



Analysis of Narrative Arcs of College Writers' Creative Writing: Implications for Engaging Creative Writing Across the Curriculum

Justin Nicholes

University of Wisconsin-Stout

nicholesj@uwstout.edu

ABSTRACT

*Creative writing across the curriculum (CWAC) represents one especially meaningful college-writing experience in various settings in higher education (Nicholes "Creative Writing across the Curriculum"; Creative Writing across the Curriculum; Hanauer "Meaningful Literacy"). To further understand experiences of CWAC from the perspective of student authors, this study linguistically examined two sets of texts from undergraduate writers: 221 works of creative nonfiction (CNF) and 43 works of science fiction prototyping (SFP), composed in first-year and advanced writing courses at one predominantly White, public Midwest US polytechnic university. LIWC-22 was utilized to produce descriptive statistics characterizing the narrative arcs typical in each corpus, specifically quantifying use of words signaling story staging, plot progression, and cognitive tension typical in narratives per Freytag's foundational description (Freytag; Boyd, Blackburn and Pennebaker). Statistical tests of difference (independent-samples *t*; Mann-Whitney *U*) uncovered genre-specific arc trends between CNF and SFP stories, suggesting the unique experience of autobiographical CWAC.*

In a foundational writing-across-the-curriculum (WAC) study, UC Davis professor Dan Melzer analyzed over 2,000 writing assignments from 400 courses across various disciplines in 100 US higher-education institutions. Using categorizations of Britton et al. to code assignments as transactional (to show content knowledge to a professor), expressive (to express oneself), or poetic (to compose a literary genre for aesthetic-rhetorical ends), Melzer concluded that "poetic writing and expressive writing were almost non-existent" (104). This exclusion of poetic and expressive writing, for Melzer, warranted more attention in WAC pedagogy and scholarship; expressive and poetic writing, the argument goes, offer rhetorical-situational opportunities to expand writing repertoires. The present study is a response to this and related scholarship aiming to shed light on the

affordances of poetic composition for writers across higher education.

Creative writing studies (CWS) scholars have also considered questions of how poetic writing (more commonly known as creative writing, henceforward CW) can enhance writers' compositions on a larger scale in higher education. My concern here is how research related to creative writing across the curriculum (CWAC) may hold cross-disciplinary appeal. CWS scholars such as Donnelly have argued that CW pedagogy should embrace data collection and analysis. Such data, it is hoped, can be presented to stakeholders regarding, for instance, how CW supports the institutional priority of student learning, student engagement, and even possibly student persistence (Nicholes, *Creative Writing*). Other similar concerns are cross-disciplinary, with Clark arguing that CW's future lies, in part perhaps, in interdisciplinary scholarship and empirical research outside the CWS discipline.

While definitions of CW abound, expansive ones offer numerous entry points for CWS researchers. Generously defined by Brayfield, CW refers to both a discipline and its forms, which may be text-based, multimodal, and digital:

Creative Writing is a performance-based discipline in which students study and practice the art of imaginative writing. The forms that this writing takes include novels, short stories, poetry, plays, scripts, autobiography or lifewriting, travel writing and journalism. (202)

Within this definition, CW implies author intent and audience experience. It is writing in which genre conventions often linked to creative genres, such as those of fiction, poetry, and creative non-fiction, mediate an author's aesthetic and rhetorical intent. While the discipline of Creative Writing may be most popularly imagined as encompassing undergraduate and graduate coursework and programs, CWAC as a phenomenon reaches across disciplines. While not new as a topic (e.g., Peary), this phenomenon continues to be explored (Nicholes, "Creative Writing," *Creative Writing*) and provides another expansive framework for understanding empirical and pedagogical possibilities to spread the considerable wealth that is CW's possibilities.

Creative Writing Across the Curriculum (CWAC) as Meaningful Literacy

CWAC, as I have argued (Nicholes, *Creative Writing*), aims to offer meaningful and engaging writing experiences for usually novice CW authors, resulting in hoped-for outcomes of moments of insight, empathy, understanding, and engagement. This aim of a meaningful composition experience is perhaps more of a priority for CWAC scholarship and pedagogy than it is in the more familiar, traditional CW workshop—where the aim may be to enter aesthetic conversations and produce publishable writing. For CWAC, a major goal is introspection through CW as a mode of thought rather, or more so, than on the final product and its aesthetic ends as literary art. CWAC harnesses CW as an ancient (in the sense of the timelessness of storytelling), always-relevant, uniquely human(izing)

mode of thought and delivers it along a WAC-approach continuum including short-burst, ungraded writing (more writing-to-learn/to-engage-type writing) and longer, real-world type genres, such as science fiction prototyping (more writing-in-the-disciplines-type writing) (Palmquist).

