



When Are We Going? The Dynamics of Tense Across Genres

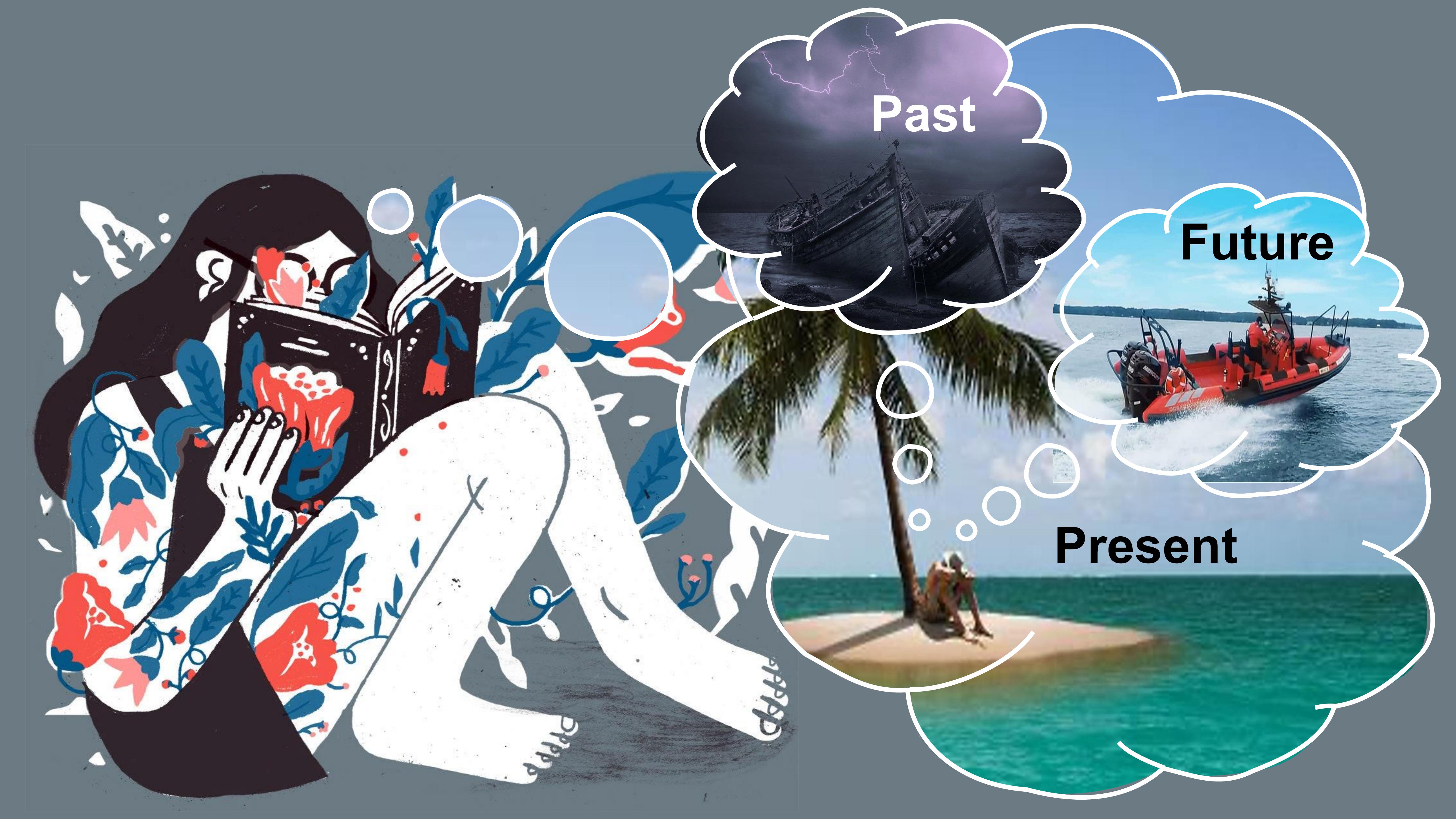
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The Society for Text & Discourse
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LOL Lab

Language Of
Learning Lab

Est. 2019



A central illustration depicts a person's legs and feet walking along a beach. The person is wearing white socks and sandals, and their legs are decorated with a vibrant, colorful floral pattern. The background features palm trees and a bright blue sky. Superimposed on this scene are three thought bubbles. The top-left bubble, colored purple, contains a dark, stormy sea with a sunken shipwreck. The word "Past" is written in white capital letters. The top-right bubble, colored light blue, shows a modern red and black rescue boat on the water. The word "Future" is written in black capital letters. The bottom-right bubble, colored teal, shows a person sitting on a beach, looking out at the ocean. The word "Present" is written in black capital letters.

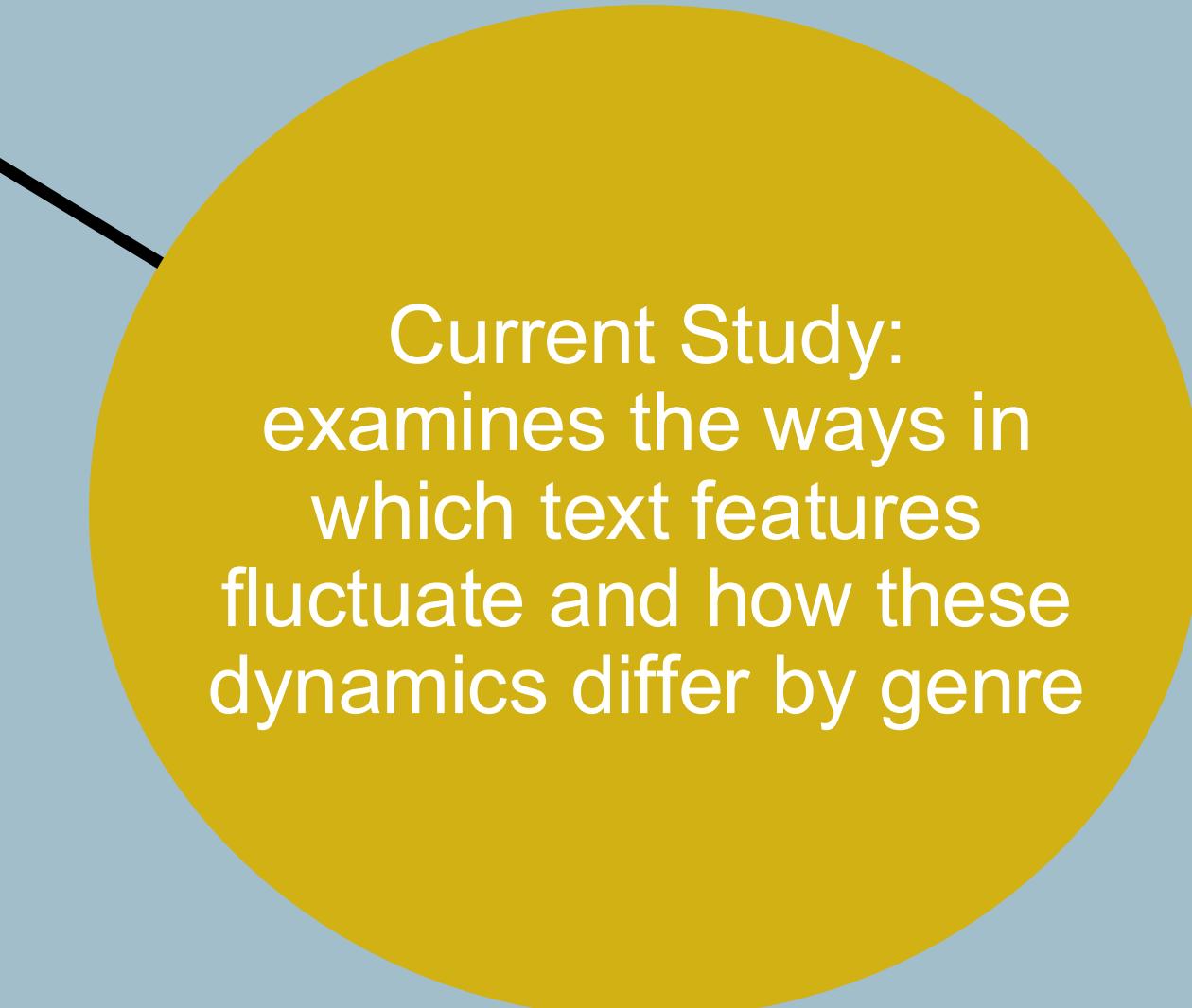
Past

Future

Present

Background

- Linguistic Features
 - prior work: examined role of linguistic properties of texts in relation to comprehension
 - focus primarily on readability or text difficulty
 - texts are complex—many other characteristics exist!
- Text Dynamics
 - text features typically measured at the aggregate level
 - little work looks at how features fluctuate over text or models this temporal property



Text Features

Linguistic features vary across genres and grade levels

text
complexity



Majority of discourse literature focused on readability features related to comprehension processes NOT those related to phenomenological experiences:

