritizes mental operations that foster an immediate emotional experience of poetry, rather than the representation of character. Morris's standard of coherence, in turn, involves more than exercising "thought" about Browning: such a standard failed McNicoll and Brimley in their attempts to wrestle with the poems. The key difference lies in where during the initial reading process a reader should be entitled to feel an emotional connection with the poetry. Oliphant desires a strong emotional connection to develop online, during reading itself. That Browning does not enable such an experience for her is a serious fault, in her eyes; the mixture of humor and sympathy in her final image of Browning as a struggling artist marks him in her opinion as a lesser writer. Morris, in contrast, does not assume that such sympathy will occur online. Instead, emotional engagement is a delayed process, one that occurs only after the detailed construction of a mental model of a character based on expanded background knowledge of Browning's volume as a whole.

The value of examining Browning's reception is that the terms of these four critics' success and bafflement reveal important elements of standards of coherence used by readers more generally. In the nineteenth century, perhaps the most widespread standard of coherence associated with literature was Oliphant's desire for emotional transportation. For those who feared the effects of novels, such intense sympathetic engagement was often treated as no standard at all but as dreamlike passivity: novel reading "throws us into a state of unreal excitement, a trance, or dream, which we should be allowed to dream out, and then be sent back to the atmosphere of reality again, cured by our brief surfeit of the desire to indulge again soon in the same delirium of feverish interest" (Cleghorn 85). As Patrick Brantlinger documented in *The Reading Lesson*, such passivity and reverie were believed to open readers to a variety of potentially harmful effects, from inflaming the passions to dulling the mind to preventing readers from doing useful work (Brantlinger 1–24; see also Mays; Gilbert; Brewer).

The vocabulary of cognitive science enables us to rewrite the Victorian dichotomy of the good, active reader versus the bad, passive reader as a contrast between divergent uses of cognitive resources, guided by varying standards of coherence. Cognitively, no comprehension can be literally passive, since even the most automatized reading of even the simplest material demands mind-body work of such complexity that science has only begun to map it. As a standard of coherence, transportation actually makes extremely high demands on attentional resources, especially in its need to suppress distractions and to monitor appropriate background knowledge (Green and Brock; Gerrig; Gerrig and Rapp). What may have been most threatening about novels for nineteenth-century critics was not that they required so little attention but that they required so much. The seeming passivity of transportation paradoxically required a great deal more mental labor than other reading goals that might, at first glance, seem more deserving to the Victorians, such as reading familiar sermons to reinforce religious sentiments (if we assume comparable

text difficulty, reader ability, and motivation). Underneath Victorian critics' contempt for the novel may lie a degree of awe and fear of the kind of brain work that seemed to be increasingly attainable: if so many people could comprehend objects as complex as novels, what kinds of privileged claims could be made for more traditional intellectual pursuits?

While Oliphant's reading strategy was perhaps the most popular during the Victorian period, the strategies of McNicoll and Morris were adopted by readers who wished to perceive themselves as having a more serious, engaged relation to literature. McNicoll's emphasis on tracing thought, for example, had been and would remain a major trait of autodidact culture during the century, as a means by which those cut off from traditional institutions would use literature to compensate for their felt lack of access to "thought." Jonathan Rose cites the autobiography of a miner, Chester Armstrong (b. 1868), who exalted the authors he read: "We talked of our household gods in authors. In heated dispute we quoted our respective gods by way of clinching the argument, just as in religion Biblical authority is used" (qtd. in Rose 74).[7] For Armstrong as for McNicoll, reading literature was not a path to emotional escape but a source of knowledge, to be used in a way parallel to "Biblical authority."

Morris's standard of coherence was already widespread in novel reviews and would also have a significant effect on the Browning societies that spread throughout Britain and America as prominent sites for the serious middlebrow reader. Mrs. Alexander Ireland in 1889 noted in her paper on "A Toccata of Galuppi's" that the poem was "extremely difficult as to the cohesion of ideas and thoughts" (192). Faced with this difficulty, her solution was to create a vivid image of the speaker as a character. She names him "Dr. H." and represents an imagined past: "Suppose him to have passed 'a stormy youth,' to have been ardent and imaginative, to have drunk deep of the cup of human passion, to have been chilled by disillusion, to have had his bounding life-pulses suddenly, permanently checked by some staggering shock of Fate, to have fossilized gradually but almost totally!" (192). While some academic critics might condemn such passages as belletristic fantasy, Ireland only foregrounds the cognitive processes that many readers follow when confronted with coherence breaks. They engage in coherence-based retrieval by creating from their background knowledge an image that will help them make sense of challenging material. For Ireland, Browning's language may be "extremely difficult," but by supplementing it in her memory representation with her image of "Dr. H.," she enables a powerful reading experience.

Although Brimley's strategies did little to help him understand Browning's poetry, his Coleridgean standards would eventually triumph, not during the Victorian period but in the twentieth century, in the form of New Criticism. To look at another Cambridge-educated critic deeply influenced by Coleridge, I. A. Richards, is to see the continuity between Brimley's standards and those of twentieth-century academic criticism. Richards, like Brimley, values Coleridgean unity in the work of art: "What is much more essential is the increased organization, the heightened power of combining all the several effects of formal elements into a single response, which the poet bestows. . . . It is in such resolution of a welter of disconnected impulses into a single ordered response that in all the arts imagination is most shown" (192–93). His standard, like Brimley's, imposes on the reader particular cognitive processes. Readers must overactivate textual coherence-based retrieval so that all "disconnected impulses" can be linked to a "single ordered response," in ways that cut against the limitations of working memory capacity. Readers can counter these limitations with strategies familiar to literary critics, such as slower reading, frequent rereadings, and skilled use of background knowledge

(contextual, generic, biographical). These intensive strategies may inhibit the emotional transportation of the kind valued by Oliphant, Morris, and Ireland, though not necessarily. Tellingly, however, Richards invites such inhibition: he condemns the "common mistake of exaggerating personal accidents in the means by which a poem attains its end" (88).[8] Though cohort activation guarantees that readers will call up a large number of associations, or "personal accidents," in any act of reading, Richards encourages the disciplined literary critic to avoid them.