CWAC can be defined broadly as “a pedagogical and empirical movement aiming at the development of learning, the communication of disciplinary concepts, and the construction of academic identities” (Nicholes, *Creative Writing* 15). As such, CWAC is a project in “applied literariness,” which has been defined by Hanauer (“Intermediate”) as the application of knowledge derived from empirical studies on reading or writing literary genres to “make the field of the scientific study of literature widely applicable and relevant for a broad constituency interested in promoting social understanding and engagement” (131). CWAC, then, synthesizes aspects of the fields of applied linguistics, CWS, and writing studies both for teaching and researching CW across contexts of learning (Nicholes, *Creative Writing*).

Numerous empirical studies have involved CW. Since this research tends not to build on other CW-related studies, I recently reviewed 130 such works of scholarship (Nicholes, *Creative Writing*). The result was a grounded theory of CWAC as meaningful literacy. Previous to this review, studies from applied linguistics and writing studies had defined meaningful writing as communication that writers perceived they owned and evaluated as relevant to their personal or professional lives (Eodice et al.; Hanauer, “Meaning Literacy”; Nicholes, “Science Fiction”). This review, I have argued (Nicholes, *Creative Writing*), nuanced a theory of meaningful literacy realized through CW, specifically determining that CWAC elicited, supported, or empowered the following:

- Mostly positive emotions
- Voice
- Identities
- Therapeutic effects
- Positive evaluations of CW as relevant literacy in learning contexts
- Community
- Ownership of the writing
- Empathy

In addition, CWAC was associated with the learning of course content and about oneself.

The Present Study

The topic of narrative arc analysis and the tools for psycholinguistic analysis are new and need descriptive studies to forward this line of inquiry to different narratives and the creative elements influencing narrative shapes—which are theorized as reflecting ways of telling narratives and experiencing narratives from the author and reader point of view. Describing CWAC experiences, it is hoped, will guide pedagogical and future empirical applications while providing insight into CWAC experiences, allowing us to calibrate assignments to maximize for rewarding, engaging processes.

In this study, I sought to extend CWAC and psycholinguistic scholarship by describing two CWAC genres: (a) creative nonfiction (CNF), specifically the academic life story, with its emphasis on autobiographical narrative arcs related to learning in general; and (b) science fiction prototyping (SFP), which is a genre of speculative fiction with real-world application that marshals fictive genre conventions for ethical forecasting. The text-analysis tool LIWC (Linguistic Inquiry and Word Count, 2022 version) enabled linguistic description.

A premise to the use of LIWC is that words writers use when composing reflects CWAC experiences. LIWC counts words and tallies them into psychologically relevant categories and has been robustly validated (Boyd et al.; Pennebaker et al.; Tausczik & Pennebaker). These CWAC genres have been explored elsewhere (Nicholes, “Developing Stem Interest,” “Science Fiction,” “Creative Writing”). Additionally, these genres have future imagining as an element—but where one is more impersonal (SFP) and asks for fictive characterization of imagined others, the other is profoundly personal and asks for (non)fictive characterization of oneself in the past, present, and imagined future (CNF).

Wendy Bishop (“Writing Is/and Therapy?”) observed that people in college taking CW courses did so often expecting self-exploration and the processing of life events and experiences, some of them traumatic or associated with uncertainty and tension. CWAC, as an empirical and pedagogical project, seeks to explore and apply findings derived from exploration of CWAC experiences. As reflected above, CWAC experiences have been theorized as meaningful literacy and relevant for learning in first-year and advanced writing coursework in US college contexts (Nicholes, Creative Writing). This study sought, then, to analyze words used in two sets of CWAC to shed light on CWAC experiences occurring while composing and revising, and to explore whether CNF as instantiated here systematically differed from SFP.

Boyd, Blackburn and Pennebaker have provided data using LIWC-22 suggesting that narratives arising from various rhetorical situations nonetheless share common narrative arcs—but also that creative elements unique to specific narratives may lead to signature arc features. Taking Freytag’s plot-structure description as a starting point, Boyd et al. (“The Narrative Arc”) specifically applied

LIWC-22 as a data-analysis tool to understand approximately 40,000 “traditional” narratives (e.g., short stories, novels, movie scripts) and 20,000 “nontraditional” narratives (e.g., Supreme Court judgments, TED talk video scripts, science-journalism compositions) (3). Addressing the question of whether different narratives shared similar arcs, Boyd, Blackburn and Pennebaker found that the “2523 fiction novels from the Gutenberg corpus, 2092 short stories from various online sources, and 14,419 brief stories written by internet users” (3) all shared similar plot characteristics measured by use of staging, plot-progression, and cognitive-tension words. Yet scholarship, the researchers suggest, is still needed: “While a generalized narrative structure was found to exist across tens of thousands of stories, great variability between narratives did exist, suggesting that a strong creative element influences a narrative’s deviation from the norm” (8). What unique creative elements imbue our CWAC assignments? This study addresses this question for the academic life story (a work of CNF) and SFP.

