# Written Performance Indicators from Experienced Creative Writers

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Abstract: Experienced creative writers (n=10) participated in an observational eye tracking study with corresponding video and cued retrospective response interview. The eye tracking data and video informed the subsequent interviews focused on identifying written performance indicators. The following question guided the study: What performance indicators from experienced creative writers can be surfaced through a combination of eye tracking, video, and cued retrospective response within an ecologically grounded writing task? Triangulation of the data yielded 10 experienced creative writing performance indicators. Performance indicators from these experienced creative writers are notably combinatorial and map onto cognitive functions such as long-term working memory, phonological loop, and visuospatial activity in writing. Experienced creative writers also purposefully create the conditions for dispositionally guided text production.

Keywords: performance indicators, creative writing, eye tracking, cognitive functions, dispositional writing

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## 1.   Introduction

What are the hallmarks of writing experience in the writing process?

This question resides centrally within the history and current state of research on writing. Experienced writers (often called "expert" in the literature) display working habits that differ from beginners. Experienced writers, for example, use writing to construct new knowledge and be transformed by their own writing (Bereiter & Scardamalia, 1987; Galbraith, 1999). Experienced writers demonstrate an advanced ability to use fluent language generation and possess content and skill knowledge of writing beyond that of beginners (McCutchen, 2011). Increased flexibility (Rose, 1980), time spent on revision (Sommers, 1980), and advanced strategies of error detection (Dūdūyan et al., 2006) and self-regulation (Graham & Harris, 2000) signify recursive approaches to writing compared to beginning or struggling writers who are typically rule-bound and serial in their approaches. Drawing from models of working memory (Baddeley, 1986) and long-term working memory (Ericsson & Kintsch, 1995), researchers on writing argue that domain-specific knowledge of writing allows experienced writers to avoid working memory overload and to utilize long-term working memory as a result of automated experience (McCutchen, 2000; Kellogg, 2001, 2006; Olive, 2011; Kellogg et al., 2013). A recent study also shows that pausing behaviors during writing differ based on writing experience (Ivaska et al., 2025). Clearly there is value in studying experienced writers as they potentiate performance indicators not yet available to novices (or at least not to the same degree) which may yield a more nuanced view of the cognitive tasks associated with writing.

This question about the indicators of experience in writing can further be refined to: "What are the hallmarks of *creative* writing experience in the writing process?" This refinement is especially useful when considering expertise in genres of writing as domain-specific (Kellogg, 2006) and residing within specified knowledge communities (Routarinne et al., 2023). For the purposes of this study, "creative writing" references specific genres of writing and features writers purposefully writing within creative domains. All of the writers in this study self-identified as creative writers and were actively writing within three common creative writing genres; more specifically, 7 writers were writing fiction, 2 writers were writing creative non-fiction, and 1 writer was writing a combination of prose and poetry.

Within the rather amorphous field of creative writing where observational and empirical studies are not the norm, a case is made that experts differ from beginning writers through a voluminous history of interviews with expert writers (for representative examples see Pack & Parini, 1991; Boynton, 2005; Paris Review, 2006) as well as essays and books on writing craft by expert writers (for representative examples see Gardner, 1983; Oates, 2003; King, 2010). In surveying such literature on the writing process within the field of creative writing, a de facto stance toward expertise persists, namely, that expert creative writers possess metacognitive writing knowledge that provides insight into

the creative writing process. The burgeoning field of Creative Writing Studies (CWS) has made more directed forays into the differences between experienced and novice creative writers, arguing, for example, that experienced creative writers possess higher levels of declarative and procedural knowledge, motivation, self-regulation, complexity of processes, and rely more heavily on recursive and automated processes than novice writers (Syrewicz, 2021). While empirical studies on creative writing expertise are admittedly scarce, there are notable exceptions utilizing such methods of data collection as think-aloud protocol (Peskin, 2019) and fMRI (Erhard et al., 2014; Liu et al., 2015; He et al., 2022). No studies on creative writing expertise were found utilizing eye tracking methods.

The advent of new technologies such as eye tracking, keystroke logging, electrodermal activity (see Fadaei et al., 2024) and fMRI have led to new methods of data collection as we can now see the writing process unfold in real-time in ways that were previously inaccessible. Innovative technologies mean we must develop new ways of understanding what we are seeing as well as offer a corresponding terminology to create an agreed upon language for sharing and discussing findings. The stated purpose of this article, then, is to explore the following question: What performance indicators from experienced creative writers can be surfaced through a combination of eye tracking, video, and cued retrospective response within an ecologically grounded writing task?

This article opens with an overview of the practical and theoretical background of the current study followed by a description of the methods and procedures of data collection. Ten performance indicators from the experienced creative writers are then described and illustrated with data. Future directions are offered focusing on written performance indicators that are more generally cognitive and prospective in nature. A discussion section follows with implications for research on experienced creative writing and, finally, limitations of the study are provided.

## 2. Practical and Theoretical Background: Design Principles

The design of the present study is informed by both practical (i.e., previous studies) and guiding theoretical design principles. A previously conducted interview study with experienced writers (n=60) across writing domains informed the current study design. This previous interview study featured qualitative interview analysis of experienced writers and provided overarching insights into the nature of experienced writing and writing pedagogy across disciplines (Wirtz, 2016, 2024). Building from this previous interview study, four design principals inform the current study that will be discussed in turn: (1) minimizing the effects of retrospection; (2) a focus on experienced creative writers; (3) an emphasis on ecological validity; and (4) a view of data as co-constructed and convergent.

The first design principal is to minimize the effects of retrospection. While the interview method offers rich, descriptive data, it is limited when researching written performance indicators. To attain a more accurate picture of written performance

indicators, the current study seeks to minimize retrospection by consulting empirical data from eye tracking and video to conduct interviews in a more specified, thorough manner. To illustrate, the previous interview study posed open-ended questions to interviewees such as: "What does your revision process look like?" While yielding detailed responses, such questions invariably rely upon generalization. Contrast this with a question based around revision from the current study: "We can see that you make your first review of what you have written so far followed by several revisions after 2 minutes and 48 seconds. What prompted this review and revision?" As another example, the previous interview study posed the following question to interviewees: "When do you know when a piece of writing is finished?" Contrast this question with a question from the current study that is able to reference data alongside an artifact of actual writing: "After writing for 45 minutes we can see that you conclude your writing session at the end of a full paragraph on the bottom of page three before reviewing a page of text both before and after this paragraph for 1 minute. Why did you decide to end the writing session here in this manner?" While retrospection is still present, the empirical eye tracking and video data direct the interviewee's attention to actual events taking place during the writing session. The fact that the writing event is viewed by both the participant and researcher together in real-time is another means of increasing the veracity of self-report and minimizing the effects of retrospection.

