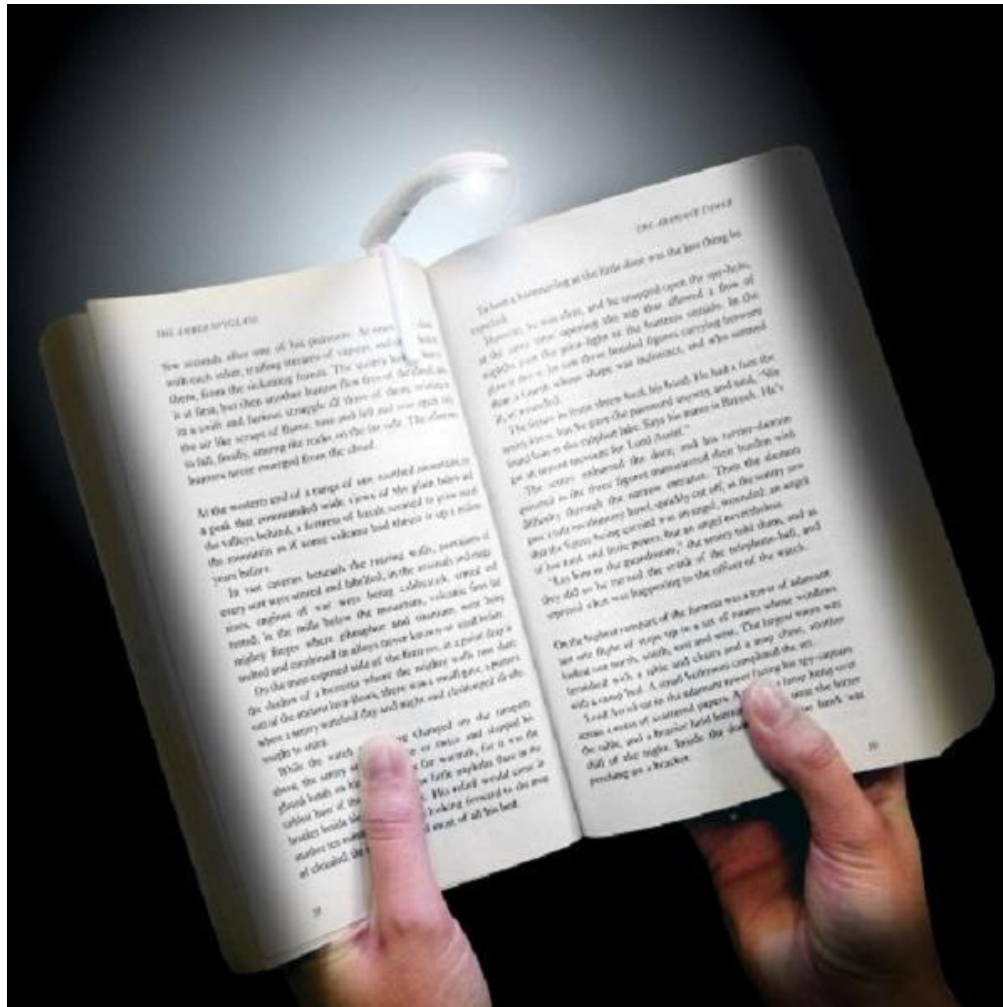


# How Reading Shines a Bright Light on Consciousness: The Science of Reading

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You, the reader of this very sentence, are consciously reading this very sentence from left to right here and now.

The first sentence of this essay is not only *self-evidently true*, but also *self-evidently known to be true* (Hanna, 2023a). I call that kind of sentence a *self-locating caveat lector sentence*, where the Latin phrase “caveat lector” means not only “let the reader beware,” but also, in my preferred re-translation, “let the reader be self-consciously aware” (Hanna, 2023b). For, having read that sentence, not only do you know *that (your own) consciousness exists*, but also you’ve displayed to yourself a paradigmatic example of *what*

(*your own*) *consciousness is*. That sentence, in turn, is self-evidently *about* the mental act or process of *reading*. So reading shines a bright light on consciousness.