how
emotionally
invested
you are



*I can't put
this down 'til
I find out how
it ends!*

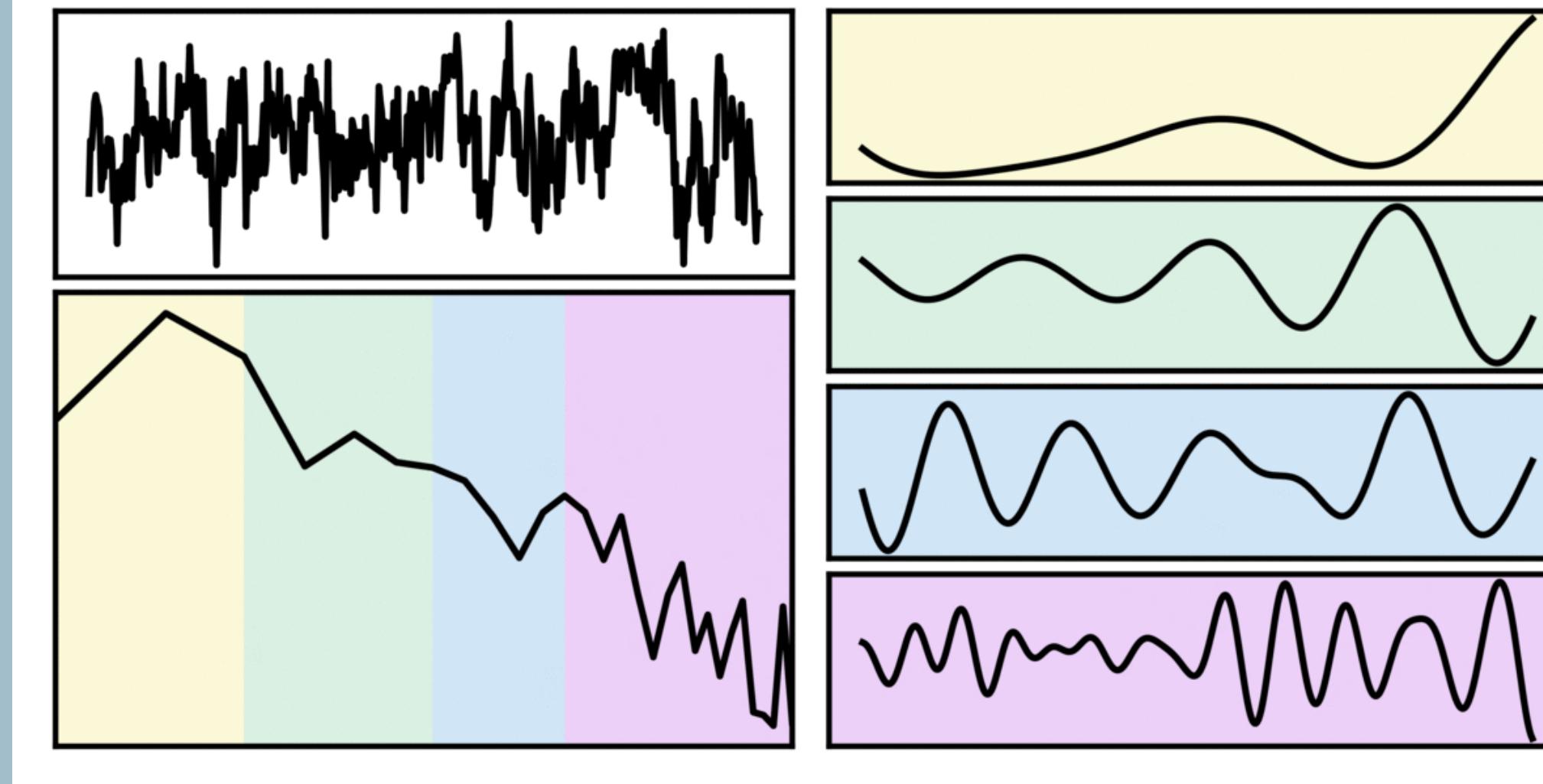
*I feel like I'm
really here!*



how
sucked in
you feel

Dynamics

Text features can meaningfully fluctuate over time to influence comprehension & reading experiences



emotions

dialogue

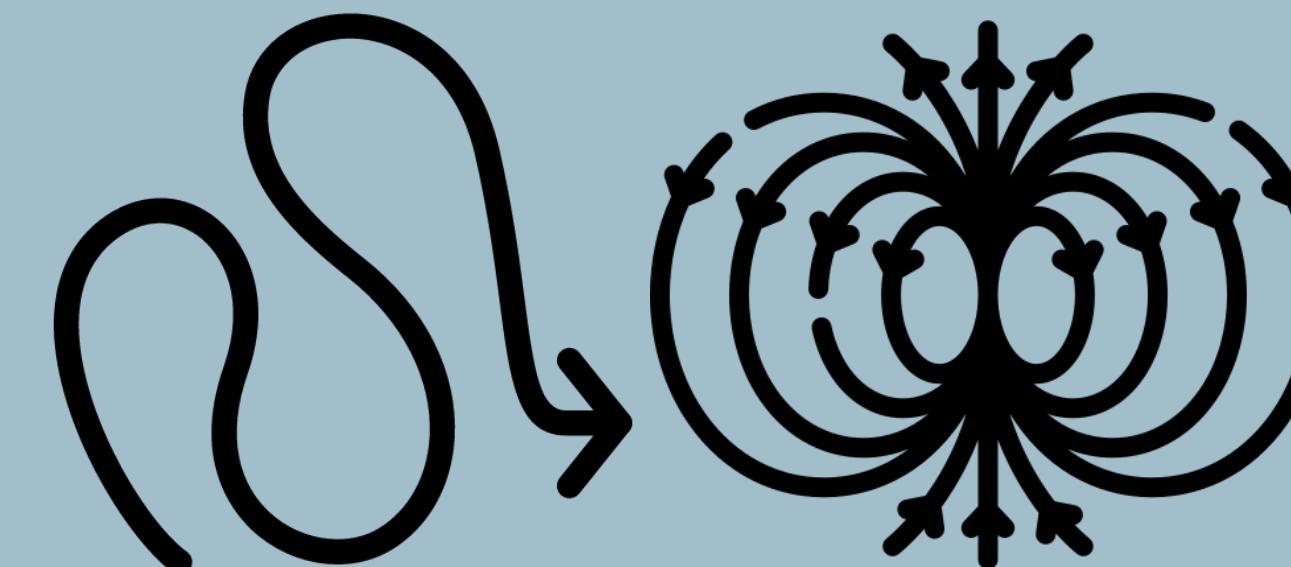
imagery

tense



By adopting a dynamic framework we can account for:

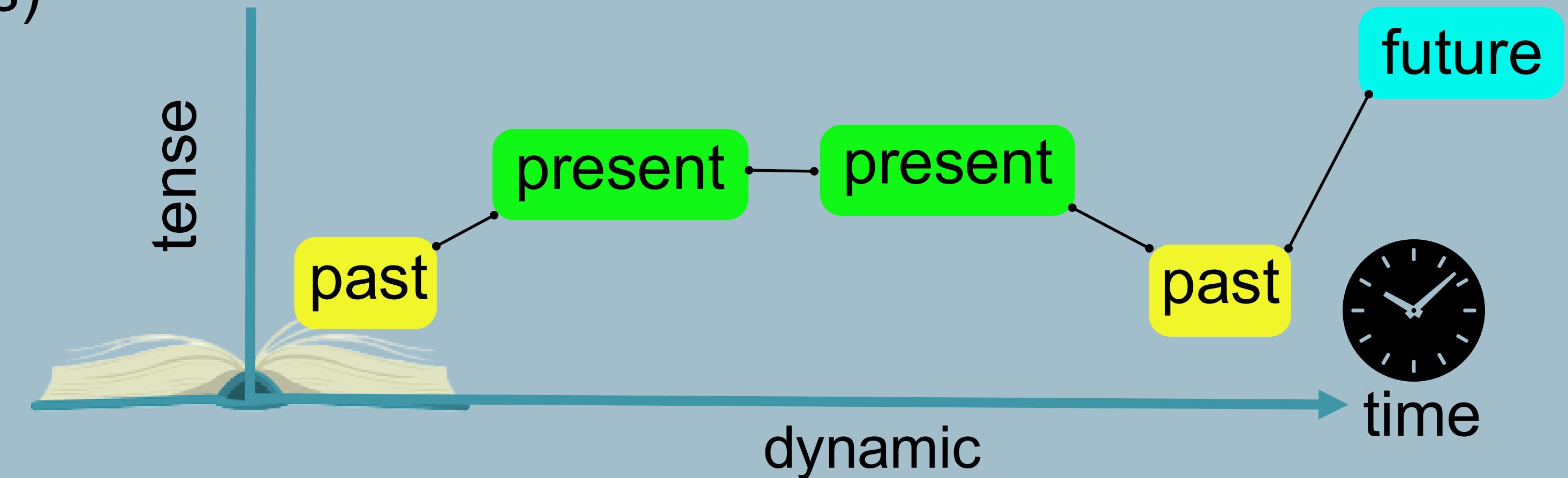
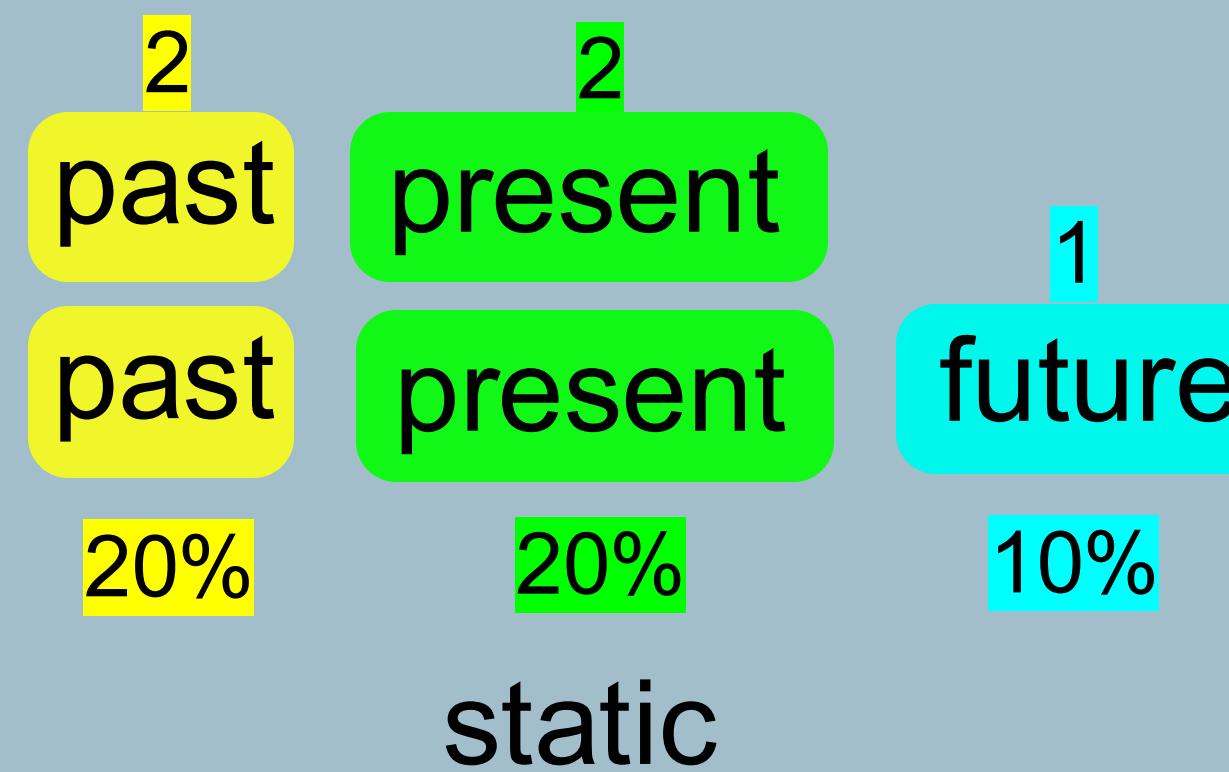
fluctuations
over time



nonlinearity
of language

Research Aims

1. Compare traditional static/aggregated text features (using overall tense proportions) to dynamic indices that consider the complexity and nonlinearity of texts (using RQA analyses)



2. Explore how these text features vary by fictional genres



Methods



- texts downloaded using *gutenbergr* R package
- kept only fiction, text-available, English books, & only 1 book per author
- matched for # of words, sentences, & dialogue %
- POS-tagging used to detect verb tenses



Past Tense **Present Tense** **Future Tense**

"I hate all these cut and dried rules!" cried Billie.
"It would take all the spice out of literature if we stuck to them."