A second design principal is to focus on experienced creative writers. Participants (n=10) were selected based on creative writing experience in order to surface operating units more likely derived from expertise. At minimum, participants were enrolled in a nationally recognized Master of Fine Arts (MFA) program in creative writing. Participants also demonstrated experience through publications, awards, and/or teaching other creative writers. Of significance to an eye tracking study design, all of the writers in the present study are monitor gazers as opposed to hunt-and-peck typists. Monitor gazers are writers who, based on typing experience, do not spend time focusing on the keyboard while typing. This provides more robust eye tracking data as the eye tracker is able to capture uninterrupted eye movements on the screen rather than missing gaze patterns while writers hunt for the correct keys. Additionally, the writing sessions were all conducted on one open document at a time as opposed to other domains of writing that may rely on several open documents to conduct searches, locate references, consult source work, etc. Again, for the purposes of capturing eye tracking data, being able to view gaze patterns continuously on a single open document is preferable for the purposes of this study (i.e., identifying and describing written performance indicators).

A third design principle was to maintain the ecology of the writing event. First and foremost, an ecologically valid paradigm was chosen because some observations may only emerge under such conditions (Liu et al., 2015). Ecological validity is maintained in a study design in order to best describe phenomena that takes place in natural settings (Berkowitz, 2010; Brewer, 2014). Constraints were limited so that writing session would not be overly scripted. More specifically, writers were asked to work on a self-generated

problem-solving task as opposed to a scripted/given problem-solving task. Experienced writers are also more apt to participate in a research study if they are allowed the flexibility to work on their own writing projects, marking a link to motivation. An aim of this study was to enable writers to enter into a flow state (Csikszentmihalyi, 1990; Perry, 1996; Kellogg, 2006) to observe performance indicators in an authentic experience of writing. Another factor in designing the ecology of the writing sessions was the time allotted for writing. Writers were told they could write for as long as they wanted. This contributed to the design goal of ecological validity because writers were able to work themselves into a state of flow. As one writer corroborates: "I think it took me a page and a half to get my voice or get my actual momentum going." Finally, it must be stated that designing an ecologically grounded study is an ideal, not a certainty.

A fourth design principle holds that data is co-constructed and derives from converging sources. This design principle was especially relevant in the use of cued retrospective response interview where the creative writers themselves were asked to comment on the eye tracking data. This convergence of quantitative and qualitative data sets, as has been noted by researchers using keystroke logging methods (Leijten & Van Waes, 2013), enables researchers to achieve understandings of cognitive processes in the data that may otherwise remain unknown. Such alignment of writing behaviors and cognitive processes is best achieved through data triangulation (Vasylets & Marín, 2025). Notably, co-construction of insights around data is bidirectional as the researcher in this study was able to signify performance indicators the writers had not previously consciously considered. Furthermore, there are cognitive processes involved in writing that remain implicit to writers and are therefore unlikely to surface in verbal protocols alone (Hayes & Flower, 1980; Hacker et al., 2017).

## 3. Procedures and Methods of Data Collection

There were three main movements to the study: (1) initial discussion and outline of the study with participants; (2) the writing event captured with video and eye tracking technology; and (3) the cued retrospective response interviews. After participants identified a preferred location and time, the writing session was conducted on a ThinkPad laptop with eye tracking analysis software pre-downloaded and a Gazepoint GP3 HD 150Hz eye tracker. For those writers working from an existing project, the writing project was also pre-downloaded onto the laptop. After confirmed calibration with the eye tracker, participants wrote for as long as they chose resulting in a mean of 54.9 minutes with a standard deviation of 22.2 minutes. Data from the writing session was coded using qualitative content analysis (Atkinson, 2020) based on the following question: What performance indicators are surfaced in the eye tracking and video data? In other words, to flesh performance indicators out of data from the writing sessions, data was coded for written performance indicators using qualitative content analysis that also included insights from the writers themselves. After the writing session, the video of the writing session with eye tracking data was shared with participants. The shared video included

the working document with overlaid fixation map featuring fixation directions and durations as well as fixation ID numbers. The fixation map duration was set for 2 seconds meaning that each fixation point was displayed in the captured video for 2 seconds before disappearing from view. (Of note: Figures 2 and 3 in this article are examples of this 2 second window in view whereas Figure 1 is a collective fixation map without this 2 second duration setting). Also included in the video is a "gaze video" displaying the eyes and full-face of the participants as they wrote.

Along with the video an initial question was sent to prime the cued retrospective response interviews: "In watching the video what do you notice? Are there any surprises or questions that you have about the eye tracking data?" The retrospective interviews took place within one week of the writing session with preference given to in-person and synchronous online meetings but some being conducted via email. The actual data served as a locus of communication and discussion during the retrospective interviews where the eye tracking data was viewed to cue and structure the interviews. Along with conducting the interviews in close proximity to the writing sessions, viewing the eye tracking data with the participants during the interviews helped minimize the effects of retrospection. Finally, the cued retrospective response interviews were recorded and transcribed.

## 4.    Findings: Performance Indicators from Experienced Creative Writers

There are 10 performance indicators to be shared from the current study. Each performance indicator will be named, described, and illustrated with data. While some indicators are evident across all three levels of data collection (i.e., eye tracking, video, and retrospective response), some indicators are illustrated at one or two levels of data collection.