In view of that profound, yet perhaps also at first glance surprising, truth about reading, in this essay I want to take some initial steps in *the science of reading*, by which I mean *the science that provides the best overall explanation and theory of the mental act or process of conscious reading*. Such a science will *not* be the same as *the cognitive psychology of reading*. Here's a brief description of the cognitive psychology of reading, quoted from a standard contemporary textbook:

We think of [the mind] as the executor responsible for cognitive activity, which presumably can be ultimately explained in terms of the structure and function of the brain. The task of the cognitive psychologist is to learn how the mind is structured and functions. If it were possible, perhaps an ideal way to study reading would be to open up a reader's brain and observe what kinds of activities and changes occurred during reading. But we cannot do this. Furthermore, ... some brain imaging techniques currently available are relatively slow with respect to moment-to-moment processes, and those that do provide real-time information about brain processes often suggest that these processes occur too slowly to actually be the basis of behavioral phenomena.... Thus cognitive psychologists are forced to infer characteristics of how the mind works in skilled cognitive tasks like reading on the basis of various types of evidence that we can accumulate. In a sense then, a cognitive psychologist is like a detective searching for clues to how the mind works. The type of structures presented in [information-processing flow diagrams] serve as a convenient way of hypothesizing about how the mind works and then summarizing what we know. Throughout this book we will present evidence accumulated by cognitive psychologists about how the mind works in reading and we will frequently use the convention of presenting information-processing flow diagrams ... to summarize what we know. (Rayner et al., 2012: ch. 1, underlining added)

Thus the cognitive psychology of reading proceeds under the assumption that "cognitive activity .... can be ultimately explained in terms of the structure and function of the brain," i.e., it proceeds under the assumption that the cognitive psychology of reading bottoms out in the *cognitive neuroscience* of reading. But here's a fundamental constraint on *any* science of reading:

In order to explain reading or justify any theory of reading, conscious reading must already be presupposed and used.

This fundamental constraint is a sub-species of what I call *the psychocentric predicament*. In turn, accepting, accommodating, and affirming the psychocentric predicament means that any adequate science of the mind must also be *a soft science of the mind*. Therefore, the

science of reading must also be a soft science of the mind, and not *a hard science of the mind*.

What do I mean by “consciousness,” “the psychocentric predicament,” “a soft science of the mind,” and “a hard science of the mind”? In an essay called “The Psychocentric Predicament, The Impossibility of Any and Every Hard Science of Consciousness, and Soft Sciences of the Mind,” I argued as follows:

In an essay called “The Circularity of Human Rationality” [Hanna, 2023c], I pointed out the profoundly significant fact that any and every attempt to *explain* or *justify* human rationality—and also, equally significantly, any and every attempt to *criticize* or *debunk* human rationality—must already *presuppose* and *use* our manifestly real innate capacity for human rationality. For all explanation and justification—and also all critical arguments and debunking arguments—are, by their very nature, human rational activities. So human rationality is inherently circular. For convenience, let’s call this *the ratiocentric predicament*.<sup>1</sup> In that essay, I also argued that the ratiocentric predicament expresses a logico-philosophically *good* or *virtuous* circularity, not a logico-philosophically *bad* or *vicious* circularity. Now, an extremely important implication of the ratiocentric predicament is that what holds for our innate capacity for human rationality as such, *also* holds for each and every innate *sub*-capacity of human rationality—for example, consciousness. That such a sub-capacity actually exists, follows directly and self-evidently from the fact that you, the reader of this very sentence, are now consciously reading this very sentence .... Therefore, any and every attempt to explain consciousness or justify a theory of consciousness, must already presuppose and use our manifestly real innate capacity for consciousness. Again for convenience, let’s call this *the psychocentric predicament*. In this essay, I want to deploy the psychocentric predicament as a critical weapon against *any and every hard science of consciousness*—by which I mean any and every science of consciousness that’s either *materialist* or *physicalist*, or *naturally mechanistic*, or in any other way reductive: for example, any *computational* or *informational* theory of consciousness. Correspondingly, it’s important to recognize from the outset that my critical argument, if sound, also fully leaves open the real possibility of a *soft science of consciousness*—by which I mean any science of consciousness that’s *neither* materialist nor physicalist, *nor* naturally mechanistic, *nor* in any other way reductive, for example, computational or informational (see, e.g., Hanna and Maiese, 2009; Hanna, 2011, 2022...). (Hanna, 2023d: pp. 1-2)