The following research questions were addressed in this study:

1. What are the narrative arcs for a corpus of undergraduate college writers’,
 - a. CNF stories?
 - b. SFP stories?
2. Is there a statistically significant difference between the segments of narrative arcs of CNF and SFP?
 - a. H1: Narrative arcs of nonfiction and fiction differ significantly.
 - b. H0: Narrative arcs of nonfiction and fiction do not differ significantly.

METHODS

This study was issued exempt status by the Institutional Review Board (IRB) of the University of Wisconsin-Stout. Interactions with participants and data were guided by ethical principles outlined in The Belmont Report—respect for persons, beneficence, and justice.

Paradigmatic Positioning

While adopting the data-collection and data-analysis methods of quantitative research, this study reflects an interpretivist paradigmatic stance. An interpretivist paradigm, in contrast to positivist or postpositivist positions, supports an ontology that is relativist (reality is multiple and local and based in experience and social contexts), and an epistemology that is subjectivist (findings of a study result from the interaction between participants and inquirer) (Babones; Lincoln et al.). Rather than seeking to confirm theory, the attempt is to learn from data in a ground-up approach—to let the data tell its own story.

Babones, in particular, has identified reflexivity on the part of the inquirer as essential to interpretive quantitative research. Babones stressed the value of reflecting on the study's research methods, the data itself, the inquirer's positionality, and the historical context pertinent to the study. The following Methods sections, as well as sections in the Discussion, address these issues of stance.

Study Design and Hypotheses

This study specifically measured narrative arcs of college writers' CWAC. In typical narratives, according to plot descriptions popularized by Freytag, staging-related words are expected to peak at the beginning of stories and then fall shortly afterward as the story continues to unfold; plot-progression-related words, meanwhile, are expected to be at their lowest at the beginning of stories and to rise shortly thereafter; finally, cognitive-tension-related words are expected to be used most in the middle of stories.

That narratives typically follow such a pattern, as noted above, has been corroborated through the work of Boyd, Blackburn and Pennebaker: Accordingly, storytellers generally follow a particular pattern when composing narratives. This pattern includes,

- **Staging:** First, storytellers begin stories with words related to nouns and how noun referents relate. This staging language peaks at the beginning of a story and includes word categories like prepositions (above, below, through), articles (a, an, the), and concept references (fight, kill, interrupt) that indicate conflict.
- **Plot Progression:** After setting the stage, storytellers' use of staging words declines while words indicating plot progression rise and peak toward the end of a narrative. Plot-progression words mark action and, such as through pronouns, imply shared understandings of which of the story's characters are engaged in action. Other words indicating plot progression include auxiliary verbs (is, be, have), connectives (and, but, so, as), and common function words (determiners, adverbs, negations) relating cohesion among a narrative's elements.
- **Cognitive Tension:** Meanwhile, storytellers usually use words indicating the building and releasing of cognitive tension. This tension happens in tandem with forms of conflict of storylines as characters, for instance, struggle to realize goals or face uncertainty. Cognitive tension traditionally rises and peaks toward the middle and into the ending of narratives and is conveyed through words implying cognitive processes, such as those related to insight (know, how, think, feel), causation (how, because, make, why), certitude (really, actually, of course, real), and differentiation (but, not, if, or).

After describing the narrative arcs of a corpus of CNF and a corpus of SFP using LIWC-22 (described below under Data-Analysis Procedure), statistical tests of difference were used to see if

the narratives about the authors that are thus identity texts (CNF) differed along key LIWC-22 variables from narratives that are about imagined others (SFP) (See Figures 1 and 2).

