



'TL;DR' (Too Long; Didn't Read)? Cognitive Patience as a Mode of Reading: Exploring Concentration and Perseverance

RESEARCH ARTICLE

INGE VAN DE VEN 

FRANK HAKEMULDER 

ANNE MANGEN 

*Author affiliations can be found in the back matter of this article



ABSTRACT

Reading literature is often related to cognitive patience (i.e., the ability to read with focused and sustained attention and delay gratification, while refraining from multitasking or skimming over parts of the text). In this explorative, survey-based study, we investigate the relations between reading literature (especially longer texts) and concentration and perseverance, as well as the role of different modes of reading like skimming and skipping. Our measures include an adapted version of the Author Recognition Test (ART) and a new behavioral measure of cognitive patience, developed specifically for this study: the Unscrambling Sentence Test (UST). Our findings offer some preliminary support for the hypotheses that (1) Attentive reading of longer literary texts correlates with cognitive patience; (2) A preference for texts that require sustained attention correlates with cognitive patience; and (3) A preference to skim or skip text passages negatively predicts cognitive patience. We recommend further research to derive more insight in what modes of attention are employed in reading literature, beyond close or deep attention, and how readers modulate between them.

CORRESPONDING AUTHOR:

Inge van de Ven

Department of Culture Studies,
Tilburg University, Netherlands
i.g.m.vdven@tilburguniversity.
edu

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When we think of a person engaged in the act of reading literary fiction, the image that readily comes to mind is one of focused concentration, often found in eighteenth- and nineteenth-century portraits of (often female) figures immersed in books. This notion of reading literature as a training of close, rapt, sustained concentration goes back at least to Victorian England (Dames, 2007). Later, I. A. Richards (2001) in *Practical Criticism* wrote of close reading as an answer to contemporary anxieties about mass media eroding students' capacities to sustain close attention, making them only capable of "stock conventional attitudes" (p. 182). In *Reader Come Home*, Maryanne Wolf (2018a) argues that acts of reading extended prose fiction such as novels help develop our "cognitive patience", an ability to attend in-depth and at length to a text focused with attention and the ability to delay gratification.

Over the last decades, however, a shift has been noted in reading, usually described as a shift from close reading (a careful reading of the text in a mode of focused concentration, in a linear manner) to hyperreading (Hayles, 2007, 2012). Close reading refers to a mode of reading with sustained and focused (or "deep") attention to the text, including its stylistic and compositional aspects (Lentricchia and Dubois, 2003). It is crucial for the deep inferential comprehension that allows one to critically engage with the meaning of texts (Baron, 2021; Mangen and Van der Weel, 2016). Hyperreading is a term coined by James Sosnoski in 1999 to denote non-linear ways of reading like skimming and scanning, often by way of screen media. It enables us to quickly identify relevant information, and thus to determine what to zoom in on (Liu, 2005). Close reading is almost exclusively discussed as pertaining to literary texts (except for dense works like philosophical or historical treatises), whereas skimming is usually discussed in relation to information texts (e.g., Duggan and Payne, 2009; 2011; Sosnoski, 1999) and rarely brought up in relation to reading literature, with some recent exceptions investigating preferences and habits for literary reading in various mediums, such as print book vs. e-reader (Kindle) vs. audiobook (Kosch et al., 2021; Spjeldnæs and Karlsen, 2022). This may suggest that reading literature more or less exclusively entails close reading in an uninterrupted mode of deep attention. In this study, we explore if this is indeed the case, and to what extent readers of longer literary texts also use other modes of reading like skimming and skipping.

In this explorative, survey-based study, we examine relations between reading habits and preferences, forms of attention, and cognitive patience (operationalized as concentration and perseverance). Exploring the relations between close reading and hyperreading, cognitive patience, and exposure to literature, we address the following questions: Are avid readers of literature better at focused and prolonged concentration, compared to moderate or non-readers of literature? Are they more persistent? Are they exclusively "close readers" or do they also use other strategies of reading, like skimming, scanning, or skipping?

THEORETICAL BACKGROUND

COGNITIVE PATIENCE

Wolf (2018a) argues that for reading extended prose fiction, for instance in the form of a novel, cognitive patience (CP) is needed. This is the ability to read with focused and sustained attention and delay gratification, without multitasking or skimming over parts of the text (p. 90). CP is a broad and multifaceted concept that has to our knowledge not been operationalized or empirically examined. In her explication of its meaning, Wolf references the effortful persistence psychologist Angela Duckworth calls grit. Grit is the ability to strive towards achieving long-term goals while persisting in the face of adversity (Allen et al., 2021; Duckworth and Quinn, 2009). Besides perseverance or grit, CP is closely linked to absorbing experiences: It is needed for immersing ourselves in books, to read for hours on end without for instance checking our phones every few minutes. Wolf claims CP is necessary for the development of high-level intellectual skills. In Wolf's conceptualization, there is a reciprocal relationship between longform literary reading and CP: On the one hand, CP is needed for acts of sustained reading of longform texts, while on the other, habitual longform reading might train our faculties for CP. Adversely, habitual engagement in skimming short texts on screens can be assumed to negatively impact CP, in turn making it harder to read longer texts with sustained attention and patience. In media psychology and reading research, this difficulty in engaging with longer texts is typically explained with reference to the so-called "shallowing hypothesis" (Annisette and Lafreniere, 2017; Baron, 2021; Delgado et al., 2018; Delgado and

Salmerón, 2021). This hypothesis explicates that we are being primed by the fact that most of our reading consists of snippets of multimedia information that are read “on the prowl” (Baron, 2015, p. 39), rather than sustained cognitive engagement with longer, linear texts such as novels. Eventually, such a shallow mode of reading is assumed to bleed over (Wolf, 2018a) to our mode of reading on paper, resulting in the difficulty to muster the CP required for engaging with longer and more demanding texts.

Sustained reading, however, has been on the decline in recent years (Baron, 2021; Baron and Mangen, 2021). Reading research has shown that the more people read shorter texts, the less they seem to be willing to look for non-literal meaning in a longer literary story (Hakemulder and Mangen, 2021). Wolf (2018b) therefore fears that as readers, we are progressively losing this ability, the more we engage in skim-reading automated texts on screen: “When the reading brain skims texts, we don’t have time to grasp complexity, to understand another’s feelings or to perceive beauty” (para. 1). This will make us less capable of reading long literary texts and benefiting from the cognitive processes this type of reading affords. It also results in a loss of depth of processing. Wolf (2016) shares her experience that today young people lose the patience prerequisite for long-form reading: “even the brightest students shun classic literary masterpieces because they are ‘too long’” (p. 152). To understand this, we should briefly outline the distinction between close and hyperreading, and the shift from the former to the latter.