"That's just it," answered Lilian. "We are not making literature but trying to sell our stuff. Persons who have arrived can write any old way. They can start off with the climax and end up with an introduction and their things go, but I'll bet you my hat that you will not find a single story by a new writer that does not have to toe the mark drawn by the teachers of short story writing."

"Which hat?" teased Billie. "The one you put on for Great-aunt Gertrude? If it is that one, I won't bet. I wouldn't read a short story by a new writer for it."

"To return to my story," pleaded Molly, "do you think if I rewrite it, leave out the letters, strengthen the plot a bit and make Polly a little wiser that I might sell it?"

"Sure!" encouraged Lilian.

"Yes, indeed!" echoed Nance.

"And the black man--please cut him out! I can't bear to think of him," from the girl from Alabama.

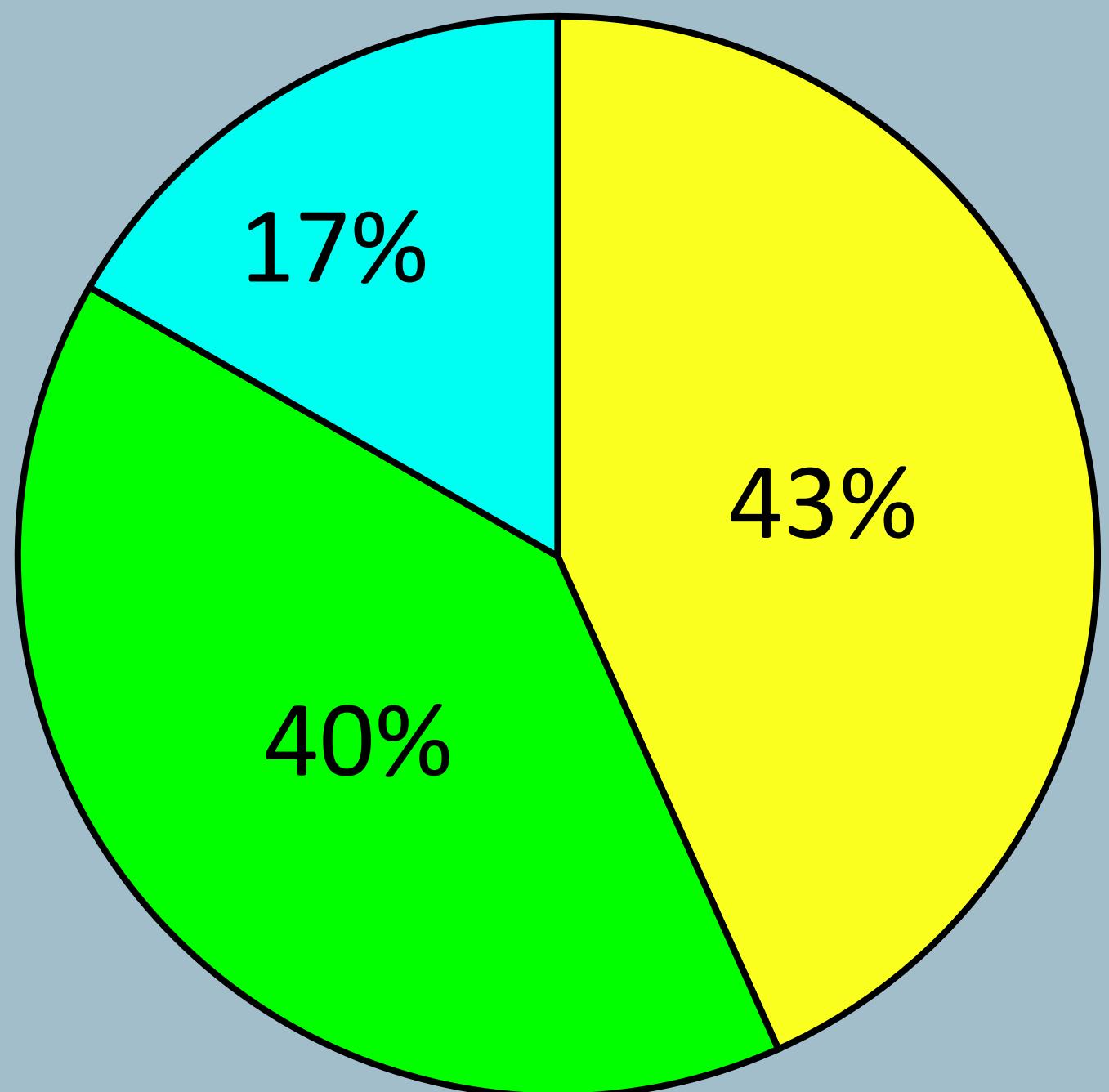
"Dialogue,--how about it?" asked the chairman.

"Pretty good, but a little stilted," was the verdict of several critics.

Static Analyses

- tense proportion scores calculated by dividing the number of each tense occurrence by the number of tenses detected per book

$$\frac{13 \text{ Past} + 12 \text{ Present} + 5 \text{ Future}}{30 + 30 + 30} = 30 \text{ Tenses}$$



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Present Tense

Future Tense

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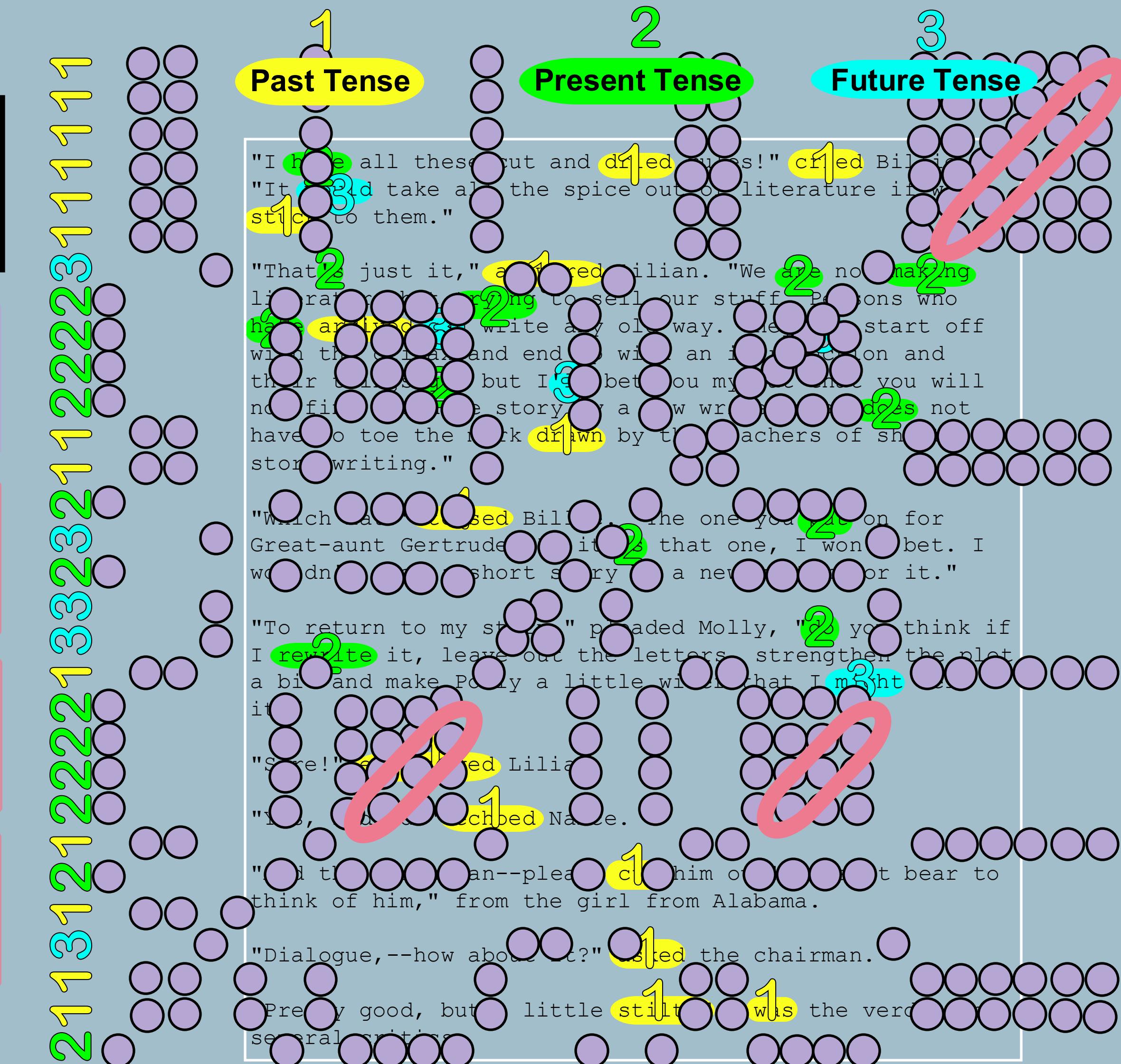
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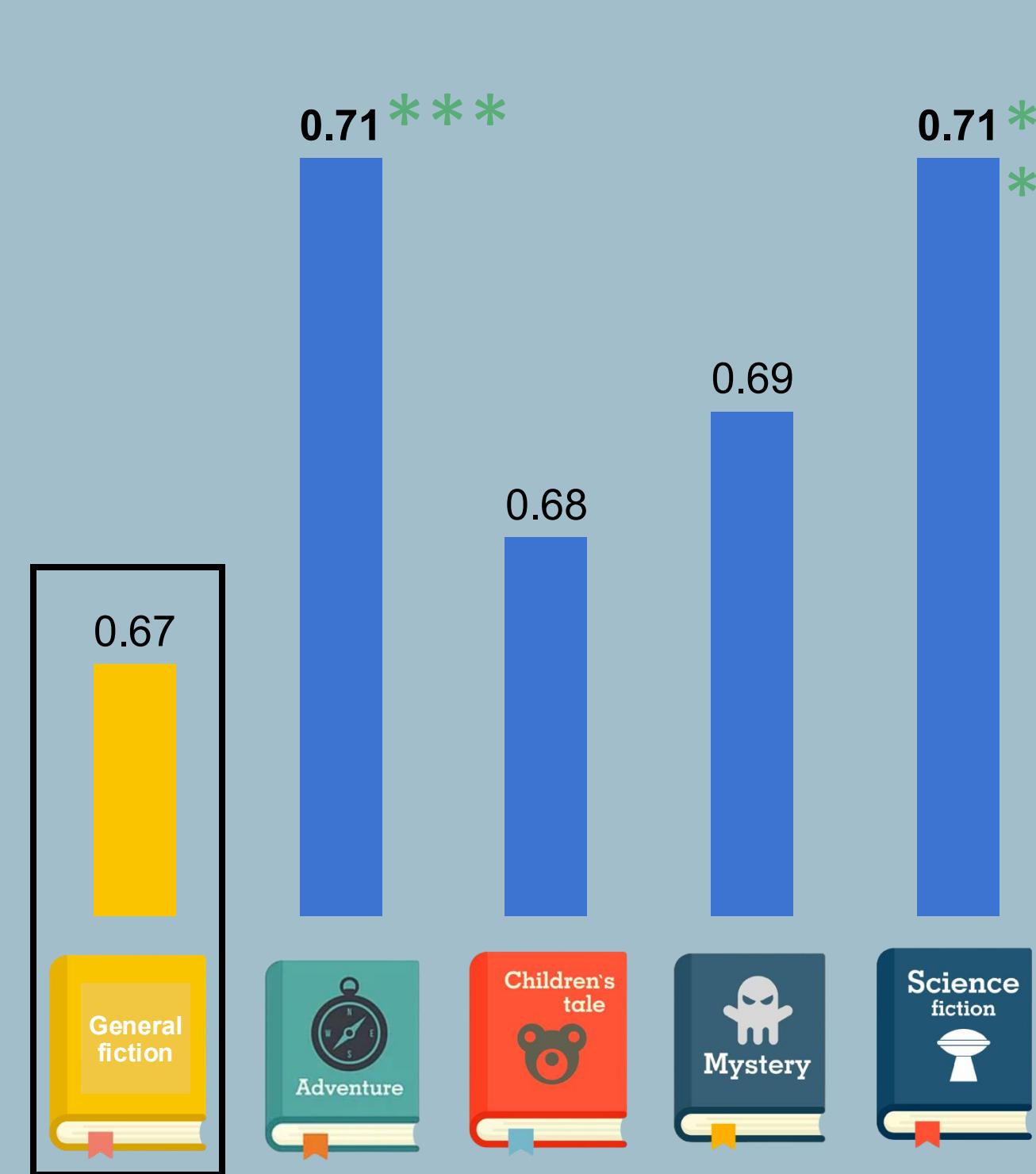
Dynamic Analyses