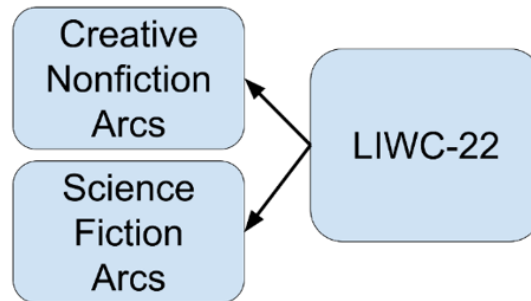


Figure 1: Data-analysis Process for Narrative Arc Analysis

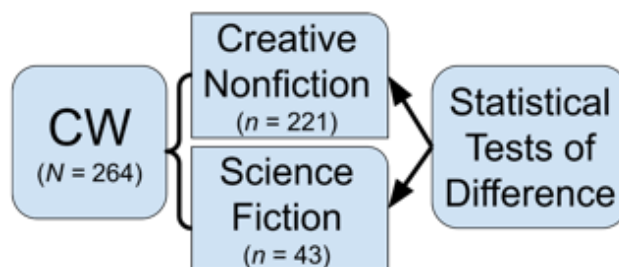


Figure 2: Data-Analysis Process for Study of Differences Between CNF and SFP

Participants

Data was collected from first-year and advanced writing classrooms at a comprehensive, public, career-focused four-year polytechnic university of approximately 8,400 (about 7,000 of whom are undergraduates). The university is a predominantly White university, with 86% of students institutionally categorized as “White/Caucasian” and with 55% of its students designated as “male.” The sample consisted of 221 individual writers who provided an academic life story (91 = female; 4 = nonbinary; 126 = male). Students held a range of majors from the humanities, arts, and sciences, with some undecided or between majors. While most students used English as a first language, five used English as an additional language or were international students. All had tested into or completed prerequisites to enroll in the course, Composition 1, an introduction to college writing commonly taken by students across the US. The sample also included forty-three (n = 43) SFP reports (females = 25; males = 18). All participants were undergraduates studying in the College of Science, Technology, Engineering, and Mathematics at the research site and studying in an advanced writing course, Scientific Communication.

Materials

The writing prompts used to elicit the genres of CWAC under analysis follow below. First, used in first-year writing courses, the prompt for the CNF academic life stories was:

People sometimes wonder if they fit their majors. They may even be undecided and want to know how others came to be undecided as well. Address this issue by composing and publishing your Academic Life Story, which generally consists of 2-3 defining life moments, events, or series of events. Describe these 2-3 life events in vivid detail so that readers not only read about what happened in your life but also experience it. The story will have sentences where you explain the meaning of these events in order to show that they logically fit together to answer a single question: “How did I come to be a college student studying what I am studying?” Or, if you are undecided, your story might answer: “How did I come to be a person torn between majors?” or “How did I come to value higher education?”

Stories were workshopped over a month-long process to scaffold the use of characterization (through description, action, thought, exposition, and dialog) as well as other genre conventions like setting, narrative shape, and metaphor.

Meanwhile, the following prompt guided students’ writing of SFP:

In this assignment, think of some possible (not purely fantastic or impossible) future innovation in science, technology, engineering, or math. Write a story about how that future innovation would impact an imagined future family. This future innovation should be designed with the hope of improving people’s lives (which excludes weaponry or other tools for hurting people) even though it may have unintended negative consequences.

Once again, these stories were workshopped over a three-draft, month-long process to scaffold the purposeful use of fictive genre conventions.

In terms of incentives to write CW, labor-based contract grading was used, whereby students automatically earned at least an 80% for submitting good-faith, completed drafts (peer-review, teacher-review, and final), an antiracist approach to grading (Inoue) used with the hope of minimizing the motivation to please a teacher and of encouraging risk-taking and investment.

Data-Analysis Procedure

As noted, LIWC-22 was used to analyze the corpus of CNF and SFP stories. LIWC-22, specifically, measured the following variables:

Table 1: Variables of Interest: Label, Verbal Definition, LIWC-22 Operationalization (Boyd et al.; Boyd, Blackburn and Pennebaker)

Variables	Verbal Definition	Operational Definition
1. <i>Word Count</i>	The number of words of the texts comprising the corpus.	A total quantifying the average number of words per text.
2. <i>Narrativity (Overall)</i>	The extent to which stories overall resemble typical structures of narratives (staging, plot progression, and cognitive tension) when segmented into fives.	A score ranging from -100 to +100 quantifying how similar (positive scores) or dissimilar (negative scores) narrative shape is to previously established normative story shapes.
3. <i>Narrativity (Staging)</i>	The extent to which <i>staging</i> —the establishing of background and characters—in stories resembles typical staging patterns.	A score quantifying the use of prepositions, articles, concept references, and other words expected to peak toward the beginning of a segmented narrative.
4. <i>Narrativity (Plot Progression)</i>	The extent to which <i>plot progression</i> —the moving forward of the story through experiential processes—in stories resembles typical plot-progression patterns.	A score quantifying the use of pronouns, auxiliary verbs, connectives, and other common function words relating cohesion among story elements expected to continually rise and peak toward the end of a segmented narrative.
5. <i>Narrativity (Cognitive Tension)</i>	The extent to which <i>cognitive tension</i> —the approach to and actual climax where narrators and characters work through issues and tension—in stories resembles typical cognitive-tension patterns.	A score quantifying the use of cognitive-processes words expected to peak toward the middle-to-end of a segmented narrative.

Again, the assumption of LIWC as an instrument of data analysis is that the words we use reveal aspects of how we think and feel. Thus, here I carry out Model the Arc of Narrative (AON) assessment, assuming that such assessment not only measures how narratives develop (Boyd, et al.) but also suggests the experience of this writing from writers' points of view.