CLOSE READING AND HYPERREADING

In literary studies, close reading denotes a mode of reading marked by a “detailed and precise attention to rhetoric, style, language choice, and so forth through a word-by-word analysis of a text’s linguistic techniques” (Guillory, 2010). It entails a close examination of the language of (a segment of) a literary text including its tone and figures, its rhetorical strategies and techniques, and the ways in which the text produces meanings (Lentricchia and Dubois, 2003). As close reading is a way to engage with the complexities, opacities, and ambiguities of (literary) language, it is typically assumed to be a relatively slow mode of reading (Culler, 2010; Herrnstein Smith, 2016; Johnson, 1986). Rather than a specialized method of scholarly reading, close reading is for present purposes understood broadly as a strategy of sustained, focused attention to the text, its meaning and stylistic composition.

The mode of attention in which close reading typically occurs, Hayles (2007) has called deep attention; deep attention is characterized by “concentrating on a single object for long periods [while] ignoring outside stimuli, preferring a single information stream, and having a high tolerance for long focus times” (p. 187). Deep attention is necessary for solving complex problems in one medium, yet “comes at the price of environmental alertness and flexibility of response” (Hayles, 2007, p. 188). Reading literature is most often associated with this mode of focused concentration, which paradoxically (and problematically, as will be explained), according to theorists like Hayles, also has elements of absorption and more automatic modes of attention.

Close reading is often contrasted with what has been called hyperreading: non-linear ways of reading like skimming and scanning, often engaged on screens. Sosnoski (1999) coined this term in relation to information texts. Liu (2005) suggests that screen-based reading behavior is characterized by “more time spent browsing and scanning, keyword spotting, one-time reading, non-linear reading, and reading more selectively, while less time is spent on in-depth reading, and concentrated reading” (p. 700). Empirical studies in various areas of reading research have found that screens seem to encourage skimming, scanning, and hence a kind of superficial reading (Liu, 2005; Mangen et al., 2013; Noyes and Garland, 2008).

Hyperreading corresponds with a cognitive style that Hayles (2012) calls hyperattention, marked by rapid switching among tasks, with a preference for “multiple information streams” seeking a “high level of stimulation” and with low tolerance for boredom (p. 178). Hyper attention is appropriate whenever we have to quickly negotiate changing environments where multiple stimuli compete for our attention. Its drawback is its impatience with sustained attention to noninteractive objects.

Reader and Payne (2007) show that skim readers focus on extracting information from the more important sentences contained within text: The *adaptive allocation of attention* or so-called *satisficing strategy* in skim reading entails that readers monitor their information gain,

and if it falls below a certain threshold, they stop reading and move on to a next (part of the) text. This is akin to what van den Broek and colleagues (2011) have called “standards of coherence.” Each reader has standards of coherence that are set individually and that differ depending on the specific goal, purpose, the reader’s background knowledge and reading proficiency, textual parameters such as complexity, and external factors such as distractions (van den Broek et al., 2011; see also Elfenbein, 2018; Linderholm et al., 2018). The various readers’ standards of coherence will have an impact on factors such as reading pace, retention, memory and comprehension. For instance, Duggan and Payne (2009) found that skim readers had better memory performance for important details in the text, but not for the unimportant ones, as well as higher scores for comprehension for important sentences (see also Duggan and Payne, 2011). Skimming has increased in frequency due to the omnipresence of digital media (Hayles, 2012; Wolf, 2018a, 2018b). However, this particular habit of reading existed well before the internet and hypertext (Edmond, 2018; Guillory, 2008; Sosnoski, 1999). Moreover, skimming is resurfacing as a phenomenon of interest in research on literary reading, primarily if not exclusively due to the rise of e-readers such as Kindles. Qualitative studies exploring readers’ preferences when it comes to choosing the medium on which to read various types of literature, have found that readers tend to prefer their Kindles for literary texts that are perceived as lighter reads and, hence, allowing a certain amount of skimming (Kosch et al., 2021; Spjeldnæs and Karlsen, 2022). The present study does not address the question of medium directly but examines how readers read literature with different modes of attention, and whether this includes other strategies like skimming in addition to close and absorbed reading.

MODES OF READING AND ATTENTION

Guillory (2008) explains how skimming can be effectively combined with close reading. Focusing on scholarly reading, he claims that it requires the ability to move in-between different modes, from hyper to close. We might consider that a similar ability to modulate would be beneficial for reading literature. After all, reading of longform text is rarely done in a cognitive mode of unbreakable, uninterrupted attention (Conners, 2009; Smallwood, 2011). To comprehend a text, we must condense information, because of limitations in our working memory and attentional resources (Kintsch, 1998). This requires strategically allocating attention to parts of the text that seem significant, at the expense of other parts of the text deemed less significant (Linderholm et al., 2018; Rabinowitz, 1987; Sanford and Emmott, 2012; Van den Broek, 2010). Besides close reading, reading literature therefore also involves selection, strategic allocation of attention informed by textual cues, condensation, and mind-wandering (Van de Ven 2023a; Van de Ven 2023b). When reading literature, we combine different modes of reading including close reading, hyperreading, and absorbed reading, and others, triggered by both textual (bottom-up) and readerly (top-down) characteristics.

In addition to close and hyperreading, a mode called absorbed reading might be distinguished. Hisgen and Van der Weel (2022) differentiate between close (or deep) reading and absorbed reading, with the former referring to a thorough mode of slowly reading a text from beginning to end, sometimes modulating reading speed and at other times rereading parts. This asks for cognitive effort, persistence, analytical and critical reading skills, and a distance with respect to the text. In this respect, it is opposed to the absorbed reading experience, which is captivating and does not ask for a critical and analytical attitude. Close and absorbed reading experiences are distinct, but they can coincide, overlap, and bleed into each other (Bálint et al., 2016; Kuijpers, 2014).