RQA Category:	RQA Index	Interpretation
Recurrence:	Recurrence Rate (RR)	How much do tenses reoccur?
Structure:	Determinism (DET)	How often are sequences of tenses revisited?
	Max Line (maxL)	How long is the longest stretch of using the same tense?
	Average Line (L)	How long, on average, are stretches of revisited tenses?

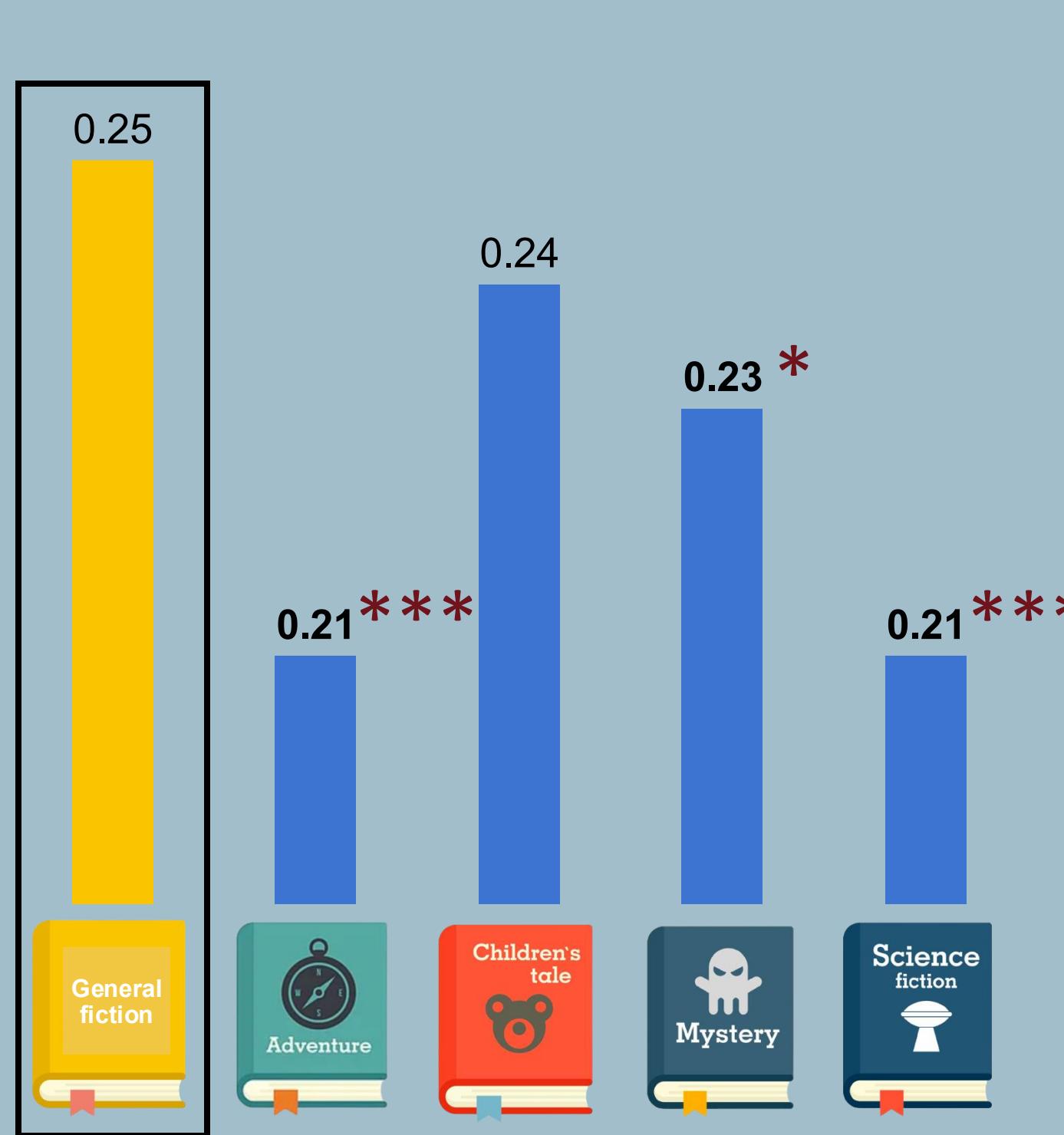


Static (Tense Proportion) Results

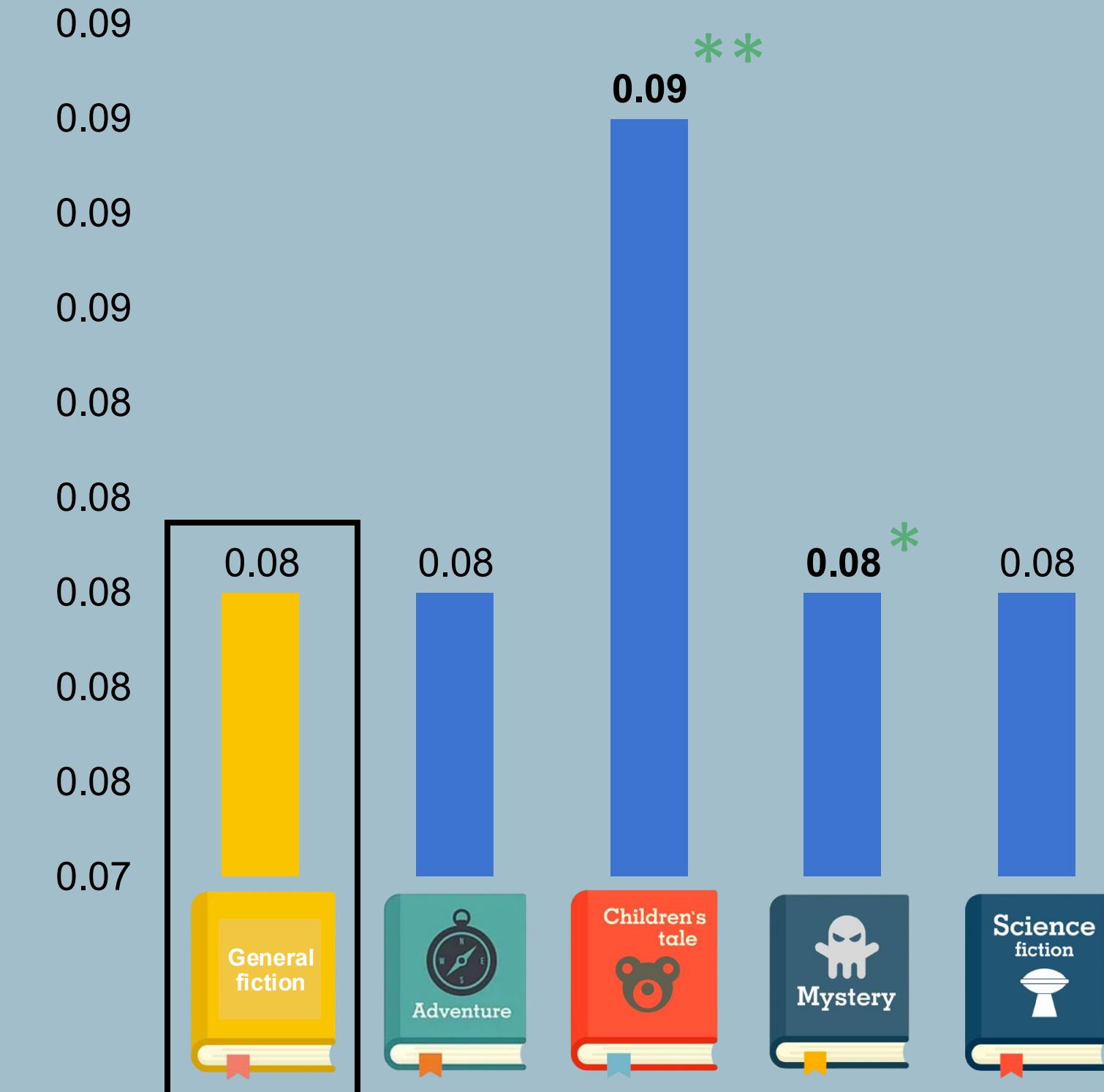
Past



Present



Future



within specific fiction genres, some appear to have significantly greater proportions of past (adv., sci-fi) and future tenses (juv., mys.)

