

# Visualizing Nonlinear Narratives with Story Curves



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Disney



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Harvard



**HARVARD**  
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**THE UNIVERSITY  
of EDINBURGH**

# STORY

What is told

# NARRATIVE

How it is told

FULL CAST AND CREW

TRIVIA

USER REVIEWS

IMDbPro

MORE

SHARE



# Pulp Fiction (1994)

★ 8.9/10  
1,456,263

★ Rate This

R | 2h 34min | Crime, Drama | 14 October 1994 (USA)



7 VIDEOS

135 IMAGES

# Narrative Order

# Story Order

#1



#2



#3



#4



#5



# Narrative Order

# Story Order

#2



#1



#5



#3



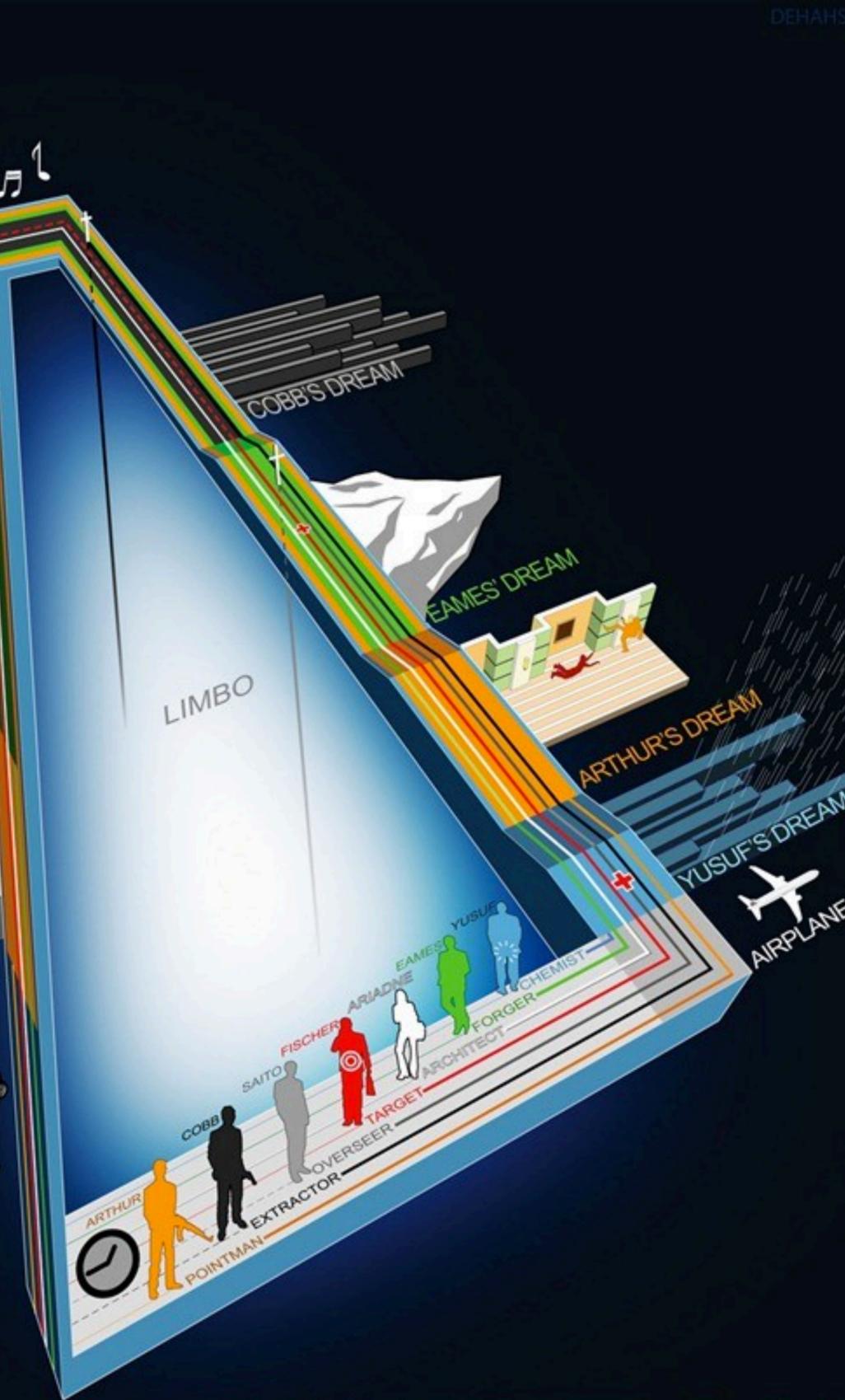
#4



# NONLINEAR NARRATIVE

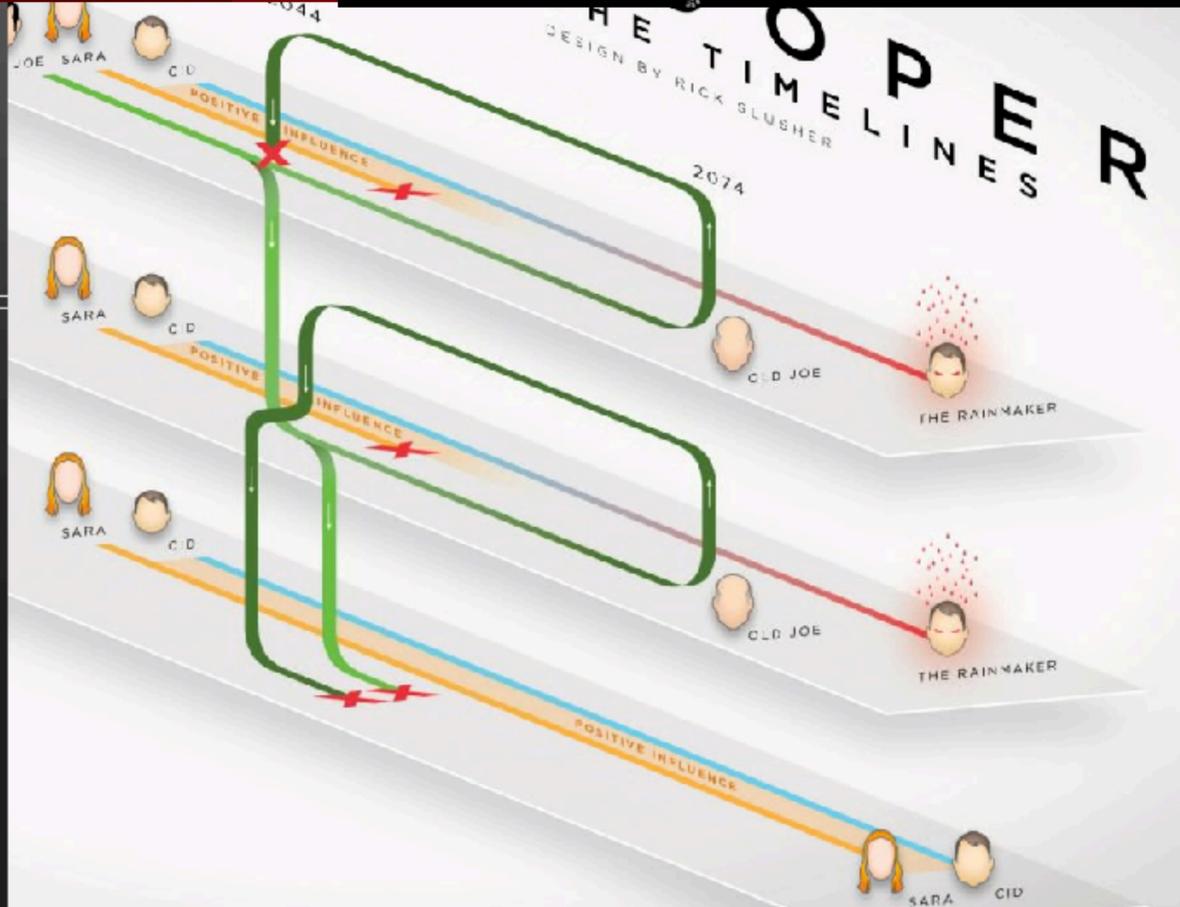
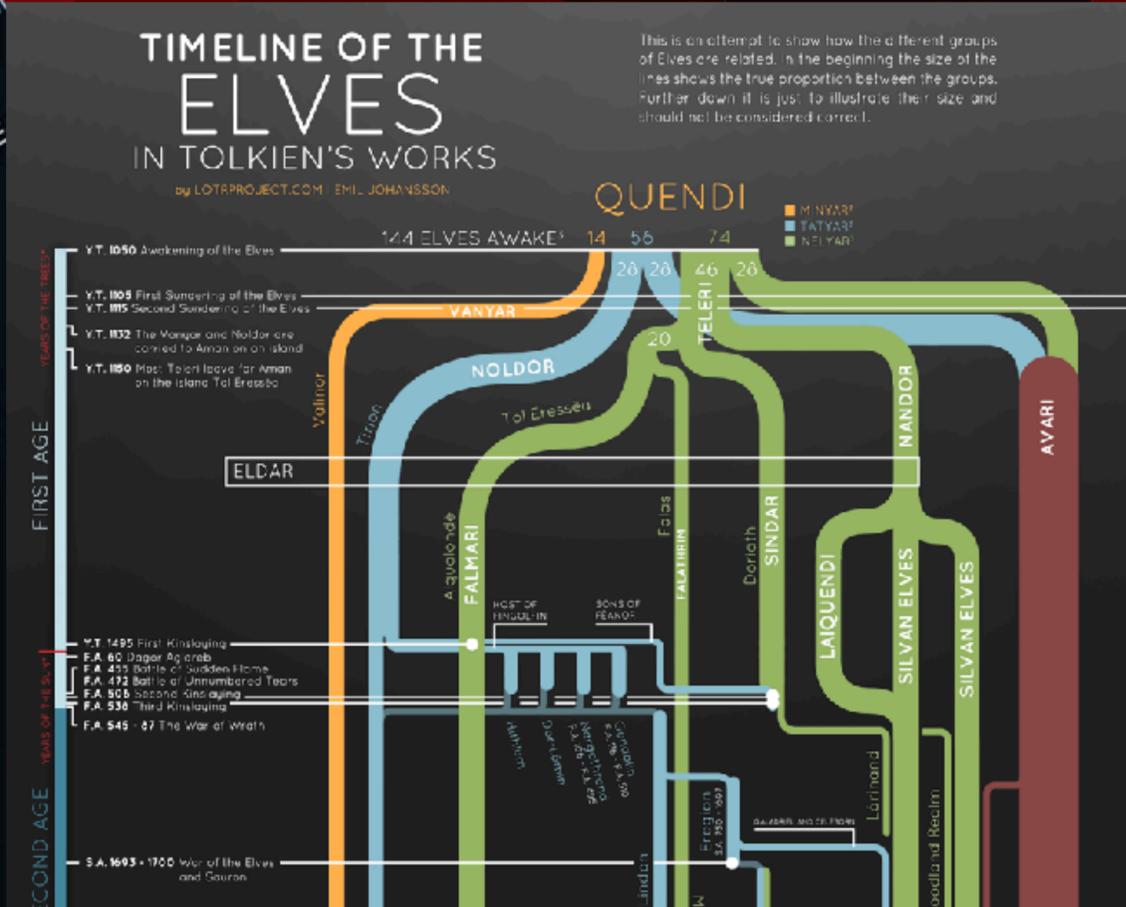
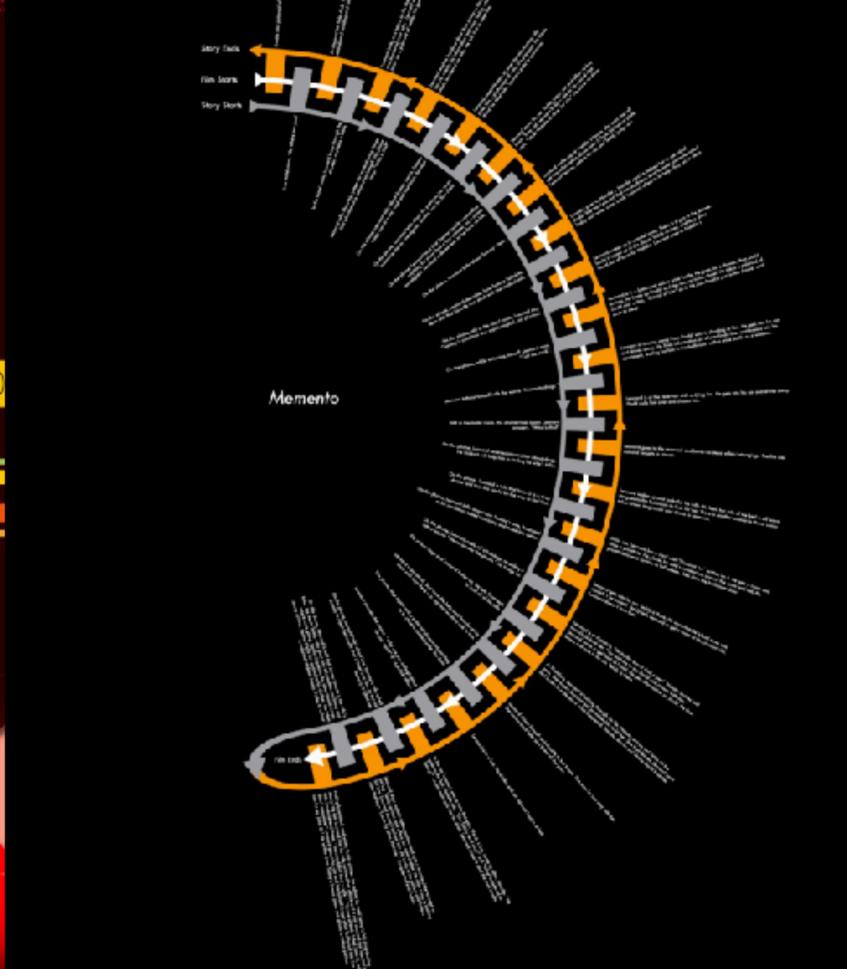
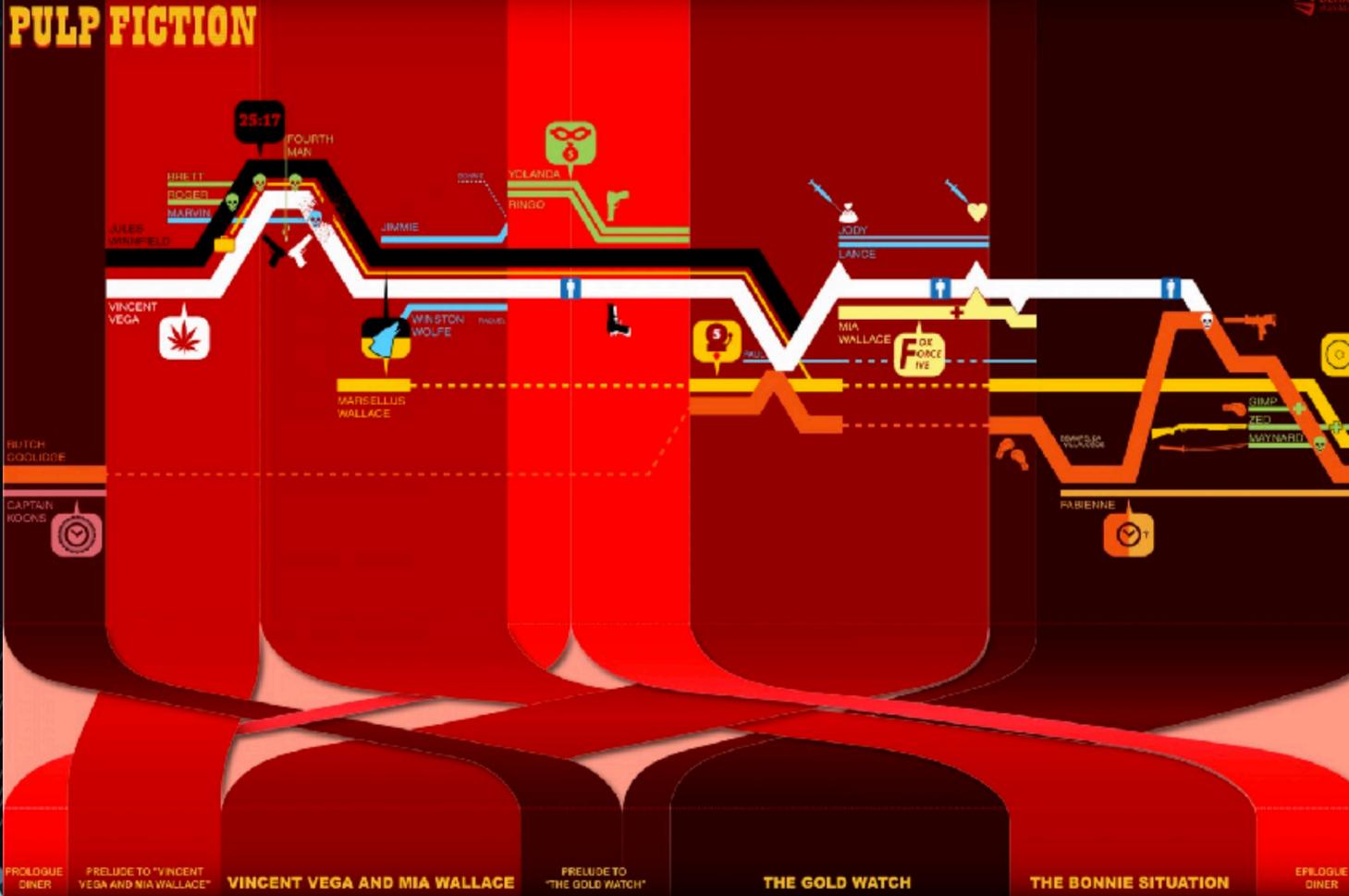
Telling events out of chronological order