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<sup>1</sup> The ratiocentric predicament is a generalization of the classical hard problem in philosophical logic known as *the logocentric predicament*, formulated in 1926 by Harry Sheffer:

[i]n order to give an account of logic, we must presuppose and employ logic. (Sheffer, 1926: p. 228)

See also (Hanna, 2006: ch. 3).

By *consciousness*, I mean *subjective experience*, which is to say that consciousness inherently involves (i) a first-person or self that's (ii) egocentrically-centered in orientable space and unidirectional time, (iii) relatively unified, and (iv) immanently reflexive or immediately aware of itself without further ado and without implicitly or explicitly forming judgments or propositional thoughts about itself (= *subjectivity*, aka "consciousness-in"), and also that (v) this self spontaneously and freely enacts or engages in mental acts, states, or processes of various kinds that also inherently possess not only (vi) some or another qualitative specific character, which tells us "what it's like," but also (vii) some or another semantic content, which tells us "what it's about" (= *experience*, aka "consciousness-of").

Furthermore consciousness has two basic modes: (i) *pre-reflective or non-self-conscious consciousness*, which, in being naturally directed towards cognitive or intentional targets *other than itself*, is *immanently reflexive*, without either implicitly or explicitly forming judgments or propositional thoughts about itself, and (ii) *reflective consciousness, or self-consciousness*, which, in being naturally directed towards, or about, *itself AS* a cognitive or intentional target, is *aware of itself allocentrically and objectively*, by implicitly or explicitly forming judgments or propositional thoughts about itself. More simply put, pre-reflective or non-self-consciousness consciousness is *just being* a conscious mind that's directed towards other things; whereas reflective or self-conscious consciousness is *thinking about itself AS* a conscious mind that's *ALSO* directed towards other things. For example, as you read the just-previous sentence, you were *pre-reflectively or non-self-consciously* consciously reading that very sentence, whereas, as you read these very words, you're now *reflectively or self-consciously* conscious of reading this very sentence. (Hanna, 2023d: pp. 4-5)

By definition, a soft science of the mind is any science of the mind that's *neither* materialist nor physicalist, *nor* naturally mechanistic, *nor* in any other way reductive. But more specifically, a soft science of the mind is the holistic result of systematically triangulating (i) evidence from empirical psychology, including evidence from cognitive neuroscience, along with evidence from other formal or natural sciences, (ii) phenomenological evidence (Hanna, 2013, 2020), and (iii) classical philosophical evidence, including the results of conceptual analysis, rational intuition, and transcendental argument: analytic a priori truths and knowledge, and synthetic a priori truths and knowledge (Hanna, 2015: esp. chs. 4-8). Let's call this *the triangulation method* (Hanna and Maiese, 2009: pp. 26-27). Most specifically, then, something X is a soft science of the mind if and only if

1. X is a science, i.e., an organized body of knowledge aimed at a posteriori and/or a priori truth, and constrained and guided by basic logical and mathematical principles, that also generates testable empirical or non-empirical predictions,
2. X fully accepts, accommodates, and affirms the psychocentric predicament,
3. X fully accepts, accommodates, and affirms the ratiocentric predicament, and