### 4.1. Re-reading as a recursive process

An initial question posed to the writers during the retrospective response interview session was: "In watching the video with the eye tracking data are there any surprises or insights that come to mind after seeing this video of your writing process?" A major theme in response to this question was the recursive nature of the writing process. Recursion between existing and emerging text is perhaps the most recognizable aspect of experienced creative writers as the following quotes from retrospective interviews illustrate:

> How recursive my process was, (re)checking sentences before and after the one I was focusing on. So, not only does a 'targeted' sentence for revision require attention to see if it ends up right, it struck me that I appear to look at the sentence before and after, like top and bottom slices of a sandwich, to make sure what comes before and after also read correctly/smooth enough to my liking.

I'm struck by how 'modular' the process appears to be. I keep looking back at the previous few lines as I type, and it seems that I look at the chunk of writing (paragraphs, mainly) as a sort of whole. There's recourse to what I've already written as I think about what I'm about to add. It's like a building, floor by floor.



*Figure 1*: Collective fixation points within a single paragraph
demonstrating re-reading as a recursive process

This recursive performance indicator is illustrated in the eye tracking data of experienced creative writers wherein fixation points are found to be recursive rather than serial. Figure 1 typifies the nature of re-reading as recursive and illustrates the non-linear production cycle of writing (Ulasik et al., 2025). The blue circles in figure 1 demarcate three fixation point ID numbers: 465, 331, and 149. It can be seen that fixation point 149 takes place toward the bottom of the paragraph while fixation points 331 and 465, which come later in time, are toward the middle and top of the paragraph under review.

The recursion between existing and emerging text is perhaps the most recognizable indicant of experienced creative writers. Experienced creative writers re-read the existing text more than beginning writers and time spent on revision is typically greater for experienced writers than beginning writers (Sommers, 1980; Horning, 2006; Caporossi & Leblay, 2011). As a case in point, one experienced writer composed an opening paragraph in 3:09 minutes. This writer then spent 4:25 minutes recursively re-reading and revising this opening paragraph. As a result, 40% more time was spent revising (re-reading and re-writing) than initial drafting.

## 4.2. Re-reading existing text with an a priori, albeit flexible, idea in mind for revision

Re-reading existing text with a flexible plan toward revision was particularly evident in two writers who were working on a text after receiving feedback from a group of trusted readers. This writer had recently received feedback from a graduate course in an MFA program:

I had gotten some feedback that the introduction needed to be tighter or more connected to my overall theme; the introduction seemed to be a stand-alone scene. So the last paragraph I was tying it to the rest of my thesis, or the writing, and it just made sense at the time to go back and re-read it and make sure that it flowed one to the next.

Notably, this writer's priorities shift as a result of this re-reading performance:

I thought I was going to do revision around the part where I talk about the dancing and preparing food, that was the part that I needed to revise, and I did later on but when I gave it a read-through I realized that there were things that I could add at the beginning, the part about my grandfather, the part about my own personal history. Those came up in the first few pages and I realized that needed to be flushed out first before I got the part that I thought was the one that needed the most revision.

Another writer, also working in reaction to feedback, shares this experience of working within a writing group:

This is my process: the writing group listens to me read it aloud as they follow along reading a version on their computers. Then it's "round robin" where 8-12 people share what they thought was good, and what areas could be improved. I list all of the areas they suggest need to be improved and decide immediately if any are "off" (i.e., against my intentions for the piece, striking a line through them) But I do heed most feedback, and then, alone, re-read the piece and jot down in the margins where suggested changes may occur.

Just as the previous author notes, re-reading is generative of unforeseen changes because, as this writer says, "decisions have to be made." Re-reading with a flexible plan in place provides a working ratio of structure to flexibility for these writers.

### 4.3. Re-reading existing text to prime the content of emerging text

Data from the current study suggests priming takes place within two general areas: priming content and priming linguistic markers. Separated rather artificially here for the purposes of delineation, these two aspects of priming are typically combinatorial. As poet William Olsen (2008) succinctly shares in a previous interview study: "If it doesn't sound good it probably has no meaning and if it has no meaning it probably doesn't sound good." What does re-reading the existing text to prime the content of emerging text look like? Here is an explanation from a creative writer in the current study:

I think as I write, which means that the concepts shift… Sometimes I go into it having an idea on how I want it to end, but when I don't, I reread the entire piece to try and imagine what the logical flow of events might be. Especially in the case where I have an ending in mind, but I don't know how to get to the ending, I have to do a lot of re-reading.

Another writer speaks to this practice of using the existing text as a prime as well: "If I'm stuck and I don't know what to write next I'll re-read the paragraph before that hoping that by the time I get to the part I'm stuck something will flow." A third writer exhibited traits of priming for content as the eye tracking data showed a pause in writing emerging text to conduct a re-read before continuing with emerging text. After asking the writer to explain the thinking behind this process of writing emerging text, re-reading existing text, and then returning to emerging text the writer says:

> I've written myself to a place where I realize I am momentarily lost, where narrative itself cannot guide me forward. This could be narrative weakness. Or a brief exhaustion of imagination. I may have strayed outside the necessary parameters of the narrative that has emerged.

This writer concludes that re-reading existing text to inform emerging text is a means of "making sure I haven't strayed outside the bounds I've already written or implied." Overall, there is evidence to support re-reading existing text as a performance strategy to help prime the content of emerging text.

### 4.4. Re-reading existing text to prime the linguistic markers of emerging text

Similar to re-reading to prime content, several experienced creative writers discussed the performance indicator of re-reading to prime the linguistic markers of emerging text. One writer says "re-reading helps me find rhythm" and another writer calls such re-reading a search for "rhythmic linkage." A third writer goes into further illustrative detail of this performance indicator:

> In poems you want then to have a certain kind of energy, a rhythm, a momentum like you're looking for that meter, da, da, da, da, da, so maybe it's the same way that I approach my prose maybe I do those glances to make sure everything not necessarily looks right but feels right, has that da-da, da-da, da-da to me that makes me keep going because if I don't feel it like you've seen I'll erase it like "no this isn't right."

These experienced creative writers interchangeably use descriptors such as "rhythm," "energy," "momentum," and "feel" to express this performance indicator of using the existing text to prime the linguistic indicators of emerging text.

Re-reading to prime both content and linguistic markers are tied to the popular idea, especially within creative writing studies, that the writing leads the writer. As one writer shares, "The poems are like writing you which is so corny but it's so true." Using existing text to prime emerging text for both content and sound sheds light on this experience where the writer is purposefully positioned to be receptive to the text produced so far.