almost all specific genres (except juvenile) were found to have significantly less present tense verbs than general fiction

Dynamic (Tense RQA) Results

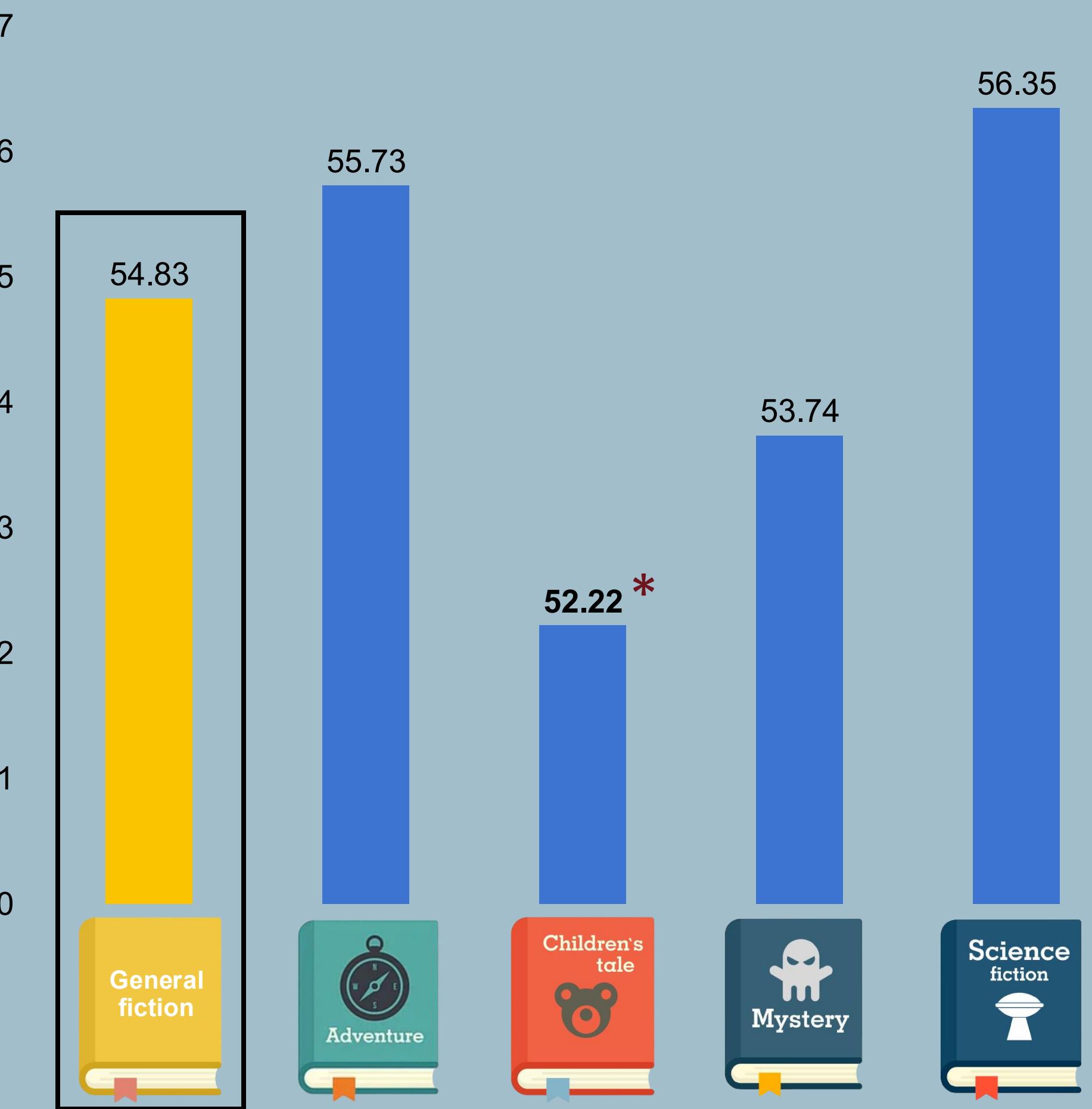
Recurrence:

Recurrence Rate
(RR)

How much do tenses
reoccur?

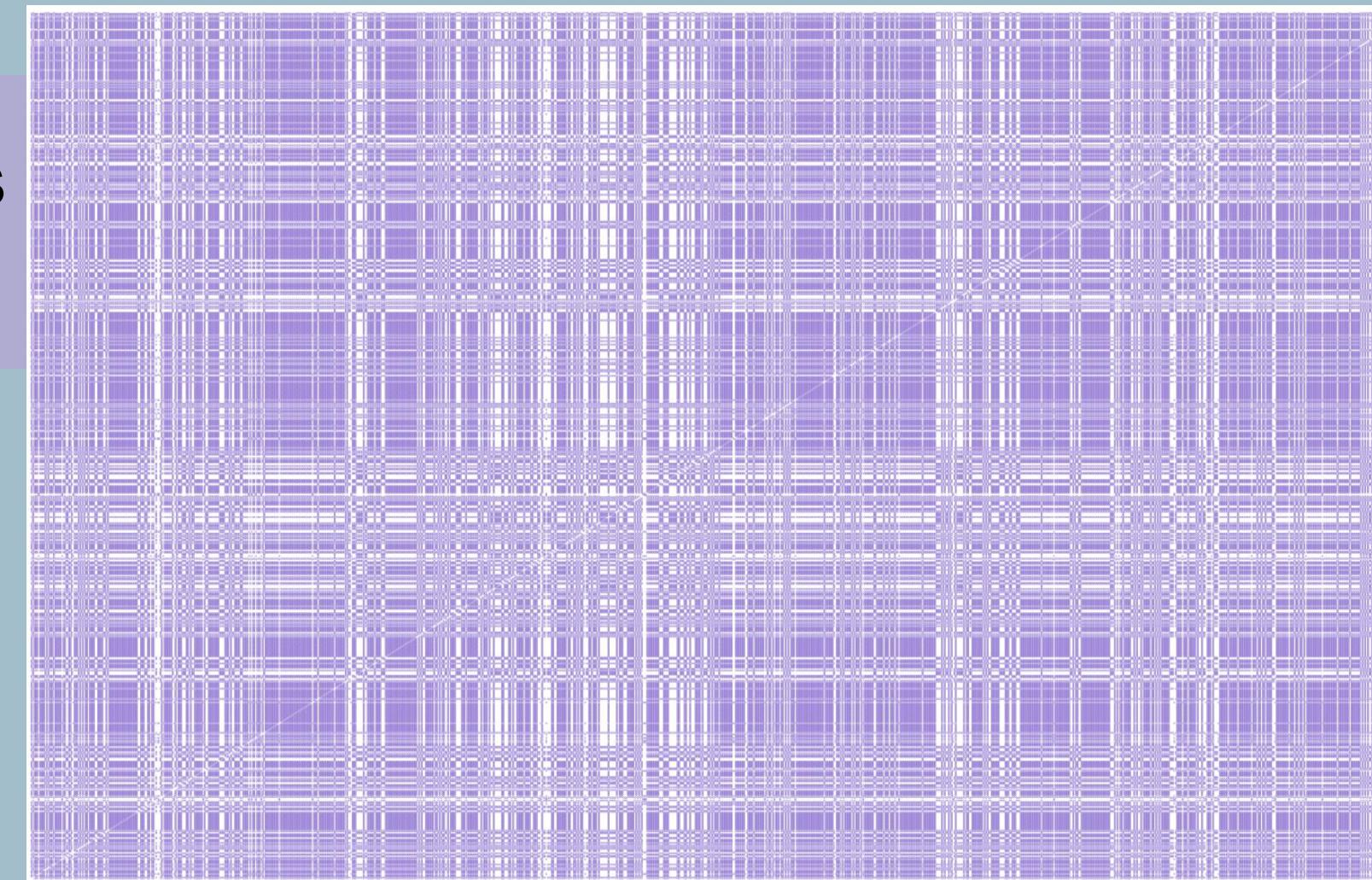
General:

Joy in the Morning
(RR = 54.8214)



Juvenile:
Peter Cotterell's
Treasure
(RR=52.1602)