In sum, when it comes to the role of attention in reading literature, it has often been claimed that reading can be beneficial for our abilities to concentrate, and studies of foregrounding offer some (short-term) evidence for their correlation (Hakemulder and Van Peer, 2015; Van den Hoven et al., 2016; Van Peer et al., 2007). It is often assumed that close reading aligns with reading literature and that skimming pertains to online information texts. However, modulation between different modes of reading and attention while reading literature has received less attention. In what follows, we outline the results of our exploratory survey study in which we investigated the relations between reading literature (especially longer texts) and CP, as well as the role of different modes of reading like skimming and skipping in reading literature.

Our survey aimed to gain insight into the relations between reading habits (e.g., frequency of reading, preference for shorter or longer texts, skimming and skipping versus close reading) and abilities of concentration and perseverance. From our literature review, it seems plausible to expect that experience in reading longer literary texts would correlate positively with CP, and that skimming and skipping would correlate negatively with CP. Therefore, the hypotheses of this study are:

H1. Attentive reading of longer literary texts positively correlates with cognitive patience.

H2. A preference for texts that require sustained attention positively correlates with cognitive patience.

H3. A preference to skim or skip text passages negatively correlates with cognitive patience.

METHODS

PARTICIPANTS

Participants ($N = 829$; 237 male, 569 female, 15 other, 7 not disclosed; $M_{\text{age}} = 43.8$, $SD = 17.1$, ranging from 18 to 84). In terms of nationality, 63.2% of the participants were Dutch; 11.3% American, 6.4% Belgian, and 2.2% Norwegian. The rest of the respondents were from 43 less frequently occurring nationalities.¹

As a necessary condition for participation, participants needed to have read at least one work of literary fiction (broadly defined as including novels, poetry, and short stories) during the last year. Those who answered in the negative were sent to the end of the questionnaire. This way, we would ensure the population consisted of readers of literary fiction (from occasional to frequent). Full ethical approval was obtained from the data and ethics board of Tilburg University before the start of data collection. Participants signed a form for informed consent and were briefed and debriefed. Mandatory personal data protection guidelines were met.²

MATERIALS AND MEASURES

Author Recognition Test (ART)

We measured print exposure with an adapted Author Recognition Test (ART; orig. Stanovich and West, 1989). We used an adapted version (Brysbaert et. al., 2020) of a Dutch ART developed by Koopman (2015). Compared to other measures like self-report scales and book counting, the ART on fiction is considered to be a reliable proxy for lifetime print exposure (Acheson et al, 2008; Wimmer and Ferguson, 2022). The ART presents the participants with a list of names (or pseudonyms) of authors: some real, others invented. They are asked to mark each name they know to be an author. Participants are asked to only select the names they are sure to be of real authors. If they mark a false name (a foil), this will be subtracted from their score, which discourages guessing. We made some adjustments by adding some author names.³ For the Dutch version of the survey, we used Dutch and international author names; for the English version, we substituted the Dutch names for English-language authors from the same ART. The English-language survey ART contained 15 literary author names, 15 popular/genre authors, and 12 foils. The Dutch-language version contained 15 literary authors (7 Dutch/Belgian ones and 8 international), 15 popular ones (5 Dutch/Belgian; 10 international), and 12 foils. The ART

1 Afghan; Argentinian; Australian; Austrian; Brazilian; British; Bulgarian; Canadian; Cape Verdean; Catalan; Chinese; Colombian; Czech; Danish; French; German; Greek; Hungarian; Indian; Indonesian; Iranian; Irish; Italian; Japanese; Luxembourgish; Malaysian; Mexican; Moroccan; Pakistani; Philippine; Polish; Puerto Rican; Romanian; Russian; Scottish; Seychelloise; Spanish; Swedish; Swiss; Taiwan; Turkish; Venezuelan; Vietnamese.

2 Identification code: REDC 2020149a.

3 New names for Dutch art were Anna Blaman; Willem Kloos; Terry Pratchett; Isaac Asimov; Jeff Kinney; Henk van Straten; Manon Uphoff; Robert Vuijsje; Marieke Lucas Rijneveld; for the international art: Terry Pratchett; Jeff Kinney; Isaac Asimov; Stéphane Mallarmé.

was scored by adding up the number of correctly identified names and subtracting the number of chosen foils. The range of the ART was 31 ($M = 16.47$, $SD = 8.88$). Besides two participants with four foils, no one chose more than two foils.

Concentration and perseverance

Scale 1 (dimension ‘Concentration Ability’) from the AQ (AQ; Schepers, 2007) was used to measure concentration abilities (see Table 1). The inventory consisted of 9 items. An example item is “I am able to pay attention to one specific issue for a long period of time.” The dimension *Perseverance* from the Short Grit Scale (Grit-S: Duckworth and Quinn, 2009; Lechner et al., 2019) was used to measure perseverance. The inventory consisted of three 5-point Likert scale questions. An example item is “Setbacks don’t discourage me.” We added three items of our own to measure absorption (“I have difficulty focusing on more than one thing”), multitasking (“When I am working on an engaging task I sometimes forget the time”), and boredom (“I am often bored”). The participants indicated their level of agreement with statements on a scale ranging from “completely untrue” to “completely true.” In scoring the total of 15 items in this section, each item weighed equally.

Table 1 Items ‘Concentration & perseverance.’

ITEM	ORIGIN
“I am able to pay attention to fine detail”	Attention Questionnaire (AQ), Scale 1 (Schepers 2007), Dimension ‘Concentration Ability’
“I am able to return full attention to something after a short interruption”	AQ
“I am able to concentrate on more than one thing at the same time”	AQ
“I sometimes miss vital information during a boring lecture”	AQ
“I become shut off from the world around me when trying to solve a challenging problem”	AQ
“I am able to isolate from my surroundings when studying”	AQ
“I am able to shut off from the world when reading an absorbing book”	AQ
“I am able to pay attention to one specific issue for a long period of time”	AQ
“I am able to give continuous attention, even if the volume of information is very large”	AQ
“I finish whatever I begin”	Short Grit scale (Grit-S: Duckworth and Quinn, 2009; Lechner, Danner, & Rammstedt 2019), Dimension ‘Perseverance’
“Setbacks don’t discourage me”	Grit-S
“I am diligent. I never give up”	Grit-S
“When I am working on an engaging task I sometimes forget the time”	Own addition
“I have difficulty focusing on more than one thing”	<i>Ibid.</i>
“I am often bored”	<i>Ibid.</i>

Frequency and duration of reading, preferred text length

An item on reading *frequency* was used to measure (self-reported) reading frequency. The item was “How often do you read literary fiction (such as novels and short stories)?” Participants indicated their reading frequency on a ten-point scale, the options being: never; a couple of days a year; a couple of days a month; and any number from 1–7 days a week (scale from De Mulder et al., 2021). Reading *duration* was measured by the item: “When you read literature, how long do you read on average?” Participants filled in the number of hours. Preferred text length was measured by the item “Do you prefer to read longer or shorter literary texts?” Participants indicated preferred text length by choosing answers from a 5-point Likert scale ranging from “highly prefer shorter texts” to “highly prefer longer texts.”