4. X fully accepts, accommodates, and affirms the triangulation method.

In this way, by virtue of the psychocentric predicament and the ratiocentric predicament, every soft science of the mind must directly incorporate phenomenological evidence about our innate mental capacities as *primitive data* for that science, along with primitive data from empirical science and from classical philosophical investigation. Therefore, any account of psychological causal mechanisms, operations, or structures that's provided by cognitive neuroscience for that soft science of the mind, will also have to be fully consistent and coherent with the primitive data provided by phenomenology and by classical philosophical investigation, and thus, by virtue of the triangulation method, it will also have to play an inherently *collaborative* role in that soft science of the mind. And so it would be for the soft science of consciousness in particular. (Hanna, 2023d: pp. 9-10)

Granting all that, then how will the science of reading proceed?

A **first** initial step in the science of reading is a three-stage analysis of the internal structure of reading, as a complex mental act or process necessarily involving the ordered sub-operations of *scanning*, *parsing*, and *comprehending*:

For convenience and ease of expression, in what follows ... I'm going to use the terms *legible*, *legibility*, *illegible*, and *illegibility*, respectively, as synonyms for the terms *readable*, *readability*, *unreadable*, and *unreadability*, respectively.

[Now] I'll propose a set of fairly precise necessary and sufficient conditions for legibility and reading.

[A]ccording to the *Oxford Encyclopedic English Dictionary*, "character" is defined as

a printed or written letter, symbol, or distinctive mark. (Hawkins and Allen, 1991: p. 247)

In view of that, then I'll ... define a *text* as *any sequence of one or more characters*, where a one-character sequence is the lower-bound limiting case, and there's no upper bound on the number of characters. In turn, what I'll call a *text-in-L* is defined as *any sequence of one or more characters belonging to a particular language L*. It's important to note that a language L can contain some characters (hence also some texts) that belong to one or more different languages L2, L3, L4, etc. So, for example, English contains some letters, words, and sentences belonging to other languages, including Greek, Latin, French, German, Italian, etc. Then, I'll provide necessary and sufficient conditions for legibility in two parts, as follows:

1. A text T-in-L is legible if and only if T-in-L satisfies *the perceptibility condition*, *the syntactic condition*, and *the semantic condition*, and

2. all and only such texts-in-L have legibility.

The perceptibility condition says that *the basic orientable (i.e., intrinsically directional, for example, up-down, back-front, or right-left) spatial shape and structure of T-in-L must be at least minimally perceptually detectable, i.e., that T-in-L must be at least partially perceptually detectable, hence it's not completely perceptually undetectable, and thereby T-in-L is able-to-be-scanned to at least that minimal extent. For example, if a text is completely blacked out, erased, otherwise completely smudged out or obscured, invisibly small, or so big that its shape cannot be perceived, then it's perceptually undetectable and illegible. But on the other hand, as it were, even if a text T-in-L is right-to-left→left-to-right mirror-reversed and turned upside down ... it's still able-to-scanned to the minimal extent that it's not completely undetectable....*

The syntactic condition says that *T-in-L must be at least minimally well-formed, i.e., that T-in-L must be at least partially well-formed, hence it's not completely ill-formed, and thereby T-in-L is able-to-be-parsed to at least that minimal extent. For example, even if a text T-in-L is perceptually detectable, it can be completely jumbled, completely misspelled, or completely ungrammatical, or its characters can be completely randomly distributed, and in any of those ways it would be syntactically illegible. Indeed, ciphers or secret codes (as opposed to hidden messages in otherwise legible texts) are designed to approach syntactic illegibility, on the working assumption that the more illegible they are, the harder they are to break; so if there are some ciphers that *have never been broken* and all their creators are dead, or, more thought-experimentally, if there were a cipher created by intelligent non-human aliens that, even in principle, *could never be broken by rational human animals*, then they would be illegible in the syntactic sense. Therefore, a text-in-L's satisfying the perceptibility condition, as such, *is not itself independently sufficient for readability and thus it's not itself independently sufficient for being the target of any actual or possible act or process of reading.**