juvenile fiction had significantly less tense recurrence
than general fiction

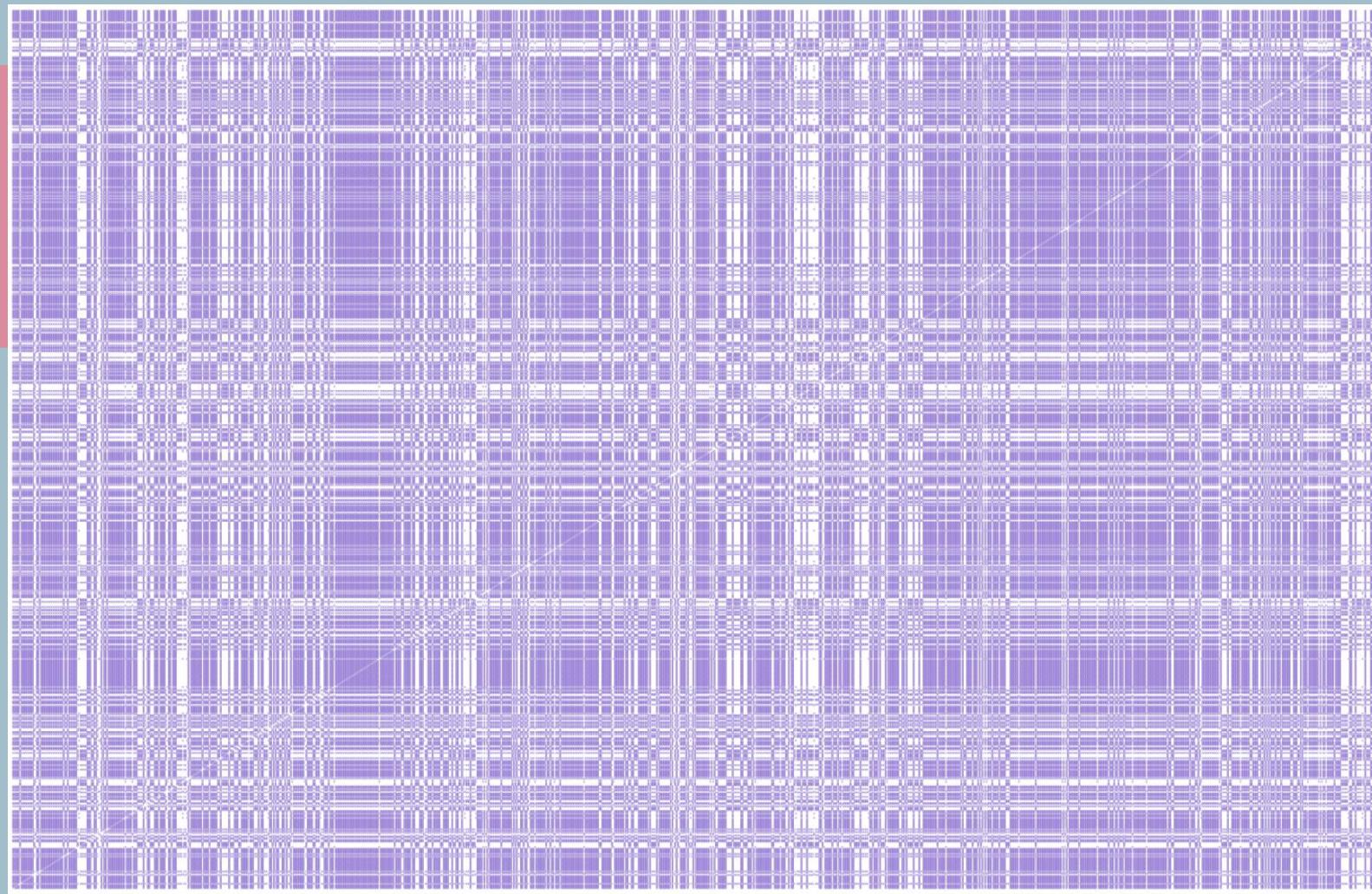
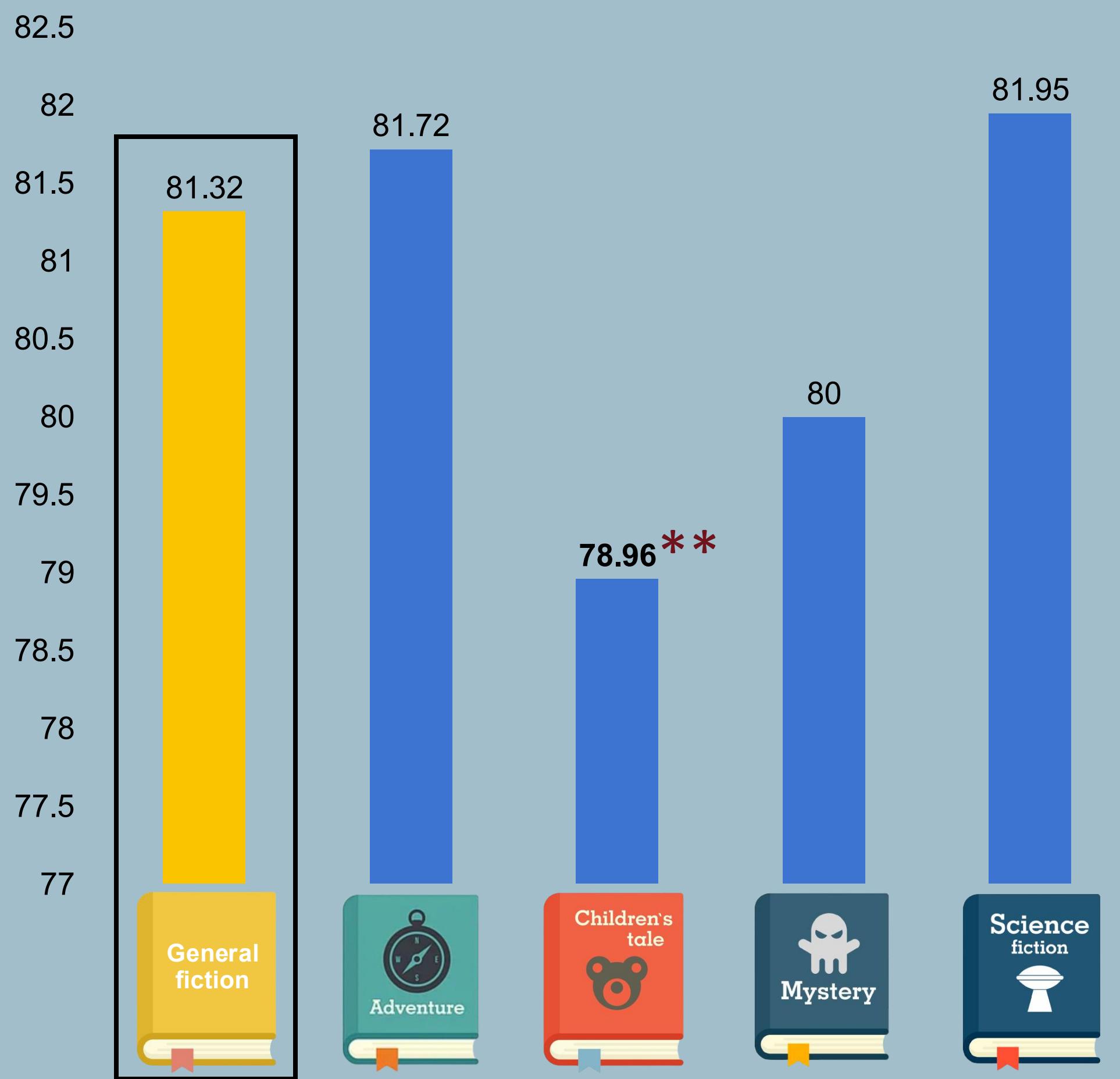


Dynamic (Tense RQA) Results

Structure:

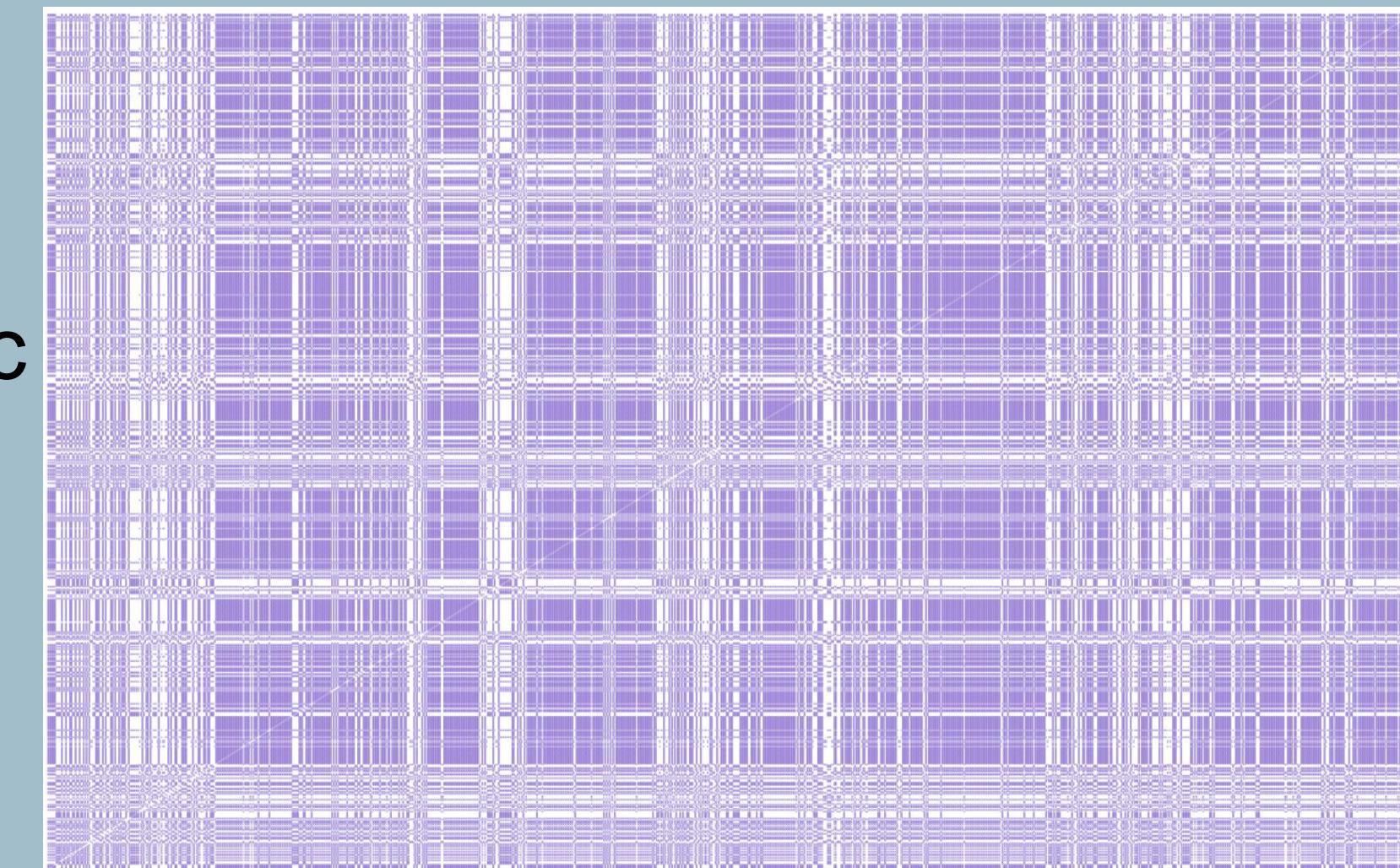
Determinism
(DET)

How often are sequences
of tenses revisited?