# INCEPTION

TIMELINE



# GÉRARD GENETTE

French Literary Theorist (1930-)

Chronology

Retrograde

Flashback

Flash Forward

Zigzag

by GÉRARD GENETTE

How did Genette identify  
such basic nonlinear narrative patterns?

“

*Sometimes passing in front of the hotel he remembered the rainy days when he used to bring his nursemaid that far, on a pilgrimage. But he remembered them without the melancholy that he then thought he would surely some day savor on feeling that he no longer loved her. For this melancholy, projected in anticipation prior to the indifference that lay ahead, came from his love. And this love existed no more.*

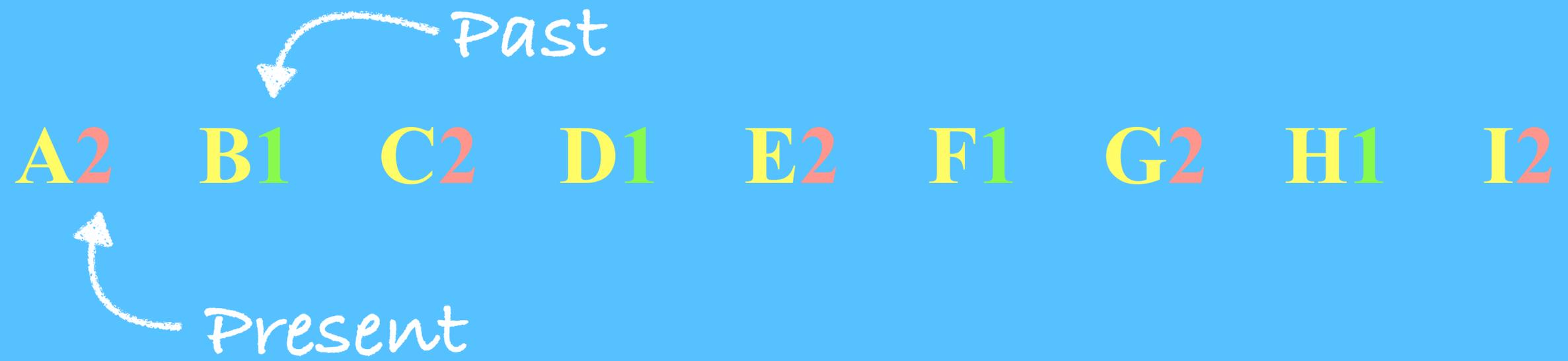
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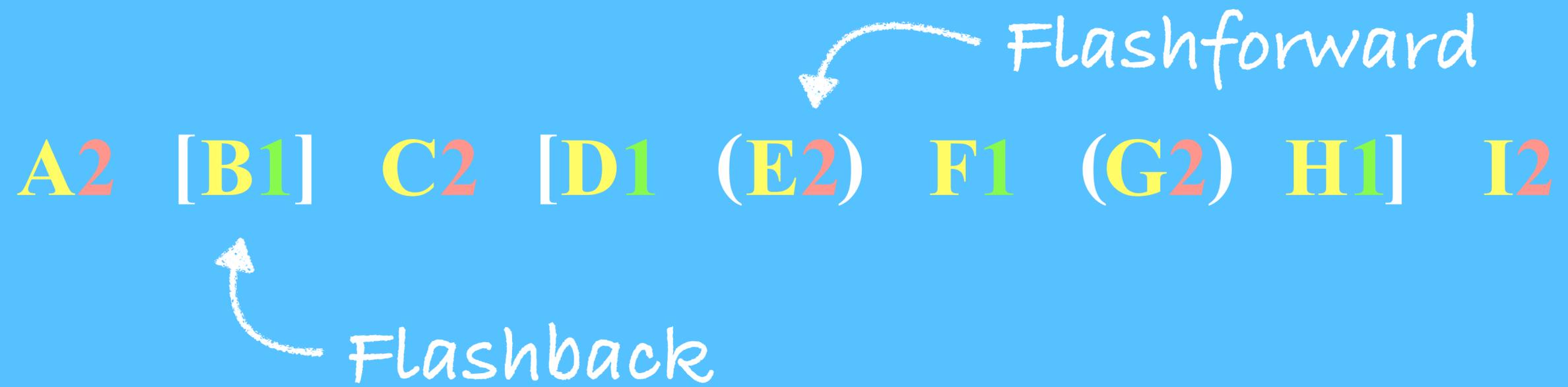
*p.38-40, **Narrative Discourse: An Essay in Method**, Gérard Genette, 1980*

**A** Sometimes passing in front of the hotel he remembered  
**B** the rainy days when he used to bring his nursemaid that far, on a pilgrimage.  
**C** But he remembered them without  
**D** the melancholy that he then thought  
**E** he would surely some day savor on feeling that he no longer loved her.  
**F** For this melancholy, projected in anticipation  
**G** prior to the indifference that lay ahead,  
**H** came from his love.  
**I** And this love existed no more.

A  
B  
C  
D  
E  
F  
G  
H  
I

A B C D E F G H I





Close reading of a text passage  
**does not scale** beyond a few sequences.