And the semantic condition says that *the conceptual content and/or essentially non-conceptual content of T-in-L must be at least minimally coherent, i.e., that the conceptual content and/or essentially non-conceptual content of T-in-L must be at least partially coherent, hence not completely incoherent, and thereby the conceptual content and/or essentially non-conceptual content of T-in-L is able-to-be comprehended to at least that minimal extent. For example, even if a text is minimally perceptible and also minimally well-formed, nevertheless it can still violate minimal requirements of conceptual *sortal correctness* and/or essentially non-conceptual *sortal correctness*, or be strictly non-referential, and be semantic *gibberish*, hence be illegible in the semantic sense, like this non-poetical text-in-English, a paradigm case of *sortal incorrectness*, devised by Bertrand Russell (Russell, 1940: p. 166)—*

quadruplicity drinks procrastination

or this famous poetical text-in-English, a paradigm case of strict non-referentiality, taken from Lewis Carroll's *Jabberwocky*... —

'Twas brillig, and the slithy toves  
Did gyre and gimble in the wabe;  
All mimsy were the borogoves,  
And the mome raths outgrabe. (Carroll, 1988)

Therefore, that text from *Jabberwocky*'s satisfying the perceptibility condition *together with* the syntactic condition, yet also failing the semantic condition, shows that the first two conditions *are not themselves conjointly sufficient for readability* and thus that *they're not themselves conjointly sufficient for being the target of any actual or possible act or process of reading*. Of course, millions of people, including you, the reader of this very essay, have in some sense or another “read” that text from *Jabberwocky*; but my way of explaining away this apparent inconsistency is just to point out that *Jabberwocky* is indeed *legible* in both the perceptible and syntactic senses (so in two senses, readable), but *illegible* in the semantic sense (so in one sense, unreadable), hence not legible in *all* relevant senses, hence *illegible* by my contextual definition, or conceptual analysis, of legibility. The same point holds, *mutatis mutandis*, for “quadruplicity drinks procrastination” and all other essentially similar texts-in-L: you can “read” it in two senses (the perceptible sense and the syntactic sense), but strictly speaking, it's *illegible* according to the necessary and sufficient conditions of legibility, precisely because it fails the semantic condition.

Assuming all of that so far, I'm now in a position to provide precise necessary and sufficient conditions for the act or process of reading. In the following contextual definition, or conceptual analysis, by *person* I mean *rational human minded animal*: namely, a living human organism that's capable of (i) consciousness, (ii) self-consciousness, (iii) caring (i.e., desire, emotion, and feeling—the affects), (iv) sensible cognition, (v) intellectual cognition, (vi) volition, (vii) object-directed and act-directed intentionality more generally, and (viii) free agency. Then, I'll provide necessary and sufficient conditions for reading in two parts, as follows:

1. A person P reads a text T-in-L if and only if P consciously or self-consciously at least minimally scans, at least minimally parses, and also at least minimally comprehends T-in-L, and
2. all and only such acts or processes are reading.

It's important to note that, consistently with this contextual definition, or conceptual analysis, of reading, a person P can read a text T-in-L either *aloud* or *silently to themselves*. It's also important to note that neither scanning, nor parsing, nor comprehending, need be *self-consciously* or *reflectively* performed: this can be done in a more-or-less or even altogether *pre-reflectively* or *unself-consciously conscious* way; indeed, we typically “look

right through” what we’re reading in order to go directly to the *meaning* (whether sense, reference, or speech-act uptake) of what we’re reading, and altogether overlook the scanning, parsing, and comprehending dimensions of the act or process of reading itself. In order to bring those dimensions back into view, all you have to do is to repeat any text-in-L—for example, a sentence or word—out loud a few times (say, ten times) until it sounds strangely *bereft* of meaning; that strange *absence-of-meaning* has then become vividly manifest to you precisely because the perceptibility and syntax of that particular text-in-L have been temporarily self-consciously detached from what you’ve been previously been pre-reflectively and unself-consciously yet still consciously comprehending.