General:
Making People
Happy (DET =
81.76234)

Juvenile:
Acton's Feud: A Public
School Story
(DET=78.94883)

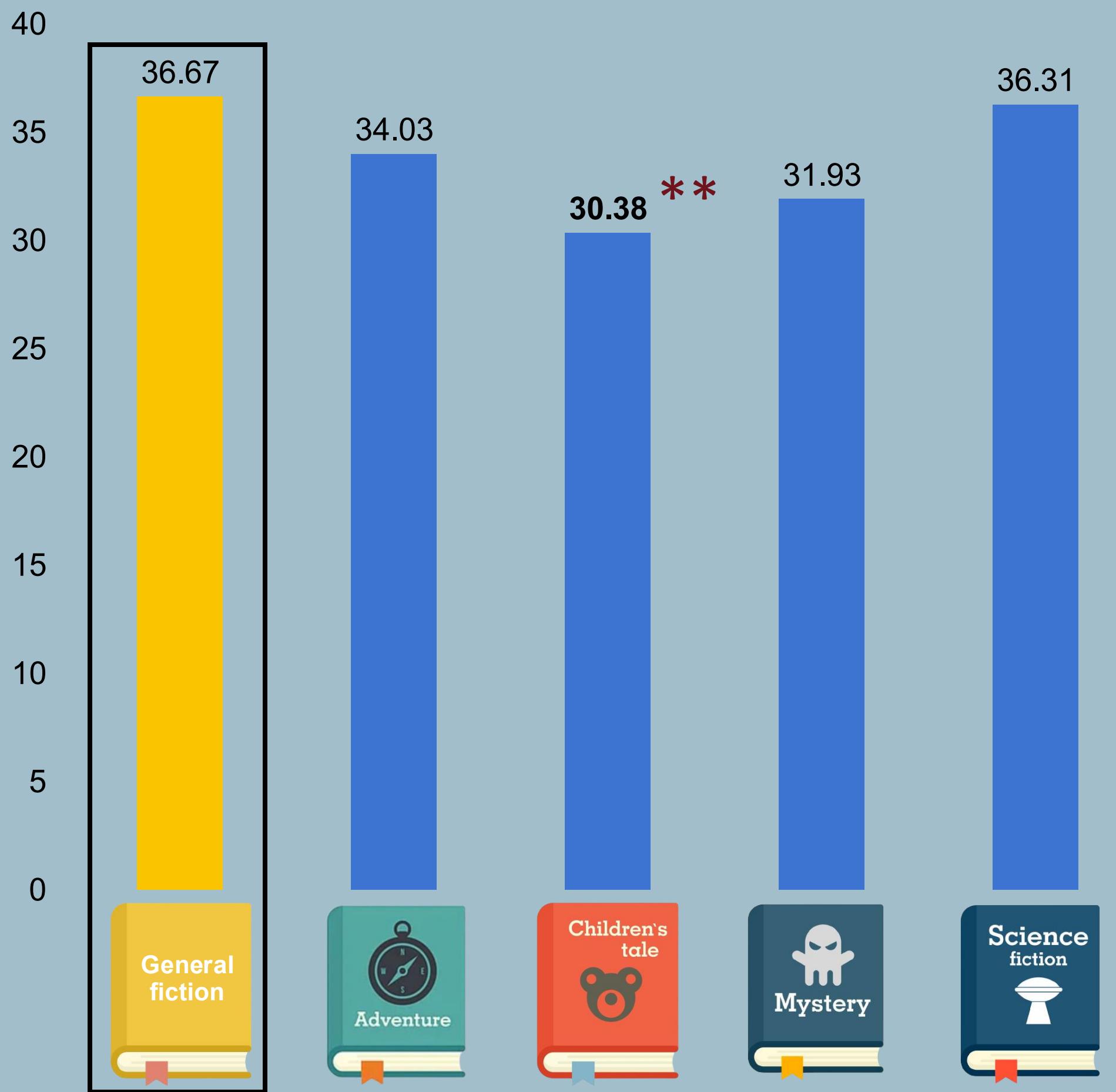


only juvenile fiction differed in how often tenses were
repeated (significantly less often)

Dynamic (Tense RQA) Results

Max Line (maxL)

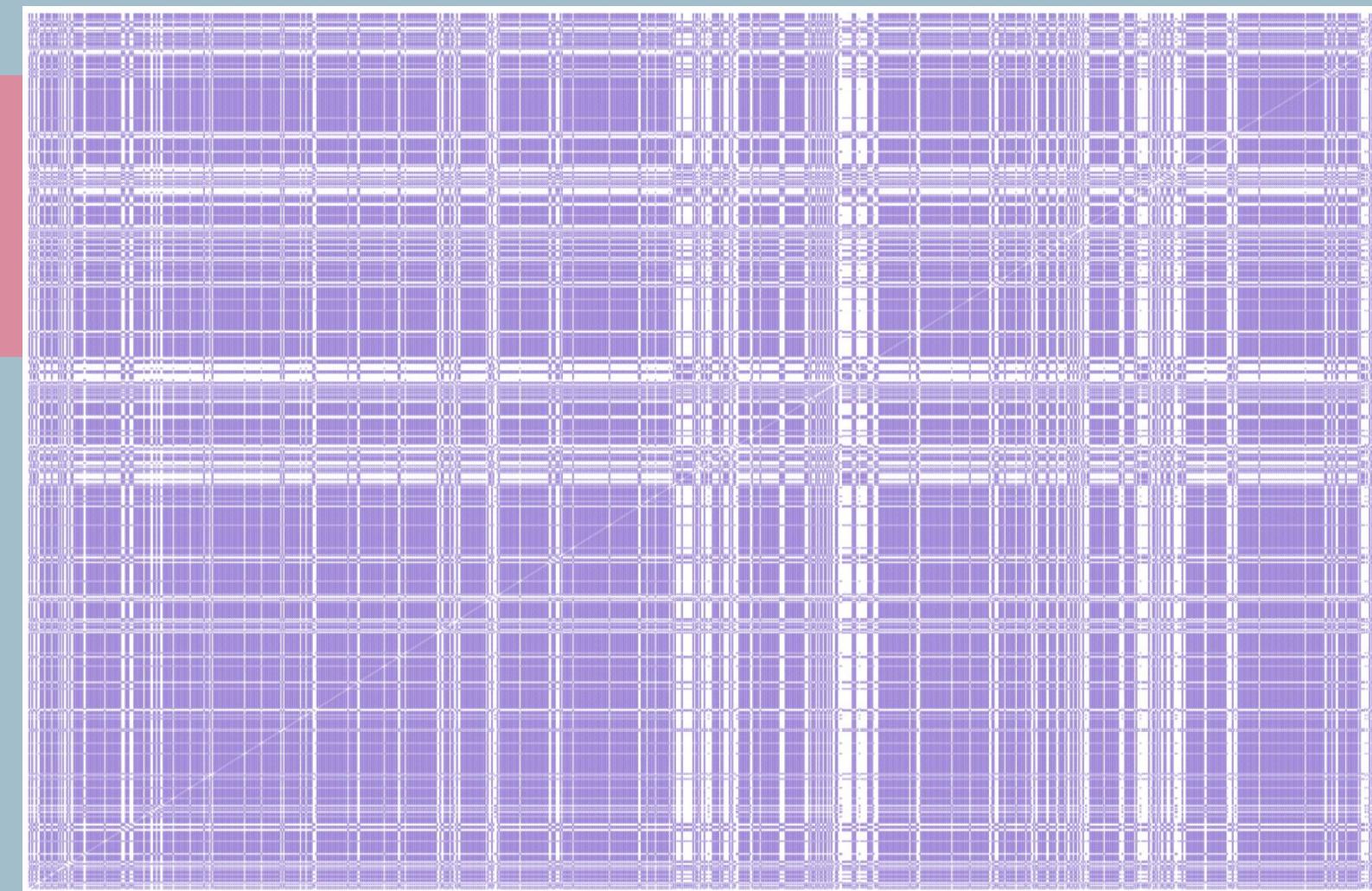
How long is the longest stretch of using the same tense?



Juvenile:
The Big Five Motorcycle
Boys on the Battle Line
(maxL=30)

juvenile fiction had significantly shorter maximum line lengths of repeated tenses

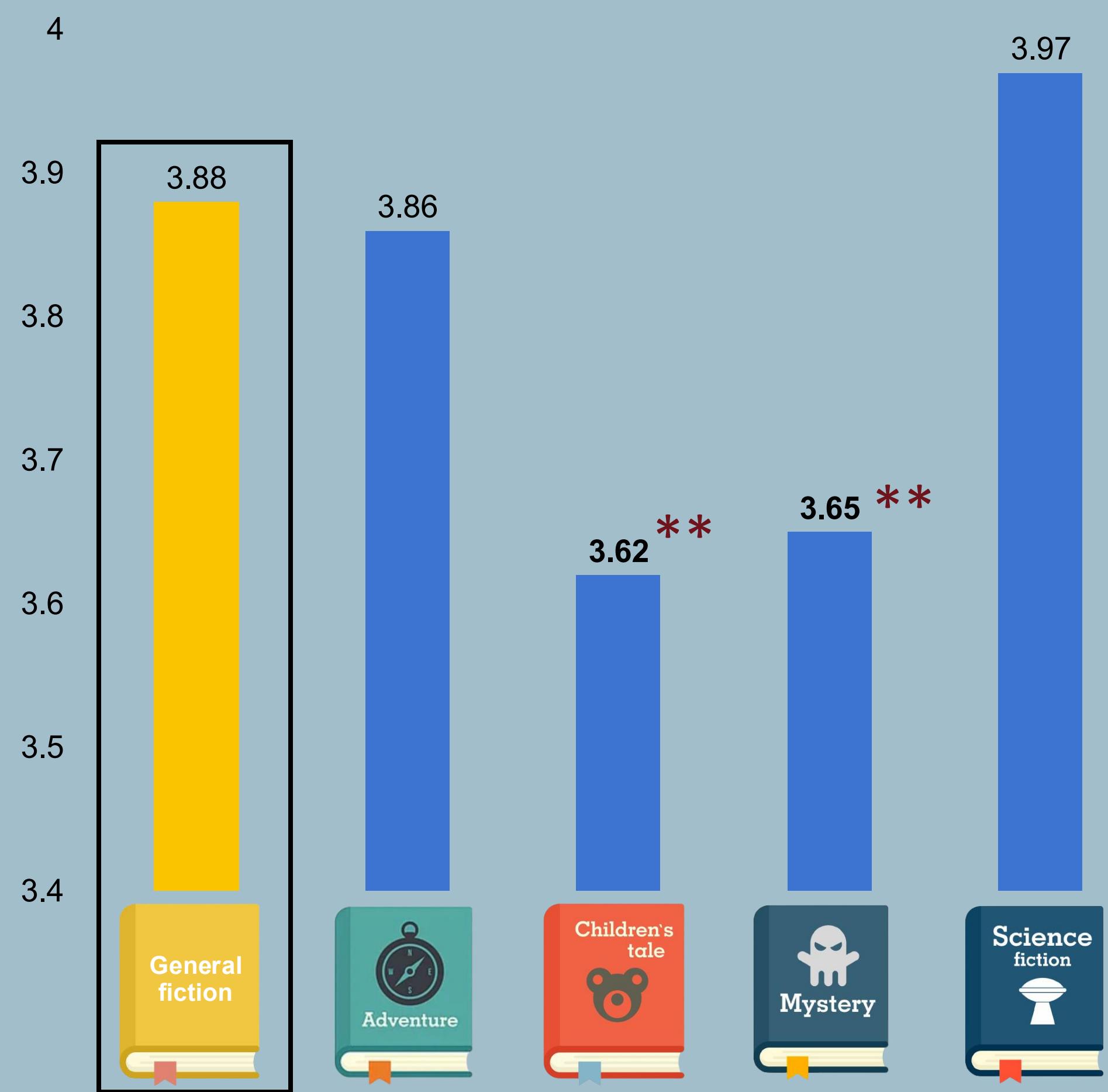
General:
The Call of the Town: A Tale of Literary Life (maxL=36)