Develop a **distant reading technique** to  
reveal global narrative structures

# STORY CURVES

**Narrative Order**

1

A

2

B

3

C

4

D

5

E

**Events**



**Story Order**

1

2

3

4

5



1

2

3

4

5

1

2

3

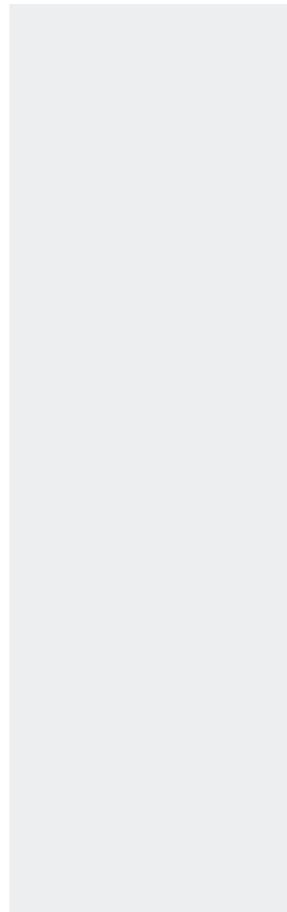
4

5



**Narrative Order**

- 1
- 2
- 3
- 4
- 5

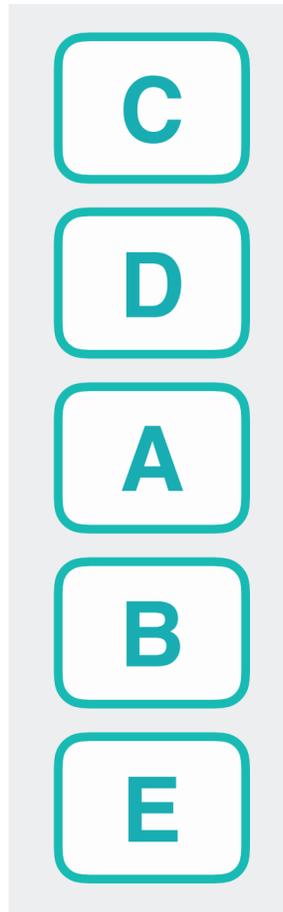


**Events**



**Story Order**

- 1
- 2
- 3
- 4
- 5



- 1
- 2
- 3
- 4
- 5



## Narrative Order

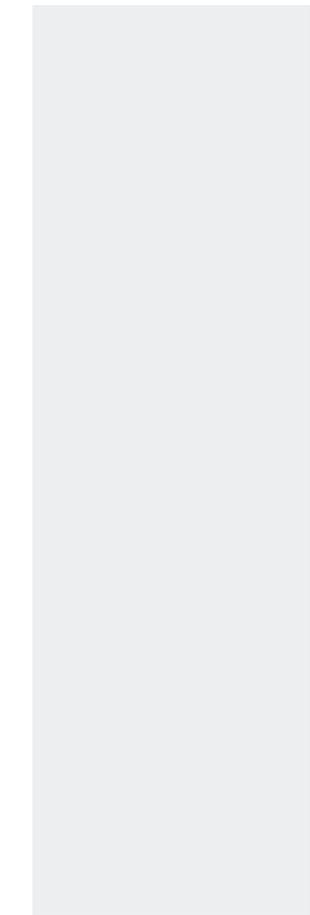
1

2

3

4

5



Events



## Story Order

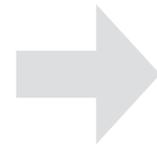
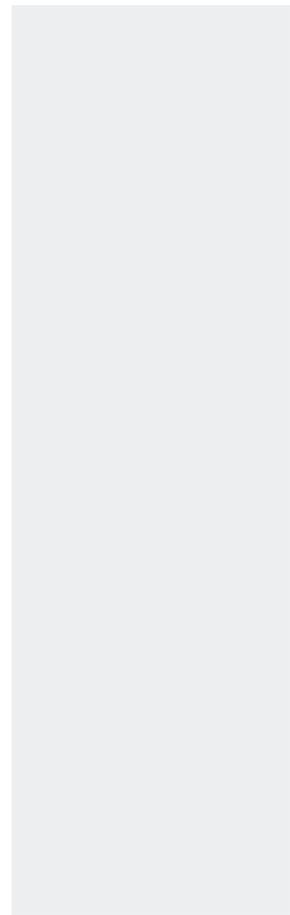
1