And it’s also important to note that the point I made above about “readers” of *Jabberwocky* and “quadruplicity drinks procrastination” goes, *mutatis mutandis*, for my contextual definition, or conceptual analysis, of reading: of course, millions of people, including you, the reader of this very essay, are in some sense or another “readers” of that text from *Jabberwocky*; and no doubt a few thousand people have read “quadruplicity drinks procrastination”; but my way of explaining away this apparent inconsistency too, is just to point out that *Jabberwocky* and “quadruplicity drinks procrastination” can indeed be *read* in both the perceptible and syntactic senses (so in two senses, that’s reading), but *cannot be read* in the semantic sense (so in one sense, that’s *not* reading), hence it’s not reading in *all* the relevant senses, hence it’s *not reading* by my contextual definition, or conceptual analysis, of reading. (Hanna, 2023d: pp. 8 and 11-15)

Even though, by virtue of the psychocentric predicament, it’s clear and distinct that reading is *not* going to “be ultimately explained in terms of the structure and function of the brain” (Rayner et al., 2012: ch. 1), nevertheless, my three-stage conceptual analysis of reading, considered as a mentalistic operational and structural analysis, *is* generally confirmed by recent and contemporary empirical work in the cognitive psychology of reading (Rayner et al., 2012: chs. 4-9).

This brings me to a **second** initial step in the science of reading. The mental act or process of reading is inherently *non-mechanical* and therefore *not* the result of any Turing-computable algorithm:

The conclusion we draw from the research reviewed in this section is that readers do not mechanically apply their knowledge of a language to arrive at the proper understanding of a sentence. (Rayner et al., 2012: ch. 8)

More specifically, this inherently non-mechanical character of reading is demonstrated by the fact that our ordinary rational human minded animal ability *to read garbled texts, provided that they’re otherwise at-least minimally legible*, will necessarily exceed the digital processing abilities of any and all computers to read those texts, i.e., there are some legible



texts that ordinary rational human animals *can* read, that even the world's most sophisticated robot *can't* read. And this is because,

as ordinary rational human minded animals, we intuitionistically represent texts as complete *Gestalt*-structures that are embedded in manifestly real, egocentrically-centered, orientable space, and therefore *we always have a unified formal spatial representation of the text as a whole for guiding us through our reading*, not only before we begin scanning it sequentially, but also throughout the time we're scanning it sequentially. This enables us to *jump over, fill in, or creatively interpret* illegible sub-texts, and/or *re-orient disoriented sub-texts in spatial imagination*, when we encounter garbled texts, hence we're able to read all sorts of garbled texts, provided that they're otherwise at least minimally legible. (Hanna, 2023e: p. 13)

For the purposes of this essay, I'll call a unified formal spatial representation of the text as a whole, that guides us through the scanning stage of our reading even for garbled texts, a *scanning-schema*. Then, my generalized proposal is that there are (i) *scanning-schemata*, (ii) *parsing-schemata*, and (iii) *comprehension-schemata* that guide us through our reading at the corresponding three stages of the mental act or process of reading.