### 4.5. Subvocalizing

Subvocalizing refers to writers reading aloud or silently (with lip movements) during the writing process. This performance indicator was captured through video where the lip

movements of the writers could be seen as they re-read chosen selections of existing text. This performance indicator was often unknown to the writer as we see in this example:

> I did not know I did this. Strangely enough, I've become hyper aware now you've brought it to my attention, and actually noticed myself stating the first sentence in this response, "I did not know this." I think it is unconscious, and as such I have not been aware of it until now. On a related note, folks have told me periodically that I'm talking to myself…. I think it is an embodied manifestation of thinking something through.

Another writer who took advantage of subvocalizing as a performance strategy discussed its role in honing in on audience awareness:

> You're thinking about how it's going to sound to people when they read it. Another problem that I have is that I'll talk about something specific and I'll assume that my reader has all the background knowledge that I have so I have to think to myself "ok no, someone who hasn't read up on this very specific topic that you're interested in how can you still make it interesting and give them the background so that they understand?" I tend not to provide enough information. Or people want more. And I don't want to bore the reader either. I do think that was what was going on in my head when I was reading out loud.

Experienced creative writers subvocalize to deepen concentration, to think something through more meticulously, and to further enhance conceptualizations of audience.

### 4.6. Review without re-reading to provide a holistic representation of existing text

Eye tracking data consistently illustrate experienced creative writers reviewing both larger units of text (i.e., several pages) and smaller units of text (i.e., sentences and paragraphs) with such speed that conscious reading is unlikely, if not impossible. Additional characteristics point toward review without re-reading as the fixation patterns typically move from the point of emerging text back up through the existing text in the reverse order of reading; writers are also seen deploying right-to-left fixation patterns that further signify re-reading is not the primary performative process. That being said, the types of skimming, scanning, and spotting techniques deployed during review without re-reading are to be considered integral to a comprehensive understanding of reading. The delineation made here for the purposes of this study are between reading words and sentences in succession (i.e., from left-to-right and top to bottom), to fixation patterns that are clearly not reading words and sentences in such succession.

What is taking place during a visual review without re-reading? A common insight from the cued retrospective response interviews is that of taking a holistic approach to the text produced so far. As one writer relates: "I think what's happening is a quick check to make sure there's continuity. That the text flows at least in broad terms. I'm orienting myself." This writer continues: "I can only say that I think I'm scanning for continuity, for

reference. A semi-conscious process at most." Writers also describe this performance indicator alternatively as "skimming" and "taking it all in."

Figure 2 depicts a representative sequence of a holistic review without re-reading. In sequence (a) the writer is composing at the point of emerging text. Sequence (b) depicts the writer conducting a review without re-reading wherein the fixation durations become shorter (ranging from 0.23 to 0.396 seconds) compared to writing emerging text (ranging from 0.93 to 1.59 seconds).
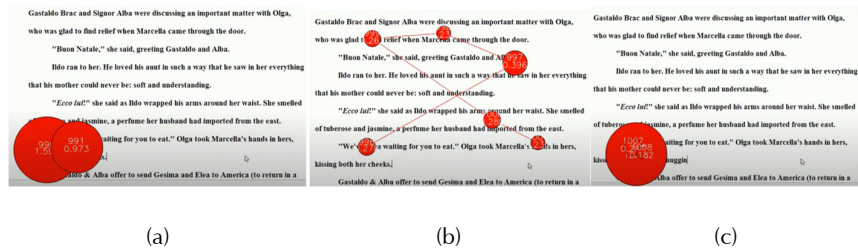


(a)                                   (b)                                   (c)

*Figure 2.* A sequence of gaze patterns with (a) writing emerging text followed by (b) review without reading then (c) a return to composing emerging text. Sequence (b) depicts three characteristics of review without re-reading: shorter fixation durations, a fixation pattern in reverse order to reading (i.e., moving from the bottom to the top of the page), and right-to-left fixation patterns.

The fixation directions during review without re-reading move from the emerging text at the bottom of the page to the top of the page and then back down again (see gaze IDs 996 through 1001) and contain right-to-left fixation patterns (see gaze IDs 997 to 999) that indicate re-reading is not the intended performance. Sequence (c) shows the writer return to compose emerging text following this holistic review without re-reading.

Review without re-reading is commonplace in the eye tracking data—a finding that came as a surprise to several of these experienced creative writers. While not sequential or chronological as would be expected during reading, these are not random fixation patterns. We can infer that they are purposeful rather than random because they lead directly to the creation of new text. Review without re-reading is characteristically holistic in nature, marked by visualizing a preceding selection of text as a unified whole as opposed to fixating on the sentence or word level of the writing where re-reading would be the expected performance.

### 4.7. Scanning (without re-reading) to identify distant points in the existing text to inform emerging text

Another performance indicator featuring review without re-reading in the data is experienced creative writers efficiently scanning sections of preceding text to find a targeted element of text that is then used to inform emerging text. This search-and-find is

quick and accurate. In a representative example, an experienced creative writer pauses at the point of emerging text to review a preceding line located 20 lines prior (and notably off-screen). The targeted previously composed line reads: "The fog was severe, thick." The writer then moves back to the point of emerging text 20 lines later to write: "The rain came." Figure 3 depicts this fixation sequence.



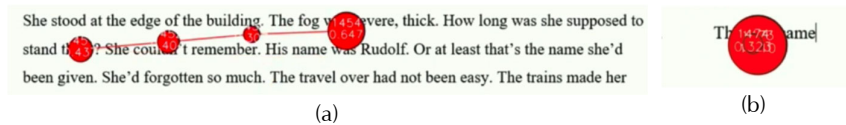(a)                                                            (b)

*Figure 3*: A sequence of gaze patterns depicting (a) the writer locating a targeted line of text followed by (b) the writer composing emerging text informed by the identified text.