2

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1

2

3

4

5

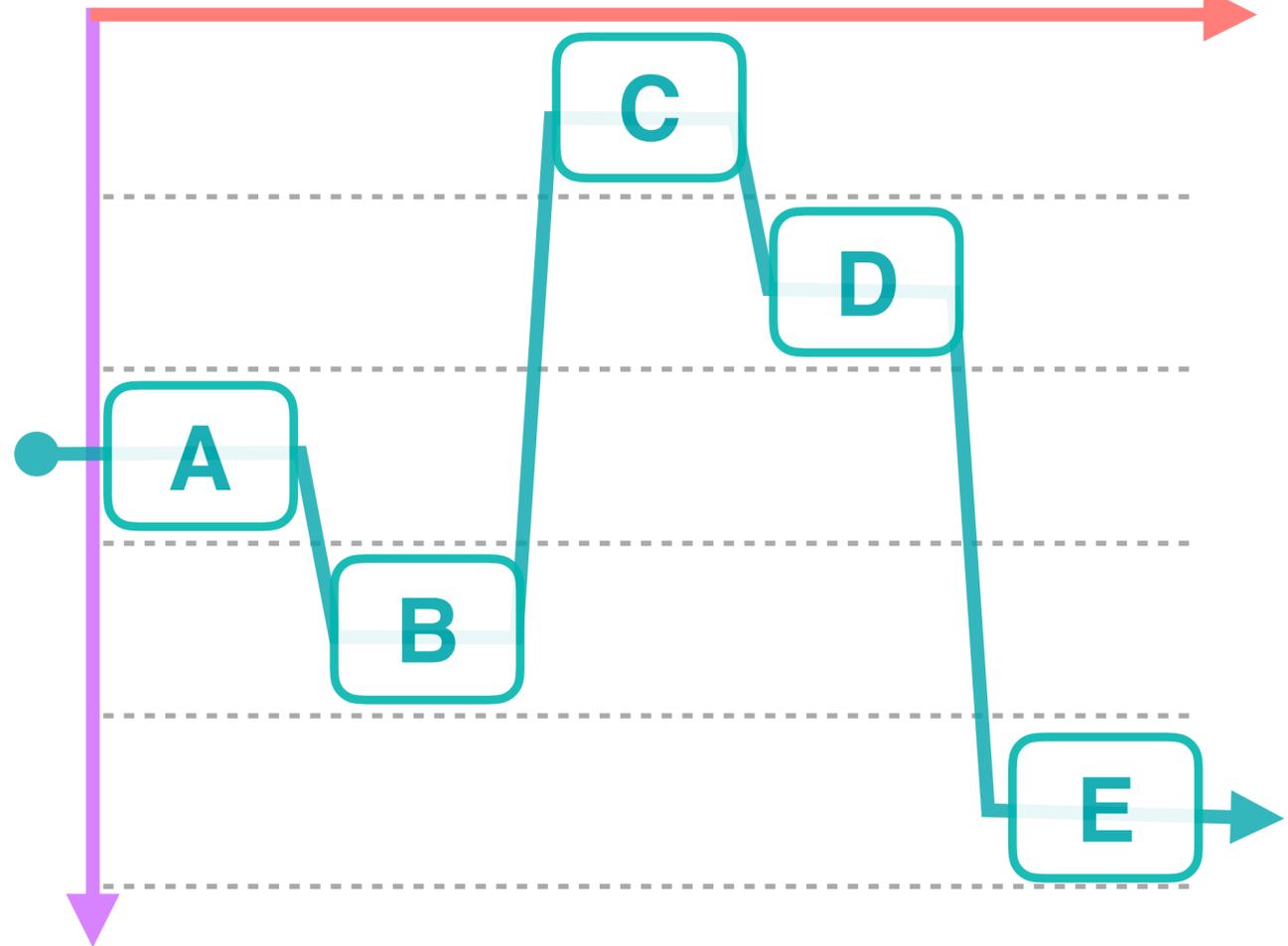
1

2

3

4

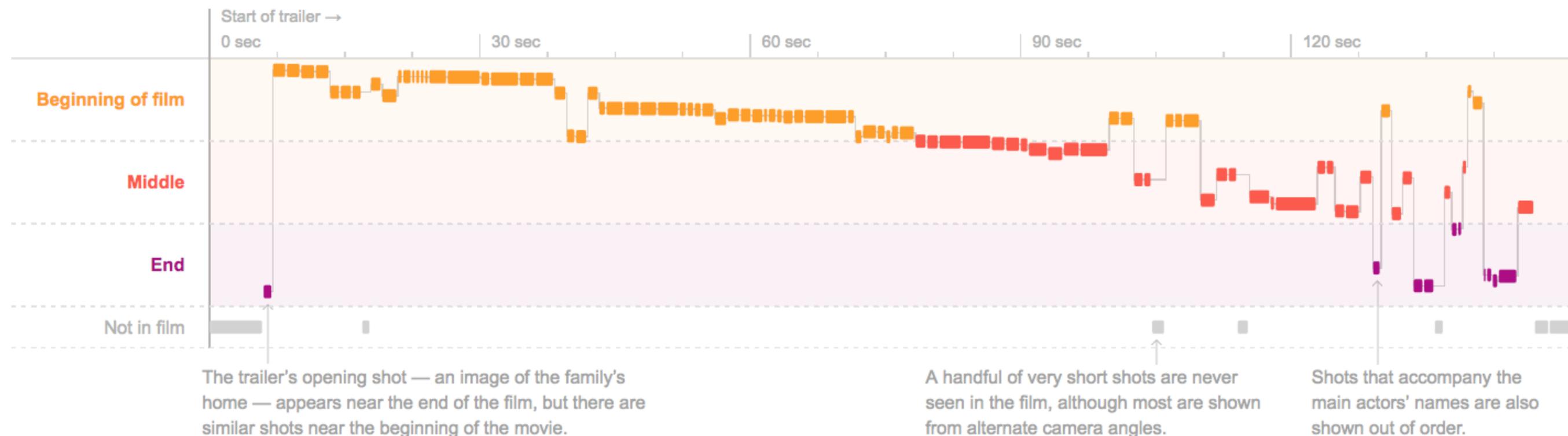
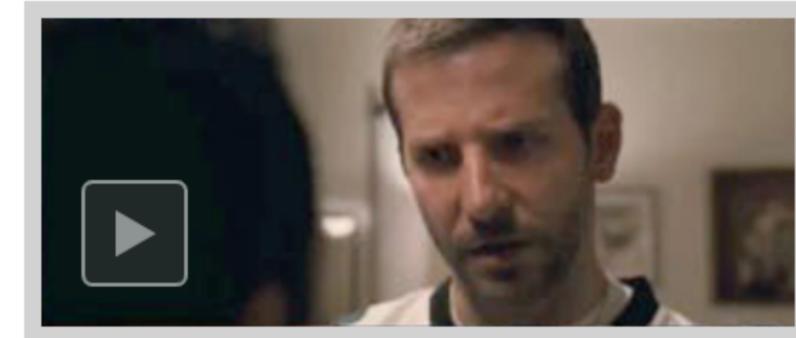
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# INSPIRATION

## Silver Linings Playbook

“Silver Linings Playbook” follows the standard model for trailers, according to Bill Woolery, a trailer specialist in Los Angeles who once worked on trailers for movies like “The Usual Suspects” and “E.T. the Extra-Terrestrial.” While introducing the movie’s story and its characters, the trailer largely follows the order of the film itself.



*Dissecting a Trailer: The Parts of the Film That Make the Cut- New York Times, Feb 19, 2013*

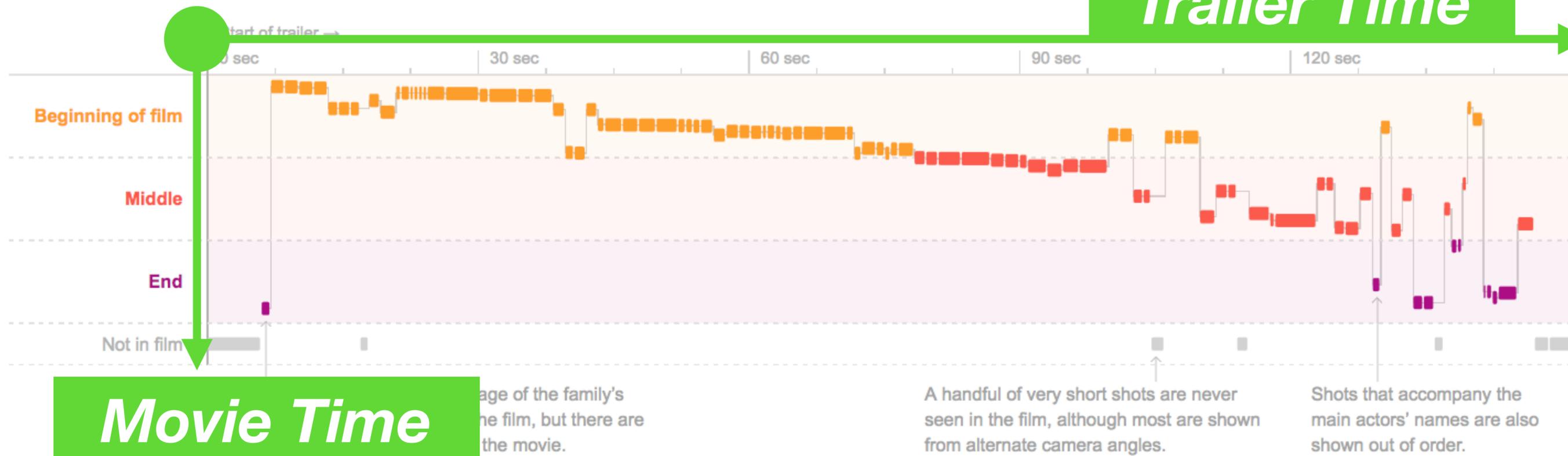
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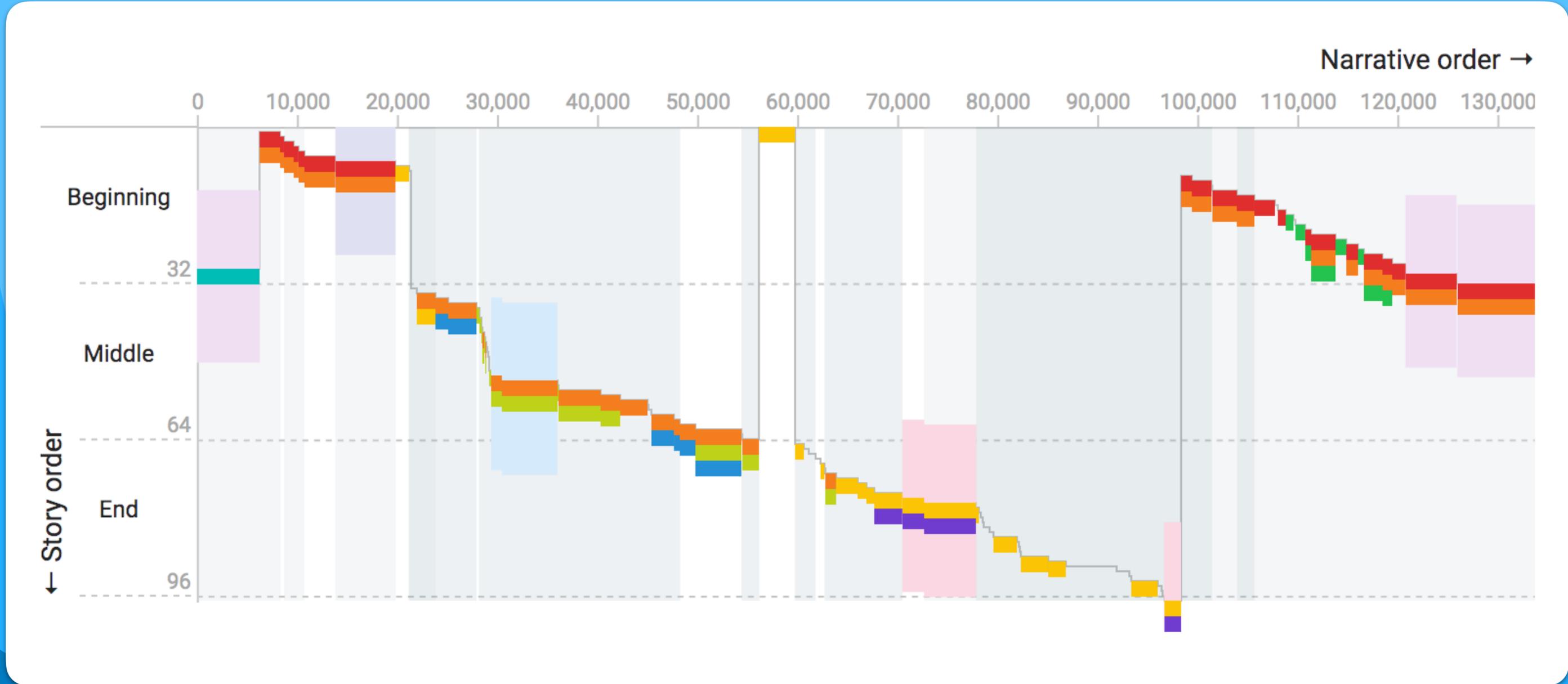
*Trailer Time*