As a consequence, a **third** initial step in the science of reading is to explore in detail how rational human minded animals *creatively construct* and *effectively deploy* these scanning-schemata, parsing-schemata, and comprehension-schemata. Perhaps not altogether surprisingly, what's called *schema theory* in the cognitive psychology of reading has been not only important and influential since the 1970s and 1980s, but also the target of various critiques (see, e.g., Alba and Hasher, 1983; Sadoski et al., 1991). Looking back on those theories and the various critiques of them, here's what Rayner et al. plausibly concluded in 2012:

One of the reasons that schema theories attracted interest was that they appeared at a time when psycholinguistics had pretty much ignored the role of real-world knowledge in understanding discourse. A major thrust of these theories was to demonstrate that comprehension of a text does not follow automatically from knowing the literal meaning of its sentences, but instead has to rely on real-world knowledge such as what it is actually like to do laundry, why men go to jewelers, etc. But nobody has an adequate explicit theory of real-world knowledge, and it is not likely that one will appear in the foreseeable future. No "grammar of knowledge" is available. In retrospect, while schema theories probably captured something important and real about how we understand discourses, the predictions they made basically boil down to claiming that we are best at understanding what makes sense to us, and that what makes sense depends on what we know. (Rayner et al., ch. 9)

My response to Rayner et al.'s plausible conclusion is twofold: (i) to focus on the core idea that "schema theories probably captured something important and real about how we understand discourses," and then (ii) to urge contemporary cognitive psychologists to resuscitate and reformulate schema theory in the light of a *broadly Kantian transcendental explicit theory of real-world knowledge*, i.e., a broadly Kantian "grammar of knowledge," like the one I developed and defended in *Cognition, Content, and the A Priori* (Hanna, 2015: esp. chs. 6-8).

Now, if my twofold response is cogent, then what does this tell us about consciousness? It tells us that *rational human consciousness is inherently schematic in nature*. That is, rational human consciousness is not *only* subjective experience, but *also* subjective experience *as presented in some or another schematic format*. For example, reading presents consciousness in schematic scanning format, schematic parsing format, and schematic comprehension format.

But rational human consciousness in reading is also (i) *affective or caring-based*, (ii) *essentially embodied*, and (iii) *free-agential* (Hanna, 2023f). Therefore, rational human consciousness in reading is also presented in (i\*) schematic affective or caring-based format, which Michelle Maise and I have called "affective frames" (Hanna and Maiese, 2009: pp. 230-237), (ii\*) schematic essentially embodied format, which I'll hereby dub *body-frames* (see also Lakoff and Johnson, 1980/2003; Gallagher, 2005), and (iii\*) schematic free-agential format, which I'll hereby dub *action-frames*.

To be sure, not only rational human consciousness in its affective or caring-based, essentially embodied, and free-agential modes, but also in its various intellectual or thinking modes other than reading, also exists in a multiplicity of ways *apart from* the mental act or process of reading. And in those non-reading-based intellectual or thinking modes, what I've been calling "schemata" in the context of the present essay show up again as what Otto Paans and I have called *thought-shapers* (Hanna and Paans, 2021).

Finally—for the time being—a **fourth** initial step in the science of reading is to explore the well-confirmed phenomenon of *inner speech in silent reading*, and then find out what it tells us about the nature of rational human consciousness. Here's what Rayner et al. have to say about that phenomenon:

When we read silently, we often experience the feeling of hearing our voice saying the words our eyes are falling on. Some readers actually move their lips at times during silent reading and there is a considerable amount of muscle activity in the speech tract that can be measured if not experienced as we read silently. What is the function of these activities? [We have] argued that access to the lexicon can proceed via either a visual route or a

phonological route. Yet most of the time we can clearly hear our voice saying the words in the text and for most readers there is evidence of much speech-like activity in silent reading.

Evidence from a number of different types of experiments converge on the notion that inner speech serves a useful function in reading comprehension. Although the meanings of individual words can be determined without recoding written language into speech, phonological representations clearly affect how words are identified. Further, phonological codes appear to be activated for most words we read, and this phonological information is held in working memory and used to comprehend text. Although inner speech consists of articulatory movements (subvocalization) and phonological codes (hearing your voice), evidence suggests that interfering with subvocalization does not necessarily block the establishment of phonological codes, although it may interfere with some aspects of phonological representations (e.g., prosodic structure.) Finally, we considered the nature and role of phonological representations in some detail and suggested that, in addition to the role they play in recognizing individual words, they may be used to hold information about temporal order in working memory and to provide prosodic cues that are useful in comprehending the text. (Rayner et al., ch. 7)

Let's assume that all of that is true. Now, let's go back to the first sentence of this essay, i.e.,

You, the reader of this very sentence, are consciously reading this very sentence from left to right here and now.