Reading habits

We used three items to measure reading habits: frequency skimming, skipping, and finishing a book. The participants indicated their frequency of engaging in these reading habits with statements on a 5-point Likert scale ranging from “always” to “never.” In addition, participants were invited to indicate what elements in a text make them skim and what made them skip a passage. We offered ten choices; any number of choices were allowed. The options were: long landscape descriptions; long dialogues; long or detailed character descriptions; violence; too many details; too complex language; too obvious information; when the text is too long; other (specify); and finally, I never skim/skip.

Reading motivation

Reading motivation was measured using 15 items from the Literary Response Questionnaire (LRQ; Miall and Kuiken 1995) and Narrative Engagement Scale (Busselle and Bilandzic 2009; Koopman 2015a). First, participants listed up to five works of literature they had read recently (in the last one or two years), and to mention (where possible) title and author. We expected that having a number of recently read texts fresh in their memory would aid them in answering the questions on reading motivation.⁴ They were asked to select one text out of this list they particularly enjoyed, and to rate the 15 statements with that text in mind. The participants indicated their level of agreement with statements on a 5-point scale ranging from “not at all” to “very much.”

Table 2 Reading motivation.

ITEM	ADAPTED FROM
“I liked it because it had an unexpected ending”	Literary Response Questionnaire (Miall & Kuiken 1995) (adapted), factor ‘story-driven reading’
“I liked it because there was a lot of action”	<i>Ibid.</i>
“I liked it because of the surprising plot twists”	<i>Ibid.</i>
“I liked it because I could empathize with the characters”	(Koopman 2015a; adapted from Busselle and Bilandzic 2009), dimension ‘absorption/empathy’
“I liked it because the book touches me emotionally”	<i>Ibid.</i>
“I liked it because I was absorbed in the narrative world”	<i>Ibid.</i>
“I liked it because the book was beautifully written”	(Koopman 2015a), dimension ‘style’
“I liked it because the book was originally written”	<i>Ibid.</i>
“I liked it because there are sentences in the book that stayed with me”	<i>Ibid.</i>
“I liked it because it was an easy read”	Own addition
“I liked it because it was a challenging read”	<i>Ibid.</i>
“I liked it because it was a ‘pageturner’”	<i>Ibid.</i>
“I liked it because it gave me new knowledge and/or insights into society”	<i>Ibid.</i>
“I liked it because it gave me knowledge about the world”	<i>Ibid.</i>
“I liked it because of how realistic it was”	<i>Ibid.</i>

Unscramble Sentence Test

Last, we included a behavioral measure of CP at the end of the survey: an Unscramble Sentence Test (UST) that we developed for this study. This optional word scrambling puzzle was presented to the participants as a language proficiency test. For this puzzle, we took 40 first sentences

⁴ In addition, this gives us a list of oft-mentioned authors that we can use to update the ART. Oft-mentioned author names we can use to update and diversify the ART: for the international ART: Chimamanda Ngozi Adichi; Clarice Lispector; Ali Smith; for the Dutch ART: Hannah Bervoets; Alex Boogers; Rob van Essen; Johan Fretz; Ilja Leonard Pfeiffer; Emy Koopman; Niña Weijers.

from well-known novels and scrambled the words, and asked participants to put them in the correct order. The sentences increased in complexity and length, ranging from “Mother died today” (from *The Stranger* by Albert Camus) to

If you really want to hear about it, the first thing you’ll probably want to know is where I was born, and what my lousy childhood was like, and how my parents were occupied and all before they had me, and all that David Copperfield kind of crap, but I don’t feel like going into it, if you want to know the truth. (from *The Catcher in the Rye* by JD Salinger)

After each sentence, participants were offered the choice to solve another puzzle or to stop. They were not told how many word puzzles would be presented in total, nor that every consecutive sentence would be longer and more challenging to unscramble. We weeded out nonsensical answers, but we did not exclusively count exact correspondences to the first sentences in the book as valid. For example, for “Through the fence, between the curling flower spaces, I could see them hitting” (William Faulkner, *The Sound and the Fury*), “I could see them hitting through the fence, between the curling flower spaces” was also considered correct. Any serious attempt was counted as a point. We added up the number of valid answers to come to a total score for how long each participant persevered. Two participants made it to the end of the test, and none were able to correctly reproduce the first sentence from Salinger’s novel.

Procedure

Participants were recruited through university mailing lists of several Humanities departments of the University of California, Santa Barbara and Tilburg University, the Netherlands.⁵ Data were collected through a survey, distributed in December 2020 and Jan. 2021. We used two versions of the survey: a Dutch ($N = 536$) and an English-language one ($N = 293$). We used the online survey tool Qualtrics to compose and distribute the questionnaire online. Participation took 10–15 minutes. No compensation was given.

ANALYSES

To evaluate the validity of our measures of concentration ability, perseverance and absorption, we first ran a principal components factor analysis of the items from the AQ (dimension Concentration Ability) and Short Grit Scale using varimax and oblimin rotations. This resulted in three factors explaining 46% of the variance (see Table 3). Adding a fourth factor only explained 7.14% more variance. It also had an eigenvalue lower than 1. All three items from the Short Grit Scale measuring perseverance loaded on the first factor. The items on Concentration Ability also loaded on this factor. Our data suggests that the relation between sustained attention and perseverance is so close that the items of the AQ and the Short Grit Scale cannot distinguish between the two and thus measure the same construct. We labeled this factor Sustained Attention and Perseverance (SAP). We removed the items that had no relation to any of the factors.