The fact that this writer quickly and accurately targets a specific sentence from the text produced so far (i.e., "The fog was severe, thick") in order to inform the emerging text (i.e., "The rain came") is illustrative of experienced writers maintaining large swaths of text in memory. The intervening text—in this case 20 lines—is reviewed without re-reading. We can be certain of this since the 20 lines of intervening text are reviewed with such speed—2 seconds—that reading is simply not possible. Upon being asked about this review the writer confirmed that the fog being "severe" informed the emerging line: "The rain came."

As we see in both representative examples, review without re-reading is primarily aimed at informing emerging text. The former is a holistic review, a type of global check-in with preceding text to help orient the emerging text. The latter is an efficient and quickly executed search-and-find passing over intervening text without re-reading to locate an item of text with specified bearing on emerging text.

### 4.8. Use of placeholders

Writers utilize linguistic markers as placeholders when they do not have the optimal word or sentiment in the current moment but do wish to continue producing text following the placeholder. Here are two examples from different writers in the study:

It had a -------.

…and Harold started college [more].

Both of these linguistic markers—the former using several dash marks and the latter using brackets to insert a note—are performance indicators that informed the cued retrospective response interview questions. Upon being cued to the use of placeholders, the first creative writer responded: "The dashes basically mean 'come back later.' I know this doesn't sound right but I don't want to get hung up on it right now. I just want to get the whole scene out and come back to it later." The second instance utilizing brackets elicited the following response:

> I know I wanted to add more, but my thoughts couldn't quite materialize around exactly what I needed to add. Instead of rushing or putting in the first thing that came to mind, this strategy of inserting "[more]" serves as a pause mechanism, allowing myself time to generate satisfactory details about his college experience, what he studied, how it would be related to a future profession etc.

While the use of several dashes and the use of brackets are clear indicators of this performance indicator, writers also deploy placeholders that are not as evident in the text and therefore surface solely in retrospective accounts. One writer, for example, speaks to the use of "I don't know" as a placeholder. Further explanation is provided:

> I noticed in the first draft I say "I don't know" a lot and I'm not even truly convinced that I didn't know. I think "I don't know" was a placeholder for "I don't know how to talk about this right now."

The use of placeholders is a performance indicator well represented in both the written texts captured by the eye tracking videos and the cued retrospective response data with 30% of the participants deploying placeholders in their writing. The cued retrospective response data demonstrates that experienced creative writers knowingly deploy placeholders and the eye tracking data demonstrates the personal/idiosyncratic formatting of the placeholders.

### 4.9. Transitions between writing tasks

Given the ecological approach of the current study—specifically, writers choosing their own writing tasks as opposed to being provided a prompt to complete—there is evidence that experienced creative writers transition between writing tasks within a given writing session. Of the observed experienced creative writers in this study, 30% demonstrated a transition from one writing task to another during the writing session. For example, one writer began with a freewriting approach before shifting to a longer writing task—a novel in-progress. The opening paragraph illustrates this transition:

> Here we go. The fun begins. Doing this experiment. Or what my writing process looks like. Freewriting. Maybe it would make more sense to be working on an actual piece, maybe I should be. So…. Let's get to that eh?

This marks the transition into writing a chapter that the writer, admittedly, had been "putting off for a while."

Another writer spent 23 minutes on a given writing task before transitioning to another, unrelated writing task. This writer then spent 73 minutes on the second writing task. A third writer illustrates another example of transitioning between writing tasks. This writer used letter writing as a means to transition into the writing of a poem. After writing a letter to a friend for 19 minutes and 20 seconds the writer transitions into writing a poem. This transition into a poem—the stated purpose of the letter writing task—was abandoned and deleted. When asked about this the writer responded: "I'm very

meticulous. If it doesn't sound right, if I can't get the first line right, I just abandon it. … If it didn't trigger something past the first line it's not the right poem." In an ecologically grounded observational approach writers are free to move as they please and this study highlights that experienced creative writers clearly do this.

### 4.10. Echo writing

Experienced creative writers demonstrate the use of echo writing, a performance indicator especially evident in the initial stages of drafting, wherein the content of previously composed text is repeated with new linguistic markers. This performance indicator surfaces during the writing process when a writer begins anew with the same content in mind. In an earlier interview study with creative writers, Diane Seuss, winner of the 2022 Pulitzer Prize in poetry, describes this process as "writing the poem's shadow" (2008). The idea here is that—especially during early drafting—the writer oftentimes begins anew with the same content in mind, hoping to further refine the language and content with a renewed approach.

A poet in the present study illustrates this technique. In the cued retrospective response interview the process is described as: "I said all this but anyway let me see again what I was trying to get to." This experience of echo writing is subsequently described in further detail:

> I need to get it perfect or I can't keep going so that was probably an attempt number two. I totally screwed up that last one, nothing was right, I was bored of myself, I'm not fully convinced that this is what I had to talk to you about so let's try it again. It's like my revision, just completely starting over. They say, I think it's Dean Young, he's a poet, and Dean Young has a really hard time doing revision so rather than revise a poem he ends up just writing a brand-new poem and I think this is sort of that same idea. Rather than go back and work through all of that chaos I just did let's just do it over.

Particularly striking is that both incarnations of text—the first draft and its echo—are, as this writer shares, "definitely in conversation with each other." An excerpt from the corpus serves to illustrate this use of echo writing as the writer, after composing text for 20 minutes, drops down four lines to create distance from the text produced so far and begins a new line with: "Let's try this email over." The writer then proceeds to revisit, or "echo," several of the same subjects that were composed during the preceding 20 minutes of writing.

## 5.  Future Directions: Prospective Written Performance Indicators

There are written performance indicators from the data set that are more generally cognitive in nature, surfacing primarily through the qualitative interviews, and are therefore prospective. These indicators provide direction for future study as they require additional empirical data to clarify.