Academic literary criticism institutionalized and continues to be fostered by many of the specific cognitive strategies and standards demanded by Richards. For literary critics, much of the value of work done by psychologists lies in making these strategies visible and thereby clarifying the kind of cognitive work that literary criticism demands. The variety of theoretical approaches used by academic literary criticism masks the relative similarity of the strategies that most of them entail, such as the linking of local to global coherence, the extensive use of particular kinds of background knowledge (such as the interpretations of previous critics), attention to details that may not have causal significance, and the inhibiting of routinized processes of disambiguation. Readers encountered in historical archives, in the classroom, or in nonacademic settings may sometimes appear naive or reductive in contrast because they do not use these strategies. The differences arise from varying standards of coherence, which yield different reading strategies.

For example, when a teacher assigns an epic or novel with complex and dense plots to students who have relatively little background in reading such works, the amount of working memory resources they will need to perform such operations as tracking characters, creating causal links between plot developments, and registering major changes in time and space will inhibit their ability to perform tasks basic to contemporary literary criticism. These include creating connections across wide spans of plot that may not be causally linked, noticing unusual details that may not play a major role in the story, and linking content to generic, historical, or ideological background. Such tasks should be easier for readers with high reading spans and for those who have more background knowledge, skills, motivation, and time to read, but for many students, the newness of the cognitive tasks may result in what, to the teacher, look merely like shallow readings and basic mistakes.

As students gain experience, they strengthen one of the most salient skills of the literary critic, metacognitive awareness. Psychologists describe such awareness as the ability to monitor and evaluate online reading processes and to alter reading strategies quickly in relation to such evaluation; metacognition has been shown repeatedly to be a key element characterizing skilled readers (Pressley and Afflerbach 30–82). The discipline of literary criticism fosters metacognitive abilities by engaging with a remarkably wide range of texts, from Anglo-Saxon poetry to postmodern theory, which encourage the development of varied reading strategies. Exposure to such an array improves the reader's ability to recognize when comprehension has broken down and to search for alternative strategies. For example, strong metacognitive skills enable literary critics rapidly to respond to and incorporate insights from other disciplines, as well as recognize and question their own and others' governing assumptions, such as Richards's. These skills may be among the most valuable that we pass on to our students, especially those encouraged to take courses in many periods and modes. A useful project for future research would determine the degree to which such metacognitive skills are transferrable from reading to other areas of cognitive activity.

While all disciplines demand some form of metacognition, few match the spectrum

and complexity of metacognitive strategies that are demanded by the practice of contemporary literary criticism. The vocabulary of cognitive psychology may be most compelling to literary critics, therefore, in making visible aspects of literary criticism that exist now largely as widespread tacit knowledge. While I would not claim that such aspects offer a complete or adequate justification for literary study, the lack of a detailed vocabulary for describing them has led them to be too often discounted or underestimated. In addition to familiar humanist justifications of the discipline, cognitive work in reading underscores the contributions that literary-critical study can make to readers' abilities to monitor, evaluate, and improve their comprehension processes. Although I have focused in this essay on translating only a small set of concepts from cognitive psychology, there are many others of potential interest to literary critics, such as the relation between bottom-up and top-down processing and the kinds of evidence produced by free recall, lexical decision tasks, and eye tracking. They all contribute to bring into focus a topic central to literary study, yet one that has received little attention from critics: comprehension as an activity through which the texts we read acquire cognitive materiality.

Notes

For their advice, I would like to thank Alan Richardson, Alan Rauch, and the members of the Textgroup of the Center for Cognitive Sciences at the University of Minnesota, Twin Cities.

1. The bibliography around cognitive approaches to literature is now substantive and has begun to develop subfields. For introductions, see Harker; Gerrig; Zwaan; Crane and Richardson; Bortolussi and Dixon. These represent different approaches to how one might link cognitive psychology and literary study, though none of them takes the historical approach to literacy. For criticism of aspects of the field, see Sternberg.

2. For Iser and cognitive psychology, see Hamilton and Schneider.

3. For such models, see Ricoeur; Blanchot; Barthes.

4. For two important other models, see the construction-integration model (Kintsch) and, for a model that operates at a greater level of generality, the event-indexing model (Zwaan, Langston, and Graesser; Zwaan, Magliano, and Graesser; Schneider; O'Brien, Cook, and Peracchi; Zwaan and Madden).

5. Oliphant wrote for *Blackwood's*; McNicoll, for the *London Quarterly Review*; and Brimley, for *Fraser's*. For the politics of these journals, see Wallins; Dunlap; Vann.

6. I am grateful to Alan Rauch for this insight.

7. For similar reading practices in an American context, see Augst 79–93.

8. Langbaum's influential formulation of "sympathy" versus "judgment" in the dramatic monologue has kept the concept of emotional sympathy more prevalent in Browning criticism than in discussions of many other authors (75–108); for examinations of the implied reader in Browning, see Martin 32; Latané; Tucker 25; Maynard; Wagner-Lawlor.

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