The three remaining items from the AQ, together with our own item “When I am working on an engaging task, I sometimes forget the time” constituted a third factor that we labeled *absorption*, as its items measure absorptive experiences (e.g., shut off from the world, forget the time, isolate from surroundings). One item from the AQ (“I am able to concentrate on more than one thing at the same time”) and one of our own (“I have difficulty focusing on more than one thing”) both measured multitasking. We labeled this item *difficulty with multitasking*. Three items had no relation to any of the three factors.

To estimate the validity of our behavioral measure and to assess to what extent it measures CP, we ran a stepwise regression analysis to see whether and to what degree SAP predicted UST scores.

5 We were further aided in distributing the questionnaire to avid readers by Stichting Lezen, a Dutch organization committed to the promotion of reading in society; the book website and reader community www.hebban.nl, the website of the International Cognition and Culture Institute (<http://cognitionandculture.net/>), *Diggit Magazine* (<http://www.diggitmagazine.com>), and www.neerlandistiek.nl, an online journal for language and literature.

ITEM	SUST. ATT & PERSEVERANCE	ABSORPTION	DIFFICULTY WITH MULTITASKING
I have difficulty focusing on more than one thing			.824
When I am working on an engaging task I sometimes forget the time		.681	
I am able to isolate from my surroundings when studying		.611	
Setbacks don't discourage me. I don't give up easily.	.694		
I am able to shut off from the world when reading an absorbing book		.752	
I am able to pay attention to one specific issue for a long period of time	.525	.534	
I am able to pay attention to fine detail	.516		
I finish whatever I begin	.727		
I am able to give continuous attention, even if the volume of information is very large	.568		
I am able to concentrate on more than one thing at the same time			.788
I am diligent. I never give up.	.788		
I become shut off from the world around me when trying to solve a challenging problem		.669	

Table 3 Factor analysis concentration & persistence. Factor loadings based on a Principal Component analysis with Varimax with Kaiser Normalization rotation for 15 items on concentration and persistence. Note: Factor loadings < .5 are suppressed.

For hypothesis 1, *A preference for texts that require sustained attention correlates with cognitive patience*, we performed Pearson R correlation tests on UST scores and ART scores as well as self-reported reading frequency, absorption, preference for reading longer texts, skimming, skipping, and finishing a book. A stepwise regression analysis was conducted to see to what extent ART-scores, age, and self-reported skimming and skipping behavior predicted UST scores.

For hypothesis 2, *A preference for texts that require sustained attention correlates with cognitive patience*, we first ran a principal components factor analysis with varimax and oblimin rotations on the 15 items on reading motivations (see Table 2). This resulted in four different types of reading, explaining 56% of the variance preferences: reading for the plot; reading for immersion; reading for aesthetics; reading for knowledge (see Table 4). Adding a fifth factor only explained 6.4% more variance. It also had an eigenvalue lower than 1. The four resulting factors show clear conceptual coherence. We decided to use the label *reading for plot* for items that all had in common their relation to events and action (including the surprising plot twist and unexpected ending). *Immersion* was used to label experiences of being absorbed in the story-world (including perceived realistic elements and emotional experiences). The label *aesthetics* unites items on style and beauty, memorable sentences, and challenge (the opposite of the so-called easy read). Last, only two items on knowledge (information about the world or society) were clearly grouped together. We performed a Pearson R correlation test on these four types and UST scores, followed by a stepwise regression analysis to see to what extent age, reading for aesthetics, and reading for plot predicted UST scores.

ITEM	READING FOR PLOT	IMMERSION	AESTHETICS	KNOWLEDGE
I liked it because it had an unexpected ending	.681			
I liked it because it was beautifully written			.620	
I liked it because it was an easy read			-.474	
I liked it because it gave me new knowledge and/or insights into society				.869

Table 4 Factor analysis reading motivation. Factor loadings based on a Principal Component analysis with Varimax with Kaiser Normalization rotation for 15 items on textual preferences. Note: Factor loadings < .4 are suppressed.

ITEM	READING FOR PLOT	IMMERSION	AESTHETICS	KNOWLEDGE
I liked it because there was a lot of action	.735			
I liked it because I could empathize with the characters		.741		
I liked it because there are sentences in the book that stayed with me			.560	
I liked it because I was absorbed in the narrative world		.483		
I liked it because it gave me knowledge about the world				.883
I liked it because it was a challenging read			.566	
I liked it because of the surprising plot twists	.748			
I liked it because it was originally written			.683	
I liked it because of how realistic it was		.555		
I liked it because it was a 'pageturner'	.582			
I liked it because the book touches me emotionally		.662		

For hypothesis 3, *A preference to skim or skip text passages negatively predicts cognitive patience*, we examined the correlation between the UST and these two measures respectively. Second, we ran Mann-Whitney U-tests comparing UST scores for participants who reported that certain text elements make them skim or skip passages (e.g., long descriptions of landscapes) to those participants that did not indicate to skim or skip these passages.

RESULTS

Results of a regression analysis revealed that SAP ($b = .104, p = .009$) and absorption ($b = .088, p = .029$) were weak but significant predictors of scores on our behavioral measure UST ($F(2, 790) = 11.176, p = .000, \text{adj.}R^2 = .025$) (see Table 5).

HYPOTHESIS 1

As predicted, significant positive relations were found between the UST scores and the ART ($r = .380, p < .001$), self-reported reading frequency ($r = .168, p < .001$), SAP ($r = .142, p < .001$), absorption ($r = .138, p < .001$), and reported preference for reading longer texts ($r = .185, p < .001$). Significant negative relations were found between UST scores and self-reporting skimming ($r = -.116, p = .001$) and skipping ($r = -.105, p = .003$). Using a stepwise regression analysis, a significant model emerged ($F(3, 740) = 60.594, p < .001, \text{adj.}R^2 = .194$, with ART-scores and age predicting higher ($b = .313, p < .001$ and $b = .205, p < .001$ resp.) and self-reported skipping behavior predicting lower scores on UST ($b = -.071, p = .033$). These results provide support for H1; that is, attentive reading of longer literary texts correlates with cognitive patience.

HYPOTHESIS 2

Positive correlations were found between reading for aesthetics with the UST ($r = 0.148, p < .001$), and a negative correlation for reading for plot ($r = -0.104, p < .001$) with the UST. Running a stepwise regression analysis, a significant model emerged ($F(4, 723) = 27.946, p = .000, \text{adj.}R^2 = .129$, with age ($b = .309, p < .001$) and aesthetics ($b = .088, p < .001$) as positive predictors of the UST, and reading for plot as a negative predictor of the UST ($b = -.099, p = .004$). Although relations are weak, these results do support our second hypothesis; that is, a preference for texts that require sustained attention correlates with cognitive patience).