The first of these prospective writing indicators is attentional control. Attentional control is a type of purposeful self-regulation (Graham & Harris, 2000) during writing that presents in three ways: (a) identifying when to start writing; (b) identifying where to focus cognition during the writing session; and (c) identifying when to stop writing. Data from the current study captures writers identifying where to focus cognition during writing via transitions between writing tasks and deciding where in a writing project to focus cognition. Several writers chose to focus writing within targeted areas of the text produced so far whereas other writers focused primarily on emerging text. One writer, for example, presented evidence of attentional control by moving away from an intended writing task, stating: "I don't have the emotional capacity for this right now." This writer was able to move to another location in the text to begin writing where the emotional and cognitive capacity was not currently lacking. Data also presents writers identifying when to stop writing. For example:

> I had an hour [to write] and I wrote for 40 minutes and I like to end on a high note so that I can come back to it so I felt like I had really gotten a good amount out with the grandfather part that I went back and there were some things that needed to be added but the next part, the next very big part was … and I didn't feel like 20 minutes was enough. I felt like I would need another 40 and I didn't want to, that was going to be something that I had to sit with and look around and think before I did it and I was like "No, 20 minutes just isn't enough and I'm going to get frustrated if I try to force it. I suppose I could have. That's another strategy to go for the full hour but I felt good with what I had accomplished and good with the form the essay was taking and I like to finish my writing sessions feeling accomplished.

These experienced creative writers also indicate a realization of implicit cognition at work within their writing process. One writer, for example, was able to differentiate processes that were conscious from those that were implicit: "The spaces and the talking out loud, that I know that I do and it's helpful, that's a method I have, but as far as paragraph construction I'm like 'nope, that just happens.'" Another writer speaks to the close connection between implicit and explicit written performance: "Now that you've identified that I do that I feel like I did know it on an unconscious level. Effectively, I think the answer is no [I did not realize I do this], not really. But again, your identification of it feels so accurate that I feel like I knew." Additionally, a few of these experienced writers responded to questions with "I don't know" or "I did not know I did this" when asked to speak to the empirical data; these writers are, in fact, quick to admit they do not have a conscious understanding of all aspects of their writing process.

> It's worth highlighting here the previous interview study conducted with experienced writers across domains consistently surfaced this notion of writers being aware of implicit cognition as a necessary ingredient in the writing process. A few examples illustrate the point:

It's something I know and can't say (James Gee).
I don't know what the dynamics of it are (Mike Rose).

I used to think invention was more explicitly controllable. I don't think that anymore (Julie Lindquist).

I can't explain it (Mariah Fredericks).
I don't know what my brain does (Simone White).

This awareness that the writing process involves more than conscious processes alone is taken as a type of de facto understanding of the writing process with these experienced writers. Here is a creative writer from the current study speaking to their understanding of the differences in approach that a creative writer assumes when writing: "I think writers sometimes write with their elbow and the logic isn't necessarily an inside logic that non-writers would get. It's more of an emotionally driven or emotionally charged instinct." This writer surmises, "There's a fluidness that I subconsciously am trying to get at." Writers also speak to using writing as a means to surface implicit cognition: "This was just to get the thoughts out and start thinking about what is taking shape in my mind."

A third prospective performance indicator is incubation. Incubation presents anecdotally in the literature within the field of creative writing (i.e., author interviews and books on writing) but little has been done to research this phenomenon with observational or experimental methods (for exceptions see Wallas, 1926; Peskin, 2019; Atkinson, 2020). In the current study, incubation arguably presents within the performance indicators of placeholders and attentional control as writers utilize pause mechanisms and changes in direction to allow for the positive effects of incubation. There is also a potential argument to be made that incubation can take both short and long-form. Short form incubation are practices that enable incubation within a given writing event whereas long-form incubation spans across writing events (i.e., the gains in perspective authors speak to after coming back to the writing days or even months later).

To reiterate, data pointing toward these prospective written performance indicators is primarily qualitative in nature. Further empirical study is needed to corroborate and refine.

## 6. Discussion

A hallmark of experience in creative writing is the combining of written performance indicators. While the purpose of the current study is to differentiate performance indicators, it is evident that experienced creative writers weave performances while writing. This finding is supported in the literature on experienced writing. As noted by Bereiter and Scardamalia (1987): "We know that mature writers, left to their own devices, will often intermix planning with production" (p. 211). In the current study, priming for content and priming for linguistic markers presents as combinatorial. As one writer

shares: "I want the writing to read "correctly/smoothly enough to my liking." This connection between "correct" and "smooth" is to bring together both content and linguistic markers associated with the composed text. As another example, cognitive reserve and transitions into new writing tasks are also commonly paired performance indicators. Cognitive reserve (or lack thereof) dictates transitions within a writing project from one section of text to another as well as movements between writing projects. A larger umbrella term of self-regulation (Graham & Harris, 2000) brings these performances together under a more broadly conceived moniker.

There are also performance indicators in the current study that map onto executive functions (for a review of executive functions in writing, see Limpo & Olive, 2021). For example, subvocalizing presents as a performance indicator taking advantage of the phonological loop as a cognitive aid to writing. If articulatory suppression (e.g., asking writers to produce an irrelevant speech act while writing) interferes with the phonological loop (Hayes & Chenoweth, 2006; Kellogg et al., 2013), it follows that subvocalizing— slowing down to read existing text aloud—operates as an aid to focused cognition. The two purposes given in the data for the use of subvocalizing (i.e., general increase in attention and a heightened consideration of audience) indicate use of the phonological loop to support cognition during writing.

Review without re-reading is another performance category that presents well with executive functions. The efficient search and find wherein existing text is passed over without re-reading is emblematic of the affordances of long-term working memory (Ericsson & Kintsch, 1995; McCutchen, 2000; Olive, 2011). This ability of writers to hold expansive lines of text in memory may signify long-term working memory developed as a result of experience. The fact that 60% of these experienced writers chose to work on existing projects with which they had significant prior experience provided an opportunity to view such enactments of long-term working memory. Additionally, both representative performance indicators associated with review without re-reading present writing as integrating visuospatial activity. Olive and Passerault (2012) argue that the visuospatial dimensions of writing, expressly for experienced writers, provide an auxiliary memory to facilitate such tasks as conducting an efficient search as well as provide a holistic representation of the working text. Data from the current study offers illustrative examples in support of both claims.