RESULTS

Results are presented by research question. After a presentation of descriptive and inferential statistics, I'll contextualize these findings in the Discussion.

Research Question 1: What Are the Narrative Arcs for a Corpus of Undergraduate College Writers' Creative-Nonfiction and Science-Fiction Stories?

Below are descriptive statistics for narrative arcs of college writers' CNF and SFP stories. As captured in Table 2 below, the Overall Narrativity of all stories, CNF and SFP alike, only moderately

reflected normal narratives as described by Freytag and further empirically confirmed by Blackburn and Pennebaker. Student writers' SFP were also on average 200 words longer and scored higher on Narrativity (Overall)—that is, the extent to which the stories' narrative arcs reflected the normal shape. While staging words were similar descriptively between CNF and SFP stories, the use of plot-progression and cognitive-tension words of SFP more closely resembled normative distributions than did the use of these words in the CNF.

Table 2: Descriptive Statistics for LIWC-22 Narrativity Variables

Variables	M CNF / SFP	SD CNF / SFP	Mdn CNF / SFP	95% Confidence Intervals	
				Lower CNF / SFP	Upper CNF / SFP
Word Count	967.3 / 1175.9	291.5 / 450.2	923 / 1094	928.7 / 1037.3	1006 / 1314.4
Narrativity (Overall)	13.6 / 23.7	26.9 / 27.1	14.5 / 20.9	10.1 / 15.3	17.2 / 32
Narrativity (Staging)	30.5 / 30.2	37.5 / 37.2	30.9 / 32.5	25.5 / 18.7	35.5 / 41.6
Narrativity (Plot Progression)	10.4 / 24.7	36 / 34.2	6.2 / 24.6	5.6 / 14.2	15.2 / 35.2
Narrativity (Cognitive Tension)	-.01 / 16.1	41.1 / 44.2	-4.7 / 26.5	-5.5 / 2.5	5.4 / 29.7

Figures 3 and 4 below detail where types of words peaked and valleyed.

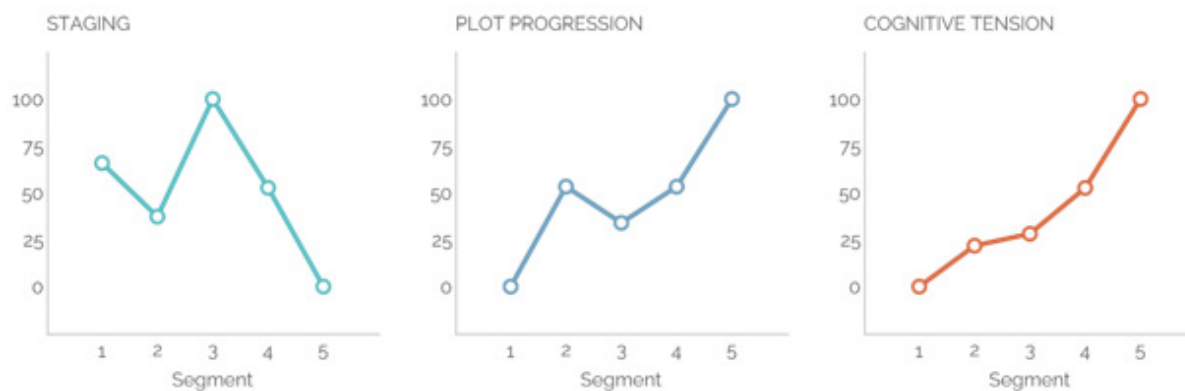


Figure 3: Narrative Arc Graph (Creative Nonfiction)

As reflected in Figure 3 above, for CNF stories, staging words, normatively peaking at the beginning of a story, mini-peaked in segment 1 but truly peaked in segment 3. Plot-progression words, as is normal, peaked toward the end of the story. Cognitive-tension words, normatively peaking at the middle of a story, peaked at the very end, in segment 5.