HYPOTHESIS 3

To test our third hypothesis, we ran Mann-Whitney U-tests. Participants who reported never to skim ($M = 462.24$) scored higher on the UST than those who did ($M = 397.94$; $U = 56598$, $p < .001$). Participants who reported never to skip ($M = 445.91$) scored higher on the UST than those who did say they skipped ($M = 381.84$; $U = 72537$, $p < .001$). Participants who did *not* skim obvious information ($M = 403.37$) scored lower than those who did skim obvious information ($M = 449.9$) on the UST ($U = 57142$, $p = .015$). These results support H3; that is, a preference to skim or skip text passages negatively predicts cognitive patience).

Next, we took a closer look at participants' self-reported skimming and skipping behaviors in response to certain text elements. The results can be found in Table 6 for skimming, and Table 7 for skipping behavior, reporting median and range for each of the analyzed indexes per group. Participants who indicate skimming and skipping passages with "too complex language" score lower on the UST (resp. $U = 25337.5$, $N_1 = 91$, $N_2 = 738$, $p = .001$, two-tailed; $U = 15416.5$, $N_1 = 50$, $N_2 = 779$, $p = .013$, two-tailed). Confirming the correlations we already reported above, we see that UST scores for participants who indicated never to skip nor skim passages were significantly higher than those who did say they skim and skip (resp. $U = 68013.5$, $N_1 = 91$, $N_2 = 655$, $p = .001$, two-tailed; $U = 90353.5$, $N_1 = 321$, $N_2 = 508$, $p = .008$, two-tailed). In addition, and unexpectedly, we see that those participants that say they skip and skim passages that contain "too obvious information" score *higher* on the UST (resp. $U = 71611.5$, $N_1 = 207$, $N_2 = 622$, $p = .015$, two-tailed; $U = 25337.5$, $N_1 = 91$, $N_2 = 738$, $p = .001$, two-tailed). In sum, all these results taken together do support our third hypothesis.

Table 5 Correlations, means (M), and standard deviations for the main variables.

* Indicates $p < .05$, and
** Indicates $p < .01$.

VARIABLE	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. ART	16.47	8.88												
2. Sustained attention & perseverance	3.83	.69	.169**											
3. Difficulty with multitasking	3.04	1.08	-.051	.280**										
4. Absorption	4.14	.63	.104**	.485**	.124**									
5. Frequency	5.74	2.60	.319**	.134**	.072*	.112**								
6. Length	6.12	2.44	.339**	.312**	.015	.208**	.144**							
7. Skimming	1.88	.73	-.119**	-.123**	-.006	-.041	-.210**	-.067						
8. Skipping	1.49	.61	-.096**	-.146**	-.019	-.061	-.131	-.132	.511**					
9. Reading for the plot	3.29	.84	-.139**	.118*	.047	.054	-.013	.095**	.041	.012				
10. Reading for immersion	4.21	.60	.063	.071	-.063	.066	.074*	.148**	.027	-.036	.262**			
10. Reading for aesthetics	3.70	.63	.133**	.197**	.083*	.168**	.178**	-.039	-.045	-.017	.024	.049		
11. Reading for knowledge	3.99	.98	.042	.107**	-.020	.093**	.050	-.038	-.023	-.091*	.058	1.89**	.287**	
12. UST	9.48	6.61	.389**	.142**	-.023	.138**	.168**	.185**	-.116**	-.105**	-.051	.042	.124**	.115**

INDEX	GROUP	N	U	P (2-TAILED)	MEDIAN	RANGE
Long landscape descriptions	Yes, do skim	299	83886.5	.159	9.0	35
	Do not skim	530			9.0	38
Long dialogues	Yes, do skim	42	13934.0	.086	7.0	21
	Do not skim	787			9.0	38
Long or detailed character descriptions	Yes, do skim	133	43581.0	.284	8.0	29

Table 6 Particular skimming behavior as related to median scores on the Unscrambling Sentence Test (UST).

(Contd.)

INDEX	GROUP	N	U	P (2-TAILED)	MEDIAN	RANGE
Violence	Do not skim	696			9.0	38
	Yes, do skim	105	42073.0	.076	10.0	38
Too many details	Do not skim	724			9.0	37
	Yes, do skim	216	66729.5	.862	9.0	38
Too complex language	Do not skim	613			9.0	35
	Yes, do skim	91	25337.5	.000	7.0	24
Too obvious information	Do not skim	738			9.0	38
	Yes, do skim	272	84478.5	.007	10.0	38
When the text is too long	Do not skim	557			9.0	37
	Yes, do skim	77	31552.5	.193	10.0	26
I never skim	Do not skim	752			9.0	38
	Never skim	174	68013.5	.000	11.0	35
	Do not skim	655			8.0	38

INDEX	GROUP	N	U	P (2-TAILED)	MEDIAN	RANGE
Long landscape descriptions	Yes, do skip	175	58227.5	.721	9.0	35
	Do not skip	654			9.0	38
Long dialogues	Yes, do skip	26	8190.5	.061	7.0	21
	Do not skip	803			9.0	38
Long or detailed character descriptions	Yes, do skip	78	26989.0	.252	8.0	29
	Do not skip	751			9.0	38
Violence	Yes, do skip	88	36282.5	.083	10.5	38
	Do not skip	741			9.0	37
Too many details	Yes, do skip	139	49275.0	.607	9.0	38
	Do not skip	690			9.0	35
Too complex language	Yes, do skip	50	15416.5	.013	7.0	24
	Do not skip	779			9.0	38
Too obvious information	Yes, do skip	207	71611.5	.015	10.0	38
	Do not skip	622			9.0	37
When the text is too long	Yes, do skip	54	20851.0	.965	9.0	26
	Do not skip	775			9.0	38
I never skip	Never skip	321	90353.5	.008	10.0	35
	Do not skip	508			9.0	38

Table 7 Particular skipping behavior as related to median scores on the Unscrambling Sentence Test (UST).