Experienced creative writers also purposefully create the conditions for dispositionally guided text production (Galbraith, 1999). Dispositionally guided text production references the use of non-planned, spontaneous text production to elicit implicit, bottom-up cognition via writing. Dispositional writing is similarly linked to discovery (Emig, 1964, 1977; Britton, 1978; Murray, 1978; Galbraith, 2009, 2015; Baaijen & Galbraith, 2018), freewriting (Elbow, 1973), free-association and free-thinking (Peskin, 2019), and defocused attention (Liu et al., 2015). Dispositionally guided writing contrasts with top-down, explicit, problem-solving, rhetorical approaches to writing. When experienced creative writers are enlisted and ecological validity is premised,

performance indicators surface that are directed toward dispositionally guided text production. Re-reading with a flexible plan in place for revision, priming, review without re-reading, and implicit cognition are performance indicators supportive of the thesis that experienced creative writers purposefully create the conditions for dispositionally guided text production. Research on the cognitive functional connections underlying creative writing performance support these findings and argue that expert writers can more efficiently suspend executive cognitive controls in the prefrontal cortex (Liu et al., 2015) and access default networks (He et al., 2022) to facilitate dispositional writing.

## 7.  Limitations

A larger pool of participants in the current study would serve to both surface new performance indicators and to support or amend the indicators presented. Although this study seeks to identify performance indicators from experienced creative writers, a lack of contrastive data is a limitation. There is also a need for further explication of performance indicators not named in this study such as deleting existing text. Deletions vary in severity from single letter or word replacement to deletions of paragraphs and pages. Finally, as has been mentioned, empirical data is needed to support, amend, or refute the more prospective writing performances named herein.

Further understanding of how choices in data collection and participant selection affect findings would enable more robust categorization of written performance indicators. For example, to what extent does writing experience affect the presentation of performance indicators? To what extent should experience/expertise in writing be considered domain-specific? What method(s) of data collection best maintain ecological and empirical validity? What methods best potentiate empirical data to illustrate the more prospective, qualitative and cognitively grounded written performance indicators? Most relevant to the current study, a consistent, agreed upon terminology of written performance indicators would positively impact research on writing. Above all, researchers on writing should strive to maintain a healthy ecosystem wherein writers learn more about their practices, researchers learn more about cognition behind writing, and writing pedagogy is informed.

## References

Atkinson, D. (2020). Engaging in textbook writing as deliberate practice: How two expert ELT textbook writers use metacognitive strategies while working to sustain periods of deliberate practice. *Journal of Writing Research*, *11*(3), 477-504. https://doi.org/10.17239/jowr-2020.11.03.03

Baddeley, A. D. (1986). *Working memory.* Oxford University Press. https://doi.org/10.1017/s0033291700025228

Baaijen, V. M. & Galbraith, D. (2018). Discovery through writing: Relationships with writing processes and text quality. *Cognition and Instruction, 36*(3), 199-233. https://doi.org/10.1080/07370008.2018.1456431

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition.* Lawrence Erlbaum. https://doi.org/10.4324/9780203812310

Berkowitz, A. (2010). *The improvising mind: Cognition and creativity in the musical moment.* Oxford University Press. https://doi.org/10.18061/emr.v7i3-4.3746

Boynton, R. S. (2005). *The new new journalism: Conversations with America's best nonfiction writers on their craft.* A Vintage Books Original.

Brewer, M. (2014). Research design and issues of validity. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 3-16). Cambridge University Press. https://doi.org/10.1017/cbo9780511996481.005

Britton, J. (1978). The composing processes and functions of writing. In C. R. Cooper & L. Odell (Eds.), *Second language discourse: A textbook of current research* (pp. 13-28). Ablex.

Caporossi, G., & Leblay, C. (2011). Online Writing Data Representation: A Graph Theory Approach. In J. Gama, J., E. Bradley, & J. Hollmȳn (Eds.), Advances in Intelligent Data Analysis X. *Lecture Notes in Computer Science, 7014.* Springer. https://doi.org/10.1007/978-3-642-24800-9.

Csikszentmihalyi, M. (1990). *Flow: the psychology of optimal experience.* Harper Perennial.

Dȳdȳyan, A., Largy, P., & Negro, I. (2006). Mȳmoire de travail et dȳtection d'erreurs d'accord verbal: Ȳtude chez le novice et l'expert [Working memory and detection of verbal agreement errors: A study in novice and skilled writers]. *Langages, 164*, 57-70. https://doi.org/10.3406/lgge.2006.2672

Elbow, P. (1973). *Writing without teachers.* Oxford University Press.

Emig, J. (1964). The uses of the unconscious in composing. *College Composition and Communication, 15*(1), 6-11. https://doi.org/10.2307/355938

Emig, J. (1977). Writing as a mode of learning. *College Composition and Communication*, 28, 122-128. https://doi.org/10.2307/356095

Erhard, K., Kessler, F., Neumann, N., Ortheil, H. J., & Lotze, M. (2014). Professional training in creative writing is associated with enhanced fronto-striatal activity in a literary text continuation task. *NeuroImage, 100*, 15–23. https://doi.org/10.1016/j.neuroimage.2014.05.076

Ericsson, K. A., & Kintsch, W. (1995). Long-term working memory. *Psychological Review, 102*, 211-45. https://doi.org/10.1037/0033-295x.102.2.211

Fadaei, S., Jacques, T., & Alves, R. A. (2024). Effects of expressive writing and self-distancing on electrodermal activity during writing. *Journal of Writing Research*, *16*(2), 223–248. https://doi.org/10.17239/jowr-2024.16.02.02

Galbraith, D. (1999). Writing as a Knowledge Constituting Process. In G. Rijlaarsdam, E. Espȳret, M. Torrance, & D. Galbraith (Eds.), *Studies in Writing: Vol. 4. Knowing What to Write: Conceptual Processes in Text Production* (pp. 139-160). Amsterdam University Press.

Galbraith, D. (2009). Writing as discovery. *British Journal of Educational Psychology*, *2*(6), 5-26. https://doi.org/10.1348/978185409x421129

Galbraith, D. (2015). Conditions for writing to learn. *Journal of Writing Research*, 7(1), 215-266. http://dx.doi.org/10.17239/jowr-2015.07.01.09

Gardner, J. (1983). *The art of fiction: Notes on craft for young writers.* Vintage Books.