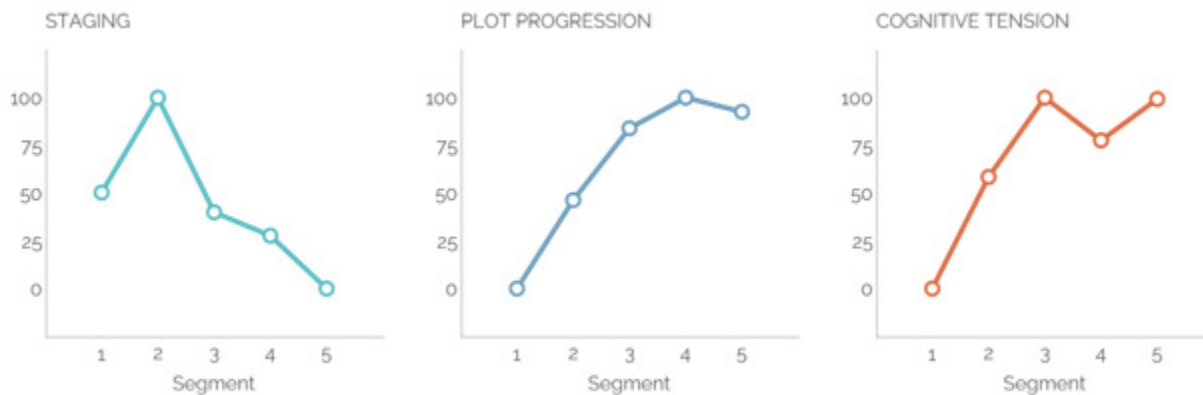


Figure 4: Narrative Arc Graph (Science Fiction Prototyping)

For SFP stories, staging words, normatively peaking at the beginning of a story, peaked in segment 2. Plot-progression words peaked toward the end of the story, as is normal. Cognitive-tension words, normally peaking at the middle point of a story, double-peaked: at the middle of the story, in segment 3, as well at the very end, in segment 5.

Central measures of tendency further describe the average narrative arc of CNF in Table 3 while frequencies in Table 4 underscore how varied stories were in terms of peaks and valleys of psycholinguistically telling words.

Table 3: Statistics of Central Tendency for Creative Nonfiction

Variables	<i>M</i>	<i>Mdn</i>	<i>Mode</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Peak: Staging	2.93	3.00	3	1.41	1	5
Peak: Plot Progression	3.23	3.00	5	1.36	1	5
Peak: Cognitive Tension	3.37	4.00	5	1.44	1	5
Valley: Staging	2.97	3.00	2	1.43	1	5
Valley: Plot Progression	2.76	3.00	1	1.44	1	5
Valley: Cognitive Tension	2.46	2.00	1	1.32	1	5

Table 4: Frequencies for Peaks of Target Narrative-Arc Word Groups for Creative Nonfiction

Variable	Segment	Frequency	Percentage
Peak: Staging	1	49	22.2
	2	40	18.1
	3	51	23.1
	4	40	18.1
	5	41	18.6
Peak: Plot Progression	1	28	12.7
	2	47	21.3
	3	45	20.4
	4	48	21.7
	5	53	24.0
Peak: Cognitive Tension*	1	32	14.5
	2	37	16.7
	3	38	17.2
	4	45	20.4
	5	69	31.2

* = statistically significant difference from expected frequencies per Chi-Square Test.

A chi-square goodness-of-fit test indicated no statistically significant difference in frequencies for Peak: Staging or for Peak: Plot Progression. Peak: Cognitive Tension; however, contained frequencies differing significantly from expected: $\chi^2(4) = 19.34, p < .001$. In particular, cognitive-tension words peaked mainly in segment 5, which is different from normative shapes where cognitive tension peaks toward the middle to the end.

Central measures of tendency further describe the average narrative arc of SFP in Table 5 while frequency tallies in Table 6 again underscore how varied stories were in terms of peaks and valleys of target word groups.

Table 5: Statistics of Central Tendency for Science Fiction Prototyping

Variables	M	Mdn	Mode	SD	Minimum	Maximum
Peak: Staging	2.74	2.00	2	1.29	1	5
Peak: Plot Progression	3.60	4.00	4	1.22	1	5
Peak: Cognitive Tension	3.56	4.00	5	1.20	1	5
Valley: Staging	3.30	3.00	5	1.44	1	5
Valley: Plot Progression	1.88	1.00	1	1.28	1	5
Valley: Cognitive Tension	2.35	2.00	1	1.54	1	5

Table 6: Frequencies for Peaks of Target Narrative-Arc Word Groups for Science Fiction Prototyping

Variable	Segment	Frequency	Percentage
Peak: Staging	1	7	16.3
	2	16	37.2
	3	6	14.0
	4	9	20.9
	5	5	11.6
Peak: Plot Progression	1	3	7.0
	2	5	11.6
	3	10	23.3
	4	13	30.2
	5	12	27.9
Peak: Cognitive Tension	1	2	4.7
	2	7	16.3
	3	11	25.6
	4	11	25.6
	5	12	27.9

A chi-square goodness-of-fit test indicated no statistically significant difference in frequencies for Peak: Staging, Peak: Plot Progression, or Peak: Cognitive Tension.

Research Question 2: Is There a Statistically Significant Difference Between the Segments of Narrative Arcs of Creative Nonfiction and Science Fiction Prototyping?

Kolmogorov-Smirnov tests of normality indicated that only the variable of Narrativity (Overall) was normally distributed for both CNF and SFP stories ($p = .200$ for both groups along this variable), warranting, after assumptions were checked, an independent-samples t test.