But as you re-read that sentence, Dear Reader, please also say this out loud at the same time: "blah blah blah blah blah blah..." Clearly and distinctly, you subjectively experience the sound of your own voice saying the words as you read them, which clearly and distinctly helps your comprehension of the text. But since your own actual voice is *already* being used for some *other* task—namely, saying "blah blah blah blah blah blah..." out loud at the same time—then it follows that inner speech isn't always or necessarily the effect of *subvocalization*. Inner speech must be something distinct from subvocalization. Indeed, inner speech is something that's even distinct from reading *comprehension*, since it's also present when we "read"—in the sense of scanning + parsing—that famous grammatically well-formed but otherwise incomprehensible text from Lewis Carroll's *Jabberwocky*, while again at the same time saying "blah blah blah blah blah blah..." out loud:

'Twas brillig, and the slithy toves  
Did gyre and gimble in the wabe;  
All mimsy were the borogoves,  
And the mome raths outgrabe. (Carroll, 1988)

My proposal, then, is that rational human consciousness is not only inherently schematic in nature, but also *inherently presented as inner speech whenever either scanning + parsing or comprehending occurs in reading*. In short, for those who *can* read, then *as they read*, rational human consciousness is also *inherently the subjective experience of hearing one's own voice*. Moreover, the phenomenon of inner speech is also present in many or even most acts or processes of *silent thinking*, even when it's *not* conscious reading, since, for those who *can* read, many or even most acts or processes of silent thinking are expressed by means of sequentially generating mental imagery of *legible texts* (Hanna, 2006: ch. 4).

To be sure, these are only four *initial* steps in the science of reading. As such, they're also *exploratory* and *tentative* steps. Nevertheless, as I've argued in this essay, the mental act or process of reading in particular, as investigated by the (soft, not hard) science of reading, brings rational human consciousness theoretically out into the open in an exceptionally illuminating way, thereby shining a bright light on it. Ulric Neisser aptly observed that silent reading is "externally guided thinking" (Neisser, 1967, as quoted in Rayner et al., 2012: ch. 7). But by the very same token, silent reading is also rational human consciousness *externalized* onto the legible text.

This means that for those like us who *can* read, our own consciousness is characteristically directly presented to ourselves schematically *on-&-via* legible texts *as* we read them, especially when we're engaged in the highly self-conscious enterprises of formal-&-natural science or philosophy. The legible text, as read by us, is literally *the shape* of that form of our rational human consciousness. And even though *not every* form of our rational human consciousness is characteristically directly presented to ourselves schematically *on-&-via* legible texts and thereby shaped by them—but instead schematically via affective frames, body frames, or action frames, which shape our consciousness in correspondingly importantly different ways—nevertheless, *philosophy as we know it*, or at least *Western philosophy as we know it*,<sup>2</sup> not only *phenomenologically begins in*, but also is *epistemically grounded in*, the consciousness or subjective experience of reading (Hanna, 2023a, 2023b, 2024).

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<sup>2</sup> Here's an important qualification I noted in an earlier essay that investigated analogies or isomorphisms between the internal structure of reading and the internal structure of philosophizing :

Of course, there are also important *non-Western* traditions of philosophy: African, Asian, Indian, Indigenous, Middle Eastern, and so-on. But unfortunately, I'm not qualified to explore these. Nevertheless, it would be extremely interesting to know whether the internal structures of philosophizing I identify in Western philosophy, also hold up in non-Western philosophy, or not—and if not, why not. (Hanna, 2024: p. 1, note 1)

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