DISCUSSION

With regards to hypothesis 1, *Attentive reading of longer literary texts correlates with cognitive patience*, we found significant positive correlations between the UST and other measures: namely, the ART, self-reported reading frequency, SAP, and preference for longer texts. Negative correlations were found between UST and skimming and skipping behaviors. The strongest correlation we found was the one between the UST and the ART: The higher people score on print exposure, the higher they score on the UST. It might be the case that people who already have a higher ability to concentrate and persevere, who already have more patience, and better inhibitions, are attracted to reading as an activity that suits their cognitive capabilities. Alternatively, reading literature might offer a training in sustained, deep attention, which then furthers perseverance. More research (e.g., intervention studies) on attention and perseverance

in reading literature is needed to distinguish between these two explanations. The present study has found that a relation between reading literature and CP indeed exists (at least with respect to this particular task) and thus offers some tentative evidence for Wolf's (2018a) statement that reading literature is associated with CP.

Self-reported reading frequency was also positively correlated with the UST. This finding, again, would lend some credibility to the notion that frequent readers of literary fiction have a special capacity for CP (Wolf, 2018a). Last, a preference for *longer* texts was also positively correlated with the UST scores. Again, the direction of the causality is uncertain. Readers who are already good at CP might prefer longer texts and enjoy word puzzles; alternatively, engaging in sustained reading of literary texts on a regular basis might improve CP.

From our stepwise regression analysis, it became clear that age was also a positive predictor for UST scores. This finding aligns with studies that identify an age-related reduction in errors in sustained attention tasks, suggesting that sustained attention improves with age (Carriere et al., 2010). Across a lifespan, aging leads to a more strategic and slow response style that reduces the consequences of momentary task disengagement (Carrier et al., 2015). It has further been established that there is an inverse relation between age and daydreaming or mind-wandering, more specifically task-unrelated thoughts (TUTs) in vigilance tasks (Giambra, 1989). Still, caution is warranted when interpreting this finding. Middle-aged participants have likely received a different form of education compared to our younger participants (mostly university students). A greater emphasis on literary education and a higher load of compulsory reading of longer prose texts might have impacted their reading habits later in life.

A third, negative predictor of UST scores was self-reported skimming and skipping, which negatively predicted scores on the UST. This should not surprise us, as it is to be expected that readers who claim to often read superficially or skip fragments of text, would also score lower on CP (Wolf, 2018a). These findings lend evidence to hypothesis 1. Like the relation between CP and reading longer texts, this relation could work in both directions.

With regards to hypothesis 2, *A preference for texts that require sustained attention correlates with cognitive patience*, we performed a factor analysis of items related to reading preference which resulted in four different types of reader preferences: reading for aesthetics; reading for the plot; reading for knowledge; and reading for immersion. We found a positive correlation between the UST and reading for aesthetics, but not immersion. One reason for this finding is that the specific task for the UST relates to constructing syntactic structures, which might be considered an aesthetic task requiring in-depth comprehension. This result can be further explained by pointing out the difference between experiences of foregrounding and immersion in reading. Foregrounding is assumed to decrease processing fluency (Hakemulder and van Peer, 2015; Sanford and Emmott, 2012). Language that draws attention to itself defamiliarizes the things that are described, can cause prolonged reading time and increased depth of processing. The reader might be taken out of the fictional world for a moment and pay attention to the materiality of the language. Absorption, although it can co-occur with foregrounding (Bálint et al., 2016), works differently: Attention is oriented at the world of the story, and as a result, readers might lose awareness of their own context, the time and place as well as themselves (Kuijpers et al., 2014). Absorption thus engages with a slightly different mode of attention than reading for aesthetics: The latter might demand more effortful persistence, whereas the former might be more *automatic*. The UST engages the former mode of *deep* attention rather than the latter.

Reading for plot negatively correlated with the UST. This was to be expected: After all, the items of reading for plot, such as "I liked it because there was a lot of action," were closely related to entertainment and escapism, the "easy read," rather than the deep, sustained focus that characterizes CP. As with hypothesis 1, a stepwise regression analysis revealed age to be a factor influencing the UST score, next to reading for aesthetics as positive, and reading for entertainment as negative predictors. Although the relations are weak, these results support our second hypothesis.

To test our third hypothesis, *Preference to skim or skip text passages negatively predicts cognitive patience* we compared UST scores for participants that reported to periodically engage in skipping and skimming behaviors to those that did not. We chose to make one group out of all the participants that reported some degree of skimming, because we initially wanted to see

if there is a difference between self-reported skimmers alleged close readers, and the same with people who skip text, regardless of frequency. We found that skimmers and skippers scored significantly lower on the UST compared to those who indicated they do not skim or skip. Readers who skim and skip might do so because they lack CP, or a lack of CP might be the result of skimming and skipping habits over time.

Interestingly, we saw the reverse effect for skimming and skipping passages with “too obvious information,” with significantly higher UST scores for participants who skim or skip such passages than those who reported they do not. Unlike skipping or skimming in general, skipping or skimming irrelevant information can be considered a profitable reading strategy that is associated with successful reading. This has been argued before with respect to reading informational texts (Reader and Payne, 2007). When it comes to literary fiction, we surmise, there might be a strategy at work which is akin to the *satisficing strategy* (or *adaptive allocation of attention*) in reading for information, where readers move on when a piece of text does not yield sufficient new information (Reader and Payne, 2007). Only in this case, readers skim for novelty, for being surprised by original turns of phrases and manners of seeing the world, rather than purely for information. We can further contextualize this finding by looking at the additional reasons for skimming and skipping participants provided, where “poor quality writing,” and in particular “cliched formulations,” were repeatedly mentioned as leading to skimming, as well as “formulaic” or “predictable” plots. When we look at the answers filled in for the option “other reasons,” skipping can also be done for moral sentiments, like not being willing to be confronted with violence or explicit sexual content, or as part of a strategy of reading-for-plot: skipping ahead to see what happens, then going back for the details.

DISCUSSION UST AND ART

In general, while our analyses using the UST were able to confirm our three hypotheses, they also reveal that more work is needed to validate our behavioral measure: We cannot as of yet draw definite conclusions concerning CP on the basis of the UST. More conceptual work is needed to obtain a more precise definition of CP, which can be used to better evaluate to what extent the UST measures CP. Wolf (2018a) postulates close-knit relations between focused attention and delayed gratification which our analyses did not confirm. This could be explained by a lack of validity of our behavioral measure, but it could also point to shortcomings in the conceptual characterization of CP revealed by our behavioral measure. In addition, more empirical research is needed to validate the UST, to assess to what extent confounds impact its outcome as a measure of CP. However, that the UST measures a concept at least proximate to CP is hard to deny. We think that the UST, though in need of additional validation, is nevertheless a promising, comprehensive measure of CP.