1. There was a statistically significant difference between creative-nonfiction and science-fiction stories on Narrativity (Overall); $t(262) = -2.24$, $p = .026$, $d = .27$, a small effect size (Cohen). Narrativity (Overall) of science-fiction stories ($M = 23.7$; $SD = 27.1$) was significantly higher than that of creative-nonfiction stories ($M = 13.6$; $SD = 26.9$).

Tests of normality for all other variables indicated that nonparametric statistical tests of difference, specifically Mann-Whitney U tests, were appropriate for other comparisons. The following statistically significant differences were identified, and according to Cohen, all yielded a small effect size:

2. The mean ranks for Word Count were significantly higher for science-fiction stories (164.6) than for creative-nonfiction stories (126.3), $U = 3369.5$, $p = .003$, $r = .19$, a small effect size.

3. The mean ranks for Narrativity (Plot Progression) were significantly higher for science-fiction stories (157.9) than for creative-nonfiction stories (127.6), $U = 3660.5$, $p = .017$, $r = .15$, a small effect size.
4. The mean ranks for Narrativity (Cognitive Tension) were significantly higher for science-fiction stories (156.5) than for creative-nonfiction stories (127.8), $U = 3719.5$, $p = .024$, $r = .14$, a small effect size.
5. The mean ranks for Staging (Segment 2) were significantly higher for science-fiction stories (159) than for creative-nonfiction stories (127.3), $U = 3610$, $p = .011$, $r = .16$, a small effect size.
6. The mean ranks for Plot Progression (Segment 1) were significantly higher for creative-nonfiction stories (137.8) than for science-fiction stories (105.2), $U = 3575.5$, $p = .009$, $r = .16$, a small effect size.
7. The mean ranks for Plot Progression (Segment 4) were significantly higher for science-fiction stories (153.6) than for creative-nonfiction stories (128.4), $U = 3843.5$, $p = .046$, $r = .12$, a small effect size.
8. Finally, the mean ranks for Cognitive Tension (Segment 3) were significantly higher for science-fiction stories (157.2) than for creative-nonfiction stories (127.7), $U = 3691$, $p = .019$, $r = .14$, a small effect size.

Overall, these results support rejection of the null hypothesis. Narrative arcs of nonfiction and fiction differ significantly. Below, I'll underscore these findings' significance.

DISCUSSION

CWAC offers meaningful literacy for college students across disciplines, languages, and identities (Hanauer, "Meaningful Literacy"; Nicholes, "Creative Writing," Creative Writing). While CW has long been identified as popular in English departments and among undergraduates (Bishop; Hesse; Nicholes, "Measuring Ownership"), CWAC is concerned also with the experience of poetic composition outside of the CW classroom. Here, I focused on two CWAC genres, one of them a work of CNF and the other a work of SFP. The goal has been to analyze how these narratives unfold to infer the usual experience, from a writer's point of view, of the composition, as well as to describe these genres.

In the present study, which used LIWC-22 narrative arc and statistical analysis, findings indicate that writers of autobiographical CNF create these classroom CWAC genres with wider variability of outcomes compared to fictional SFP. That is, Narrativity (Overall) was higher for SFP, indicating that SFP more closely approximated the normative shape of narratives as theorized by Freytag and established empirically by Boyd, Blackburn and Pennebaker. A score ranging from -100 to +100 quantifying how similar (positive scores) or dissimilar (negative scores) narrative shape is to

previously established normative story shapes, Narrativity (Overall) scores for both CNF and SFP were not descriptively high— $M = 13.6$ for CNF and $M = 23.7$ for SFP—indicating genre-specific departure points from normative narratives from Boyd et al.’s corpus.

A particularly interesting finding here concerns Narrativity (Cognitive Tension). Regarding the corpus of CNF, cognitive-tension words peaked mainly in segment 5, which is different from normative shapes of narrative arcs where cognitive tension peaks toward the middle to the end. This differs from SFP, which were statistically significantly closer to normative shapes than these CNF stories. Thus a signature difference for this particular iteration of CNF, the academic life story, empirically establishes what we might intuitively have assumed: In a story’s final segment, writers work out the meaning of their stories, explaining how their life experiences have led them to be the people they are today, at the time of their writing, either in general or on a particular academic or disciplinary path, achieved through exposition as a mode of (self-)characterization. This is a possibly intriguing observation that supports evidence-based teaching. When instructors know the students’ placement of tension words in different genres differs, teachers can more knowingly target the development of CWAC repertoires offering various levels of self-contemplation.