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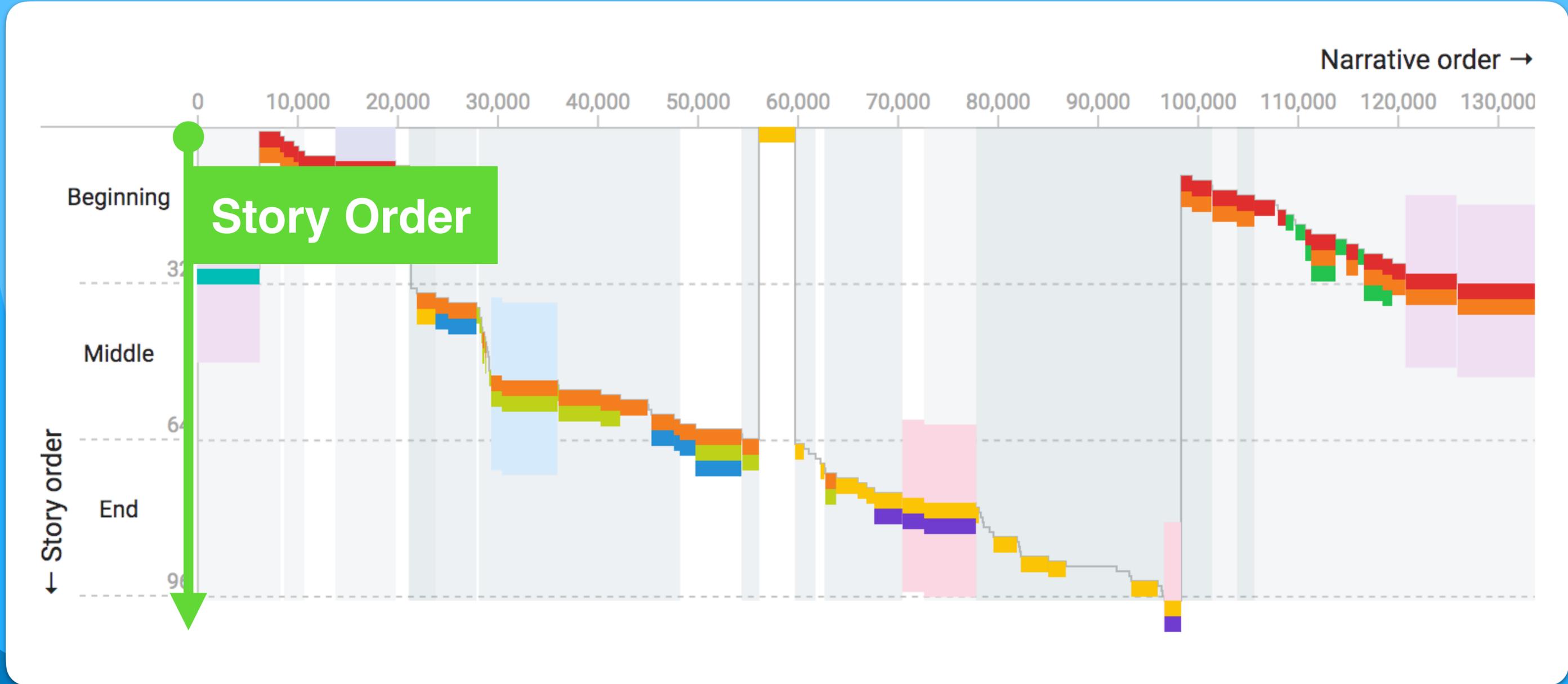
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Thriller, Crime | October 1994 | Directed by Quentin Tarantino