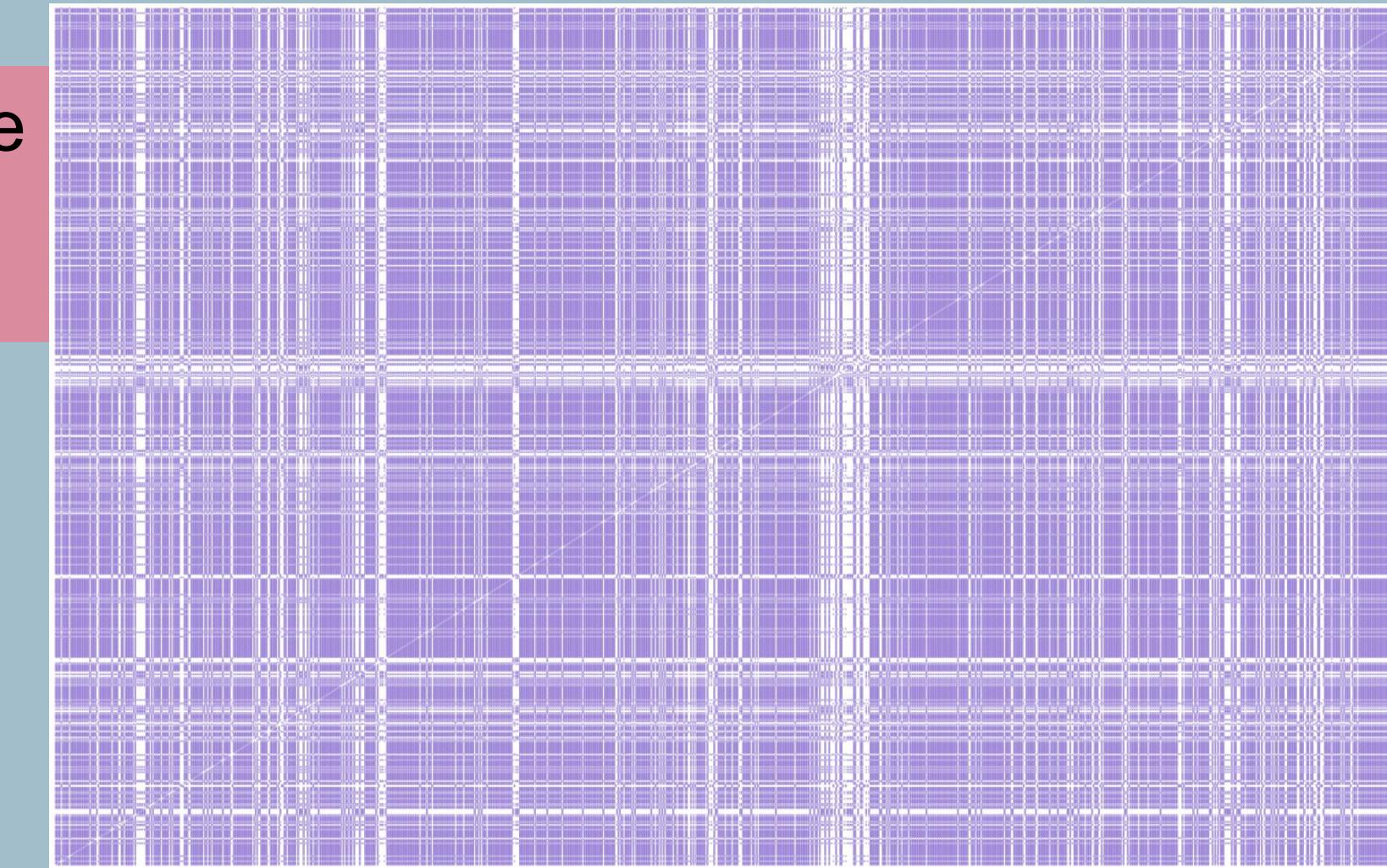
Dynamic (Tense RQA) Results

Average Line (L)

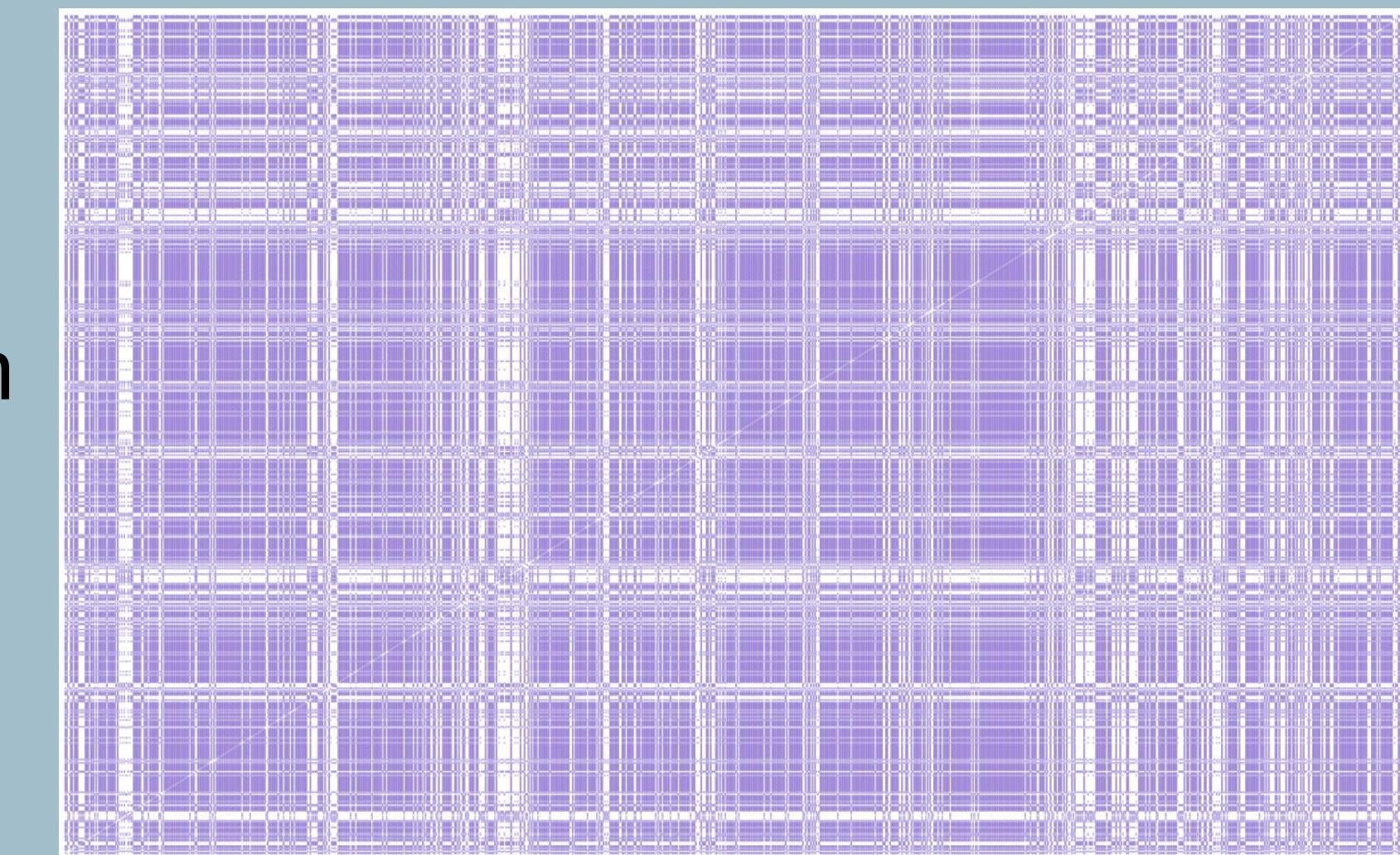
How long, on average, are stretches of revisited tenses?



General:
The Madigans
($L=3.888825$)



Juvenile:
Haviland's Chum
($L=3.630257$)



juvenile and mystery genres produced significantly shorter (on average) sequences of repeated tenses

Discussion

- we examined ways that text features fluctuate across different genres to lay a foundation for work that applies a dynamics perspective to NLP
- both static (tense proportions) and dynamic (tense RQA indices) were found to significantly differ based on the genre
 - finding dynamic nonlinear patterns suggests that other text features (other than readability metrics) ARE related to text complexity
 - may impact how readers ***experience*** texts

Future Extensions

- limitation: only fiction genres examined → extend to other genres (e.g., nonfiction)
- examine/model other dynamic text features (e.g., emotion, imagery, concreteness) that may vary across genres
- study the impact of these text features on reader experiences (how they align to their text)

Thank You!

Any questions?

Email: Flynn598@umn.edu

procedure

- nlp indices/genre labels from laura & co's genre study
- gutenbergr R package to download books
- filtering
 - in english, has text available, fiction
- 5 genres: 500 books per genre (general fiction, adventure, mystery, sci-fi, juvenile)
 - only one book allowed in sample per author (to avoid author stylistic influences)
 - books chosen with similar # of words, sentences, and ratio of direct speech
 - cleaned (removing chapter title lines, section breaks, blank lines, etc.)

Extra: Assigning Tenses

- uses udpipe R package
 - book tenses sliced from 500 to 1500 (1000 obs/verb tenses)
- `str_detect(feats, "Tense=Past") ~ "past",`
- `str_detect(feats, "Tense=Pres") ~ "present",`
- `xpos == "MD" & lead(feats) == "VerbForm=Inf" ~ "future"`