Earlier scholarship has measured the perceived ownership authors felt toward autobiographical CNF and more other-focused fiction (Nicholes, “Measuring Writing”). In that paper, I reported a statistically significant result suggesting that authors feel much more engagement when writing creatively about themselves. That creative writing invites self-contemplation has long been a staple understanding among creative writing scholars (Bishop)—again underscoring what I’ve argued here is the timeless nature of storytelling, the ancient mode of thought that narrative thinking represents. Here, however, in this report I have suggested that a unique genre characteristic—and by implication another unique experiential aspect of self-referential CWAC—is a concluding section of self-contemplation measurable by a significantly increased use of cognitive-tension words. As earlier noted, storytellers typically use words indicating the building and releasing of cognitive tension when communicating forms of conflict. These conflicts make up the storylines of characters that may be struggling to realize goals or who are facing uncertainty. In CNF, when the central character is oneself, the very words being used reflect something psychologically and emotionally relevant for the author. The study here borrows psycholinguistic methods of analysis to highlight how this happens in measurable terms, which are also actionable in the sense that teachers can glimpse what experiences our students may as a group be having through the process of storytelling.

This discussion has implications for the teaching and assessment of CWAC. One of many such implications is that CWAC assignments offer students, who may otherwise not have CW opportunities, unique experiences for self-contemplation. Indeed, in my monograph (Nicholes, *Creative Writing*), research is presented that contrasts the words used in the introduction and discussion

sections of arts-based research projects—poetic autoethnographies and science-fiction prototyping reports—with statistically significant results indicating very different cognitive experiences when writing more transactional sections of reports and creative sections (stories, poems). While this may feel like an intuitive understanding, such linguistic analysis sheds further light on the way CWAC assignments promise to push writers, in any discipline, to broaden rhetorical and aesthetic repertoires. That is, in ways argued by Melzer’s foundational monograph on assignments across the curriculum, CWAC seems to encourage writers to draw on a range of communicative resources—such as metaphor, embodied characterization, and other storytelling genre conventions—they may otherwise not have chances to employ or appreciate. It is important to mentor and model a range of communicative resources for ability and flexibility when working in diverse rhetorical situations.

This study’s methodological strengths include the application of a validated linguistic-analysis tool, LIWC-22 (Boyd et al.; Pennebaker et al.). The use of this method may help others guide CWAC pedagogy and assessment. LIWC can be used to describe word use in one composition, or it can be used to provide instructors with an overall understanding of what the cognitive and emotional experiences tend to be in a larger corpus of collected works of CW. Here, all words are taken into account, not only those that human coders deem thematically relevant. Used along with human assessment, LIWC promises an overall psycholinguistic description of CWAC compositions.

Of course, the findings reported here must be understood in relation to this study’s limitations. LIWC-22 segments stories by fives. While this has proven effective in earlier scholarship for a large corpus (Boyd, Blackburn and Pennebaker), the stories here are those composed within higher-education contexts, with often fledgling writers. It remains beyond the scope of this study, then, to infer with confidence how individual authors experienced the composing of their own stories, either CNF or SFP. In addition, the examples of CNF and SFP themselves—as established here in this sample—are idiosyncratic examples of nonfiction and fiction, respectively, precluding conclusions about these two types of creative writing. Another possible confounding variable limiting the application of the findings reported here concerns the authors and the contexts in which they were writing. The narratives collected came from a first-year and an advanced-writing course. Some of the results, then, may be attributable to variables that could not be captured, such as writing experience, confidence, or motivation. Some of the cognitive tension captured in academic life stories, too, may be higher when such stories are composed by first-year writers at the beginning of their academic and life journeys. Overall, then, this paper should be understood as exploratory. Additional research is needed to further understand CWAC experiences as meaningful literacy.

Future scholarship might build on this study by gathering additional and various large samples of various kinds of CWAC that take the form of creative nonfiction or fiction for comparative analyses. In addition, qualitative perception-gathering approaches would complement inferences made on

the basis of the words authors use as their narratives unfold. To continue to provide insight into CWAC as meaningful literacy, applied-literariness studies like the one presented here would be strongest when combining issues of not only what authors do but also how they understand what they are doing in their writing. CW as an experience, and CWS as a field with interests shared with WAC and the Scientific Study of Literature (SSoL), holds much to offer higher education in terms of engaging learners and in terms of helping people understand themselves, their life conditions, and the aesthetic-rhetorical methods available through CW practice and craft. As such, writing instructors of any writing class (from first-year composition, to scientific communication, to creative writing, and so on) are urged to continue to advocate for literary reading and writing across higher education. Supported by theoretical and, as presented here, empirical arguments, our advocacy, it seems, will have a better chance of effectively underscoring the importance of artistic, creative, aesthetic-rhetorical composition. As a uniquely engaging experience not only for CW majors—but, when the assignment is framed as relevant, for most writers across majors (Nicholes, *Creative Writing*)—creative writing remains a sorely underexplored and under-applied human experience across the curriculum.

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