The results of our regression analysis revealed that SAP and absorption were significant but weak predictors of UST scores. With respect to CP, this raises the question: Which of its aspects are measured by the items of the Grit Scale and by the AQ, and what aspects are measured by the UST? We contend that the UST not only covers the better part of the aspects of CP measured by the Grit Scale and by the AQ but also assesses other aspects of CP not covered by the self-report measures. In addition to perseverance and sustained, focused attention, CP also consists of other aspects, such as inhibition and delayed gratification (Wolf, 2018a). Inhibition is directly measured by the UST: To execute the task, participants are required to inhibit impulses to attend to something else or to quit the task altogether. Delayed gratification is also measured by the UST, since we did not inform participants how long the task would take and it was possible to continue indefinitely. In short, not only does our behavioral measure cover more aspects of CP than the items from the Grit Scale and the AQ but also it is an implicit measure, and therefore less susceptible to social desirability.

Moreover, there also seem to be some confounds in the self-report items from the AQ. Some of its items, like “I become shut off from the world around me when trying to solve a challenging problem” seem to measure a form of absorption at odds with CP, or at least not one that seems to be a strictly necessary component. In addition, some items measure other modes of attention besides the sustained, focused attention requisite for CP, like multitasking (“I am able to concentrate on more than one thing at the same time”) and being able to “return

with full attention to something after an interruption.” These cannot be assumed to be inverse measures of CP. These shortcomings of the AQ in measuring CP could partially explain the weak correlation between SAP and the UST.

Compared to other measures like self-report scales and book counting, the ART on fiction has been suggested to be a reliable indicator for lifetime print exposure, but also for linguistic abilities such as vocabulary test performance (Mar and Rain, 2015; Wimmer and Ferguson, 2022). Higher levels of print exposure (measured with ART as a proxy) were associated with higher sentence processing abilities and superior verbal ACT (standardized achievement test) performance (Acheson et al., 2008). The present study contributes another correlation: between ART scores and CP.

LIMITATIONS/FURTHER RESEARCH

The UST introduces a behavioral measure of CP. However, there are factors that might confound its workings, such as familiarity with canonical works of literature, since we used (relatively) well-known first sentences, knowledge and recognition of which might make the task easier, or at least more pleasant (which makes it easier to persevere). However, in scoring the UST, we could not consider how *correct* the sentences were, rather how long they persevered (non-serious attempts were excluded). Last, scores on the UST might be mediated by language skills. As we know that language skills correlate positively with the ART (Mar and Rain, 2015; Wimmer and Ferguson, 2022), this would explain how the ART partially works as a predictor for the UST, as those participants who score higher on the ART might be better at arranging words. As it has not yet been established to what extent CP in other domains is the same as CP while reading, future studies could consider using numbers or other non-verbal elements as the basis for a behavioral measure of CP. Another possible factor that may influence scores on the UST is time pressure: Some participants might have the ability to concentrate and persevere yet lack the time to perform to their full capacity on such a task. In a follow-up study, it might be worthwhile to control for the time spent per sentence, per participant.

For the present, exploratory study, we aimed at identifying broad correlations between different reading habits and modes of attention. We did not measure participants' skimming and skipping habits when reading online or using a digital medium, but when reading literary texts (without inquiring into the media that participants prefer to use for this reading). Further, comparative research might assess the effects of habitual skimming and skipping in digital media on CP during book reading. It should also take into account differences between prose and poetry, and genre differences.

When it comes to the assessment of skimming and skipping behavior, self-report measures have their own limitations. Readers might assess their own reading behaviors differently from what they are. For instance, some might believe they carefully read every word in a literary work and never skim or skip, while, in fact, reading research shows that this is highly unlikely (Faber et al., 2020).

In addition, the options provided as reasons for skimming and skipping are all to a certain extent subjective: Rather than positing “I skim when a text is over [a number of] words long,” we opted for “when the text is too long.” What is “too long” is, of course, different for every reader. The same applies to the option “too many details.” As a follow up to this exploratory survey study, more objective information should be solicited and triangulated with different reader types and reading motivations. Last and perhaps most importantly, future research is needed to examine how readers modulate between different modes or strategies of reading and different modes of attention, beyond close reading and deep attention.

CONCLUSIONS

Our survey-based study showed that our behavioral measure of CP, namely the Unscrambling Sentence Test (UST), correlated with self-reported CP, absorption, print exposure (using an Author Recognition Test), a preference for longer texts, and self-reported reading frequency. Negative correlations were found between UST and skimming and skipping behaviors. We expected that attentive reading of long and challenging literary texts correlates with CP, whereas a preference to skim or skip text passages negatively predicts CP. We were able to

find preliminary evidence for these claims. It is important to stress that our findings here are correlational; hence we cannot draw any conclusions about causation. As noted in the discussion section, there is a circular quality to our findings: Are (close or long-form) readers better concentrators, or do people with great abilities of CP like to read?

In sum, our results suggest that reading literature indeed correlates with cognitive patience although more work needs to be done on precise conceptual definition of CP. Avid readers of literary texts score high on perseverance and concentration, yet they are not necessarily close readers all the time: When “too obvious” information is offered, they skim or even skip text. Readers in this category might be more skilled than others at determining when to skim and when to close-read. From this we might infer that modes of reading and their associated forms of attention are more entangled in reading literature than current research might suggest, although future studies are needed to examine how these modes are combined. We underline the importance of continuing to improve these measures and being aware of the biases inherent to self-reports. We suggest that eye-tracking studies of long-form reading, combined with interviews and questionnaire measures, might offer insight into attentional modulation during reading, including the role of skimming and skipping.

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The authors have no competing interests to declare.

AUTHOR AFFILIATIONS

Inge van de Ven  orcid.org/0000-0001-7237-3779
Department of Culture Studies, Tilburg University, Netherlands

Frank Hakemulder  orcid.org/0000-0003-3923-8668
Utrecht University, NL; Reading Center, University of Stavanger, Norway

Anne Mangen  orcid.org/0000-0002-3415-1881
Norwegian Reading Center, University of Stavanger, Norway

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