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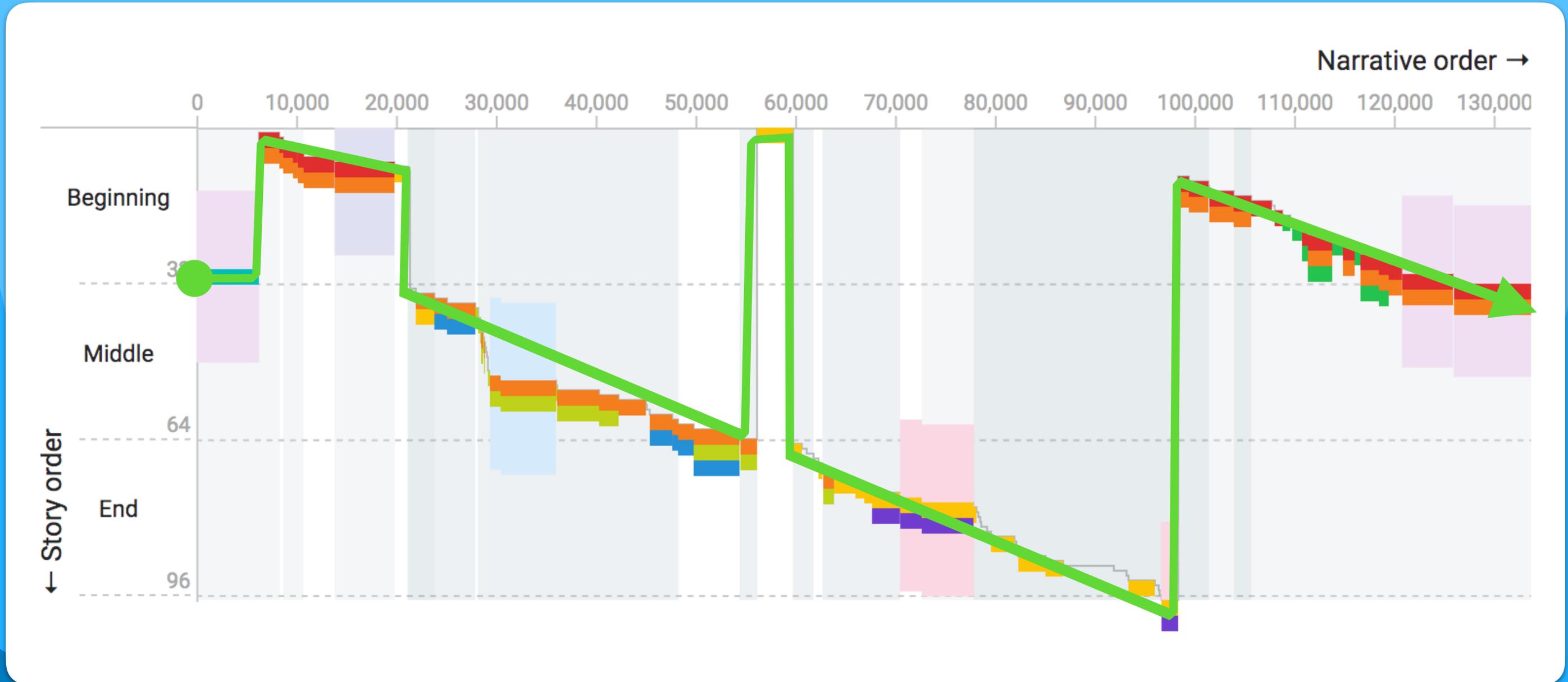
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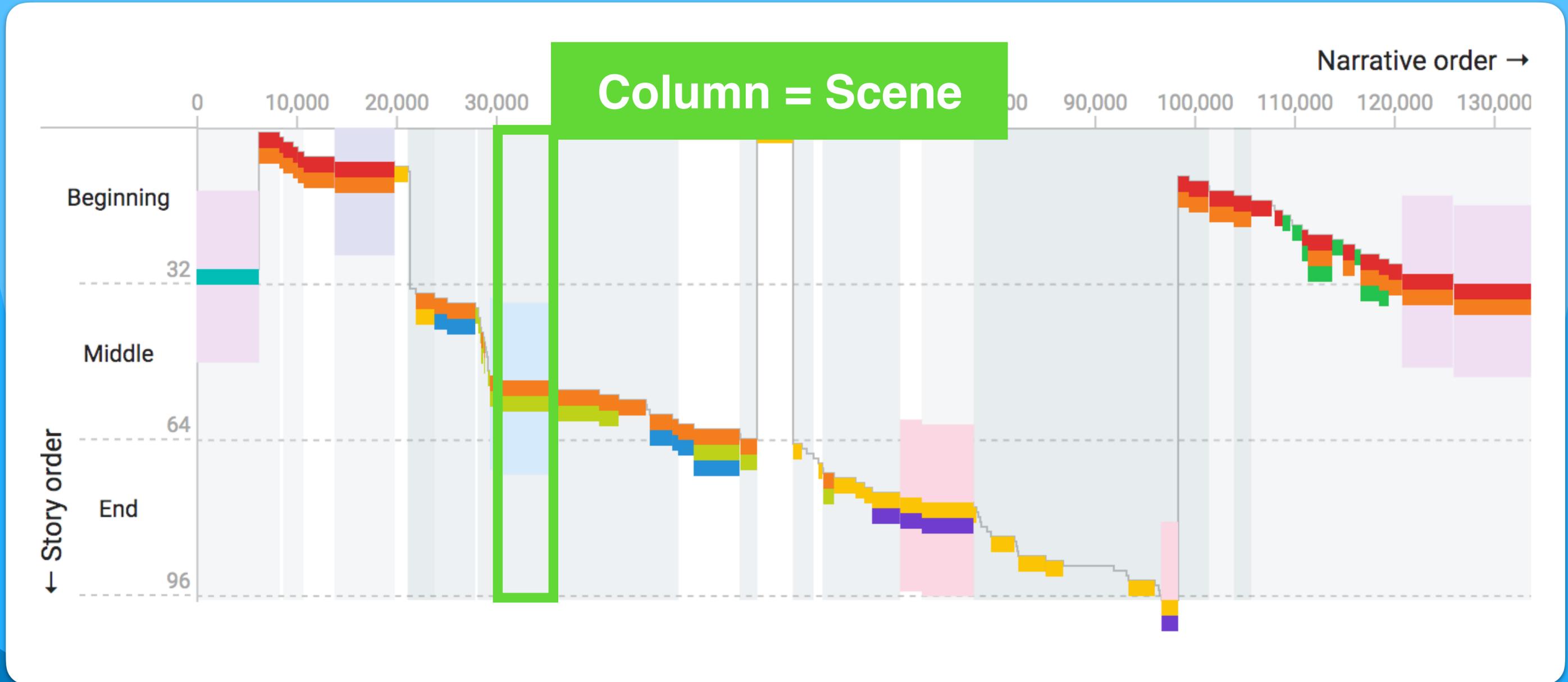
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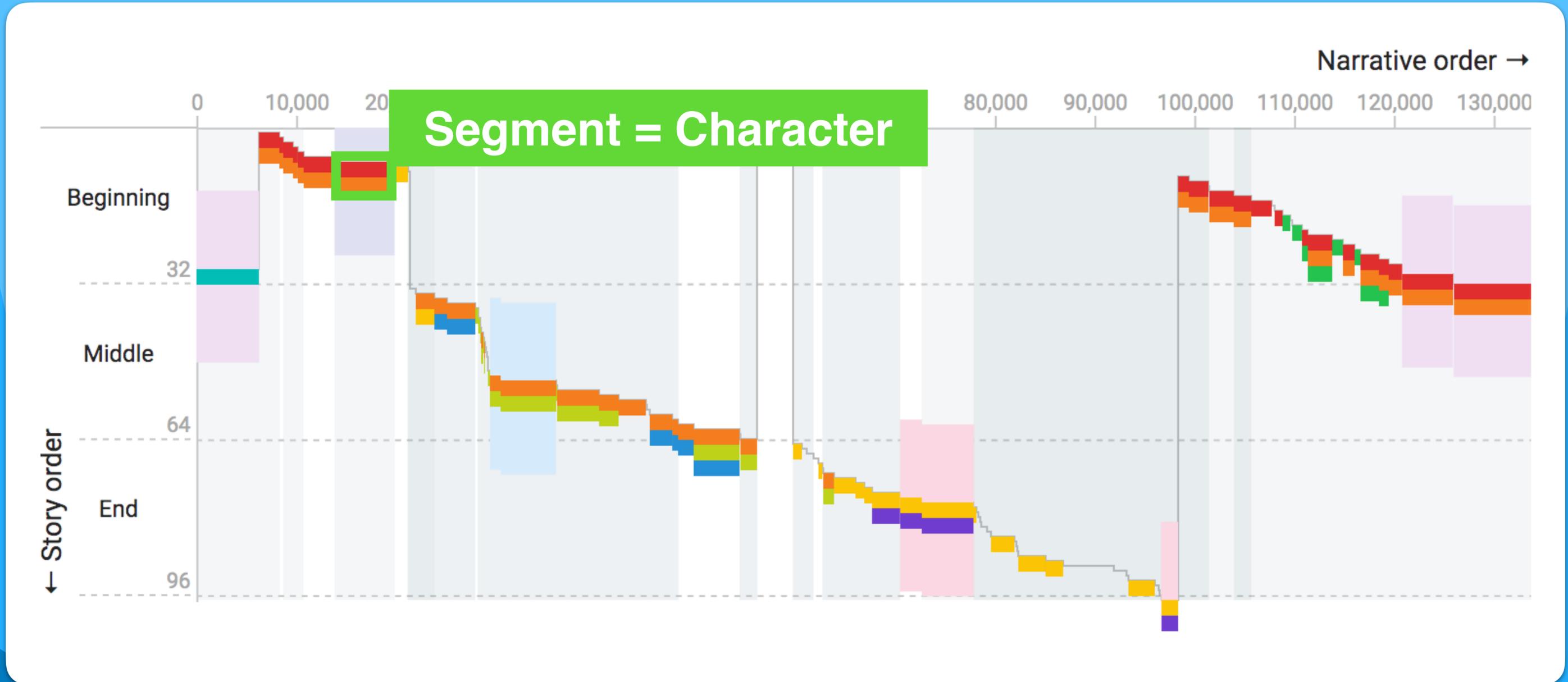
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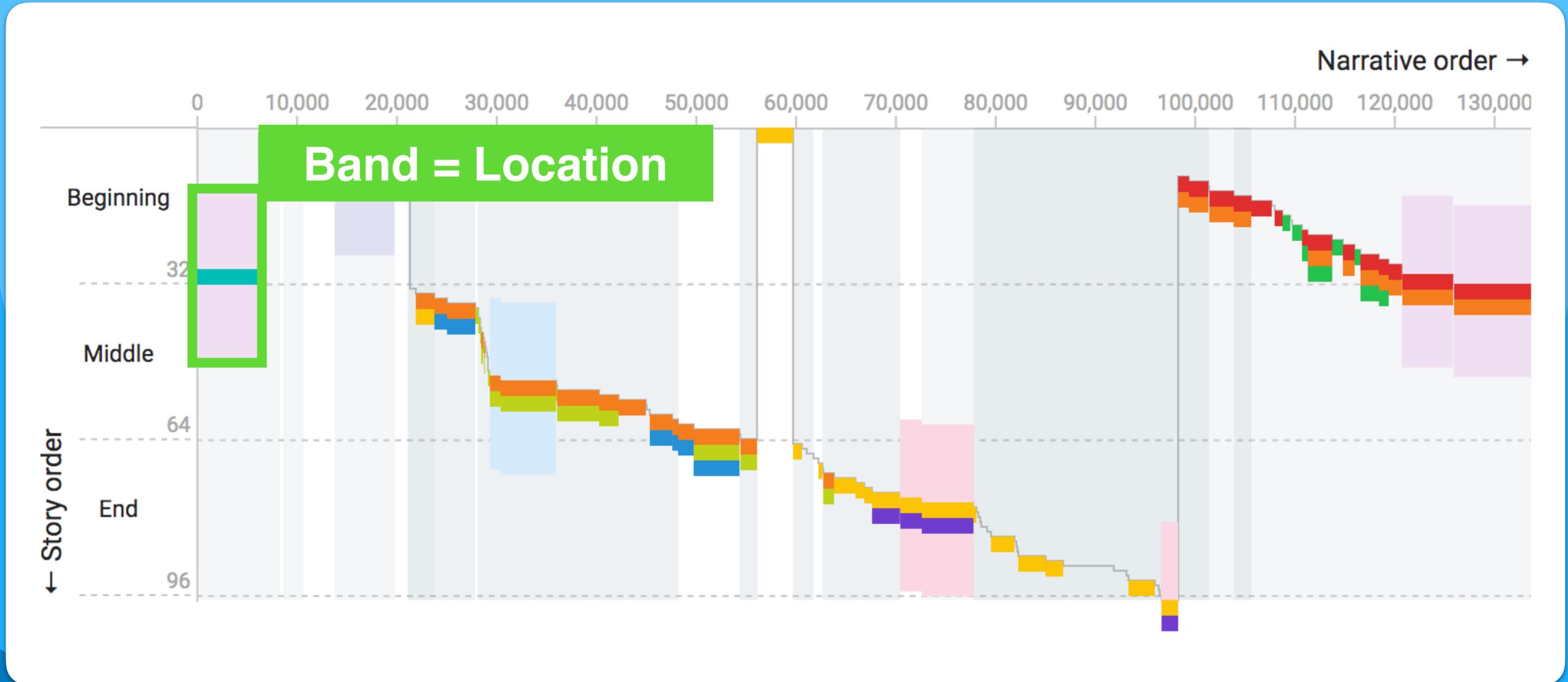
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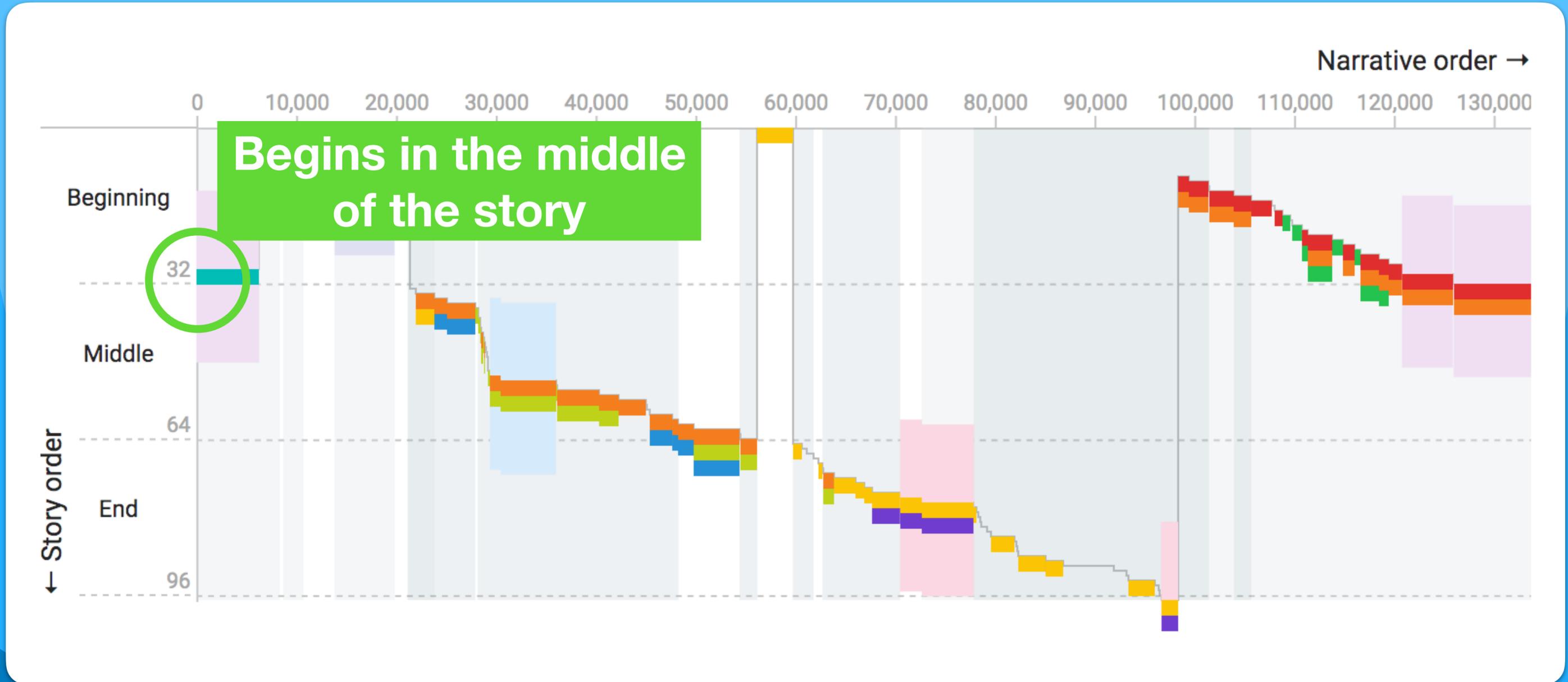
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