Graham, S. and Harris, K.R. (2000). The Role of Self-Regulation and Transcription Skills in Writing and Writing Development. *Educational Psychologist*, *35*, 3-12. http://dx.doi.org/10.1207/S15326985EP3501_2

Hacker, D. J., Keener, M. C., & Kircher, J. C. (2017). TRAKTEXT: Investigating writing processes using eye-tracking technology. *Methodological Innovations*, *10*(2), 1-18. https://doi.org/10.1177/2059799116689574

Hayes, J. R., & Flower, L. S. (1980). Identifying the organization of writing processes. In L. W. Gregg & E. R. Steinberg (Eds.), *Cognitive Processes in Writing* (pp. 3–30). Lawrence Erlbaum.

Hayes, J. R., & Chenoweth, N. A. (2006). Is working memory involved in the transcribing and editing of texts? *Written Communication*, *23*(2), 135-149. https://doi.org/10.1177/0741088306286283

He, R., Zhuang, K., Liu, L., Ding, K., Wang, X., Fu, L., Qiu, J., & Chen, Q. (2022). The impact of knowledge on poetry composition: An fMRI investigation. *Brain and language*, *235*, 105202. https://doi.org/10.1016/j.bandl.2022.105202

Horning, A. (2006). Professional writers and revision. In A. Horning & A. Becker (Eds.), *Revision: History, theory, and practice* (pp. 117-141). WAC Claringhouse.

Ivaska, I., Toropainen, O., & Lahtinen, S. (2025). Pauses during a writing process in two typologically different languages. *Journal of Writing Research*, *16*(3), 407-433. https://doi.org/10.17239/jowr-2025.16.03.03

Kellogg, R. T. (2001). Long-term working memory in text production. *Memory & Cognition*, *29*, 43-52. https://doi.org/10.3758/bf03195739

Kellogg, R. T. (2006). Professional writing expertise. In K. A. Ericsson, N. Charness, P. J. Feltovich & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 389-402). Cambridge University Press.

Kellogg, R. T., Whiteford, A. P., Turner, C. E., Cahill, M., & Mertens, A. (2013). Working memory in written composition: A progress report. *Journal of Writing Research*, *5*(2), 159-190. https://doi.org/10.17239/jowr-2013.05.02.1

King, S. (2010). *On writing: a memoir of the craft.* Scribner.

Leijten, M., & Van Waes, L. (2013). Keystroke Logging in Writing Research: Using Inputlog to Analyze and Visualize Writing Processes. *Written Communication*, *30*(3), 358-392. https://doi.org/10.1177/0741088313491692

Liu, S., Erkkinen, M. G., Healey, M. L., Xu, Y., Swett, K. E., Chow, H. M., & Braun, A. R. (2015). Brain activity and connectivity during poetry composition: Toward a multidimensional model of the creative process. *Human brain mapping*, *36*(9), 3351–3372. https://doi.org/10.1002/hbm.22849

McCutchen, Deborah. (2000). Knowledge, Processing, and Working Memory: Implications for a Theory of Writing. *Educational Psychologist*, *35*(1), 13-23. https://doi.org/10.1207/S15326985EP3501_3

Murray, Donald M. (1978). Internal revision: A process of discovery. In C. R. Cooper & L. Odell (Eds.), *Research on composing: Points of departure* (pp. 85-104). National Council of Teachers of English.

Oates, J. (2003). *The faith of a writer: Life, craft, art.* HarperCollins.

Olive, T. (2011). Working memory in writing. In V. W. Berninger (Ed.), *Past, present, and future contributions of cognitive writing research to cognitive psychology* (pp. 485-503). Psychology Press.

Olive, T. & Passerault, J.-M. (2012). The visuospatial dimension of writing. *Written Communication*, *29*(3), 326-344. https://doi.org/10.1177/0741088312451111

Olsen, W. (2008). Personal interview. 11 April. Pack, R. & Parini, J. (Eds.). (1991). *Writers on writing: A bread loaf anthology.* Middlebury college press. Paris Review (2006). *The Paris review interviews, vol. 1.* Picador

Perry, S. K. (1996). *When time stops: How creative writers experience entry into the flow state.* ProQuest Dissertations and Theses A&I. (304288035).

Peskin, J. (2019). Cognitive processes while writing poetry: An expert-novice study. *Cognition and Instruction*, *37*(2), 232-251. https://doi.org/10.1080/07370008.2019.1570931

Rose, M. (1980). Rigid rules, inflexible plans, and the stifling of language: A cognitivist analysis of writer's block. *College Composition and Communication*, *31*(4), 389-401. https://doi.org/10.2307/356589

Routarinne, S., Juvonen, R., & Pentikᴧinen, J. (2023). Developing writing across and in school subjects: Introduction to special issue. *Journal of Writing Research*, 15(1), 1-14. https://doi.org/10.17239/jowr-2023.15.01.01

Seuss, Diane. (2008). Personal interview. 8 July.

Sommers, N. (1980). Revision strategies of student writers and experienced adult writers. *College Composition and Communication*, *31*(4), 378-388. https://doi.org/10.2307/356588

Syrewicz, C. C. (2021). How do expert (creative) writers write? A literature review and a call for research. *New Writing*, *19*(2), 196-224. https://doi.org/10.1080/14790726.2021.2005631

Ulasik, M.A., Mahlow,C., & Piotrowski, M. (2025). Sentence-centric modeling of the writing process. *Journal of Writing Research*, *16*(3), 463-498. https://doi.org/10.17239/jowr-2025.16.03.05

Vasylets, O., & Marin, J. (2025) Linguistic and behavioral alignment in writing: A scoping review. *Journal of Writing Research*, *16*(3), 377-406. https://doi.org/10.17239/jowr-2025.16.03.02

Wallas, G. (1926). *The art of thought*. Jonathan Cape.

Wirtz, J. (2016). *The write mind for every classroom: How to connect brain science and writing across the disciplines*. Rowman and Littlefield.

Wirtz, J. (2024). Travel guide to the unconscious practices of creative writers. In M. Moore & S. Meekings (Eds.), *The Scholarship of Creative Writing Practice: Beyond Craft, Pedagogy, and the Academy* (pp. 35-46). Bloomsbury Collections. http://dx.doi.org/10.5040/9781350291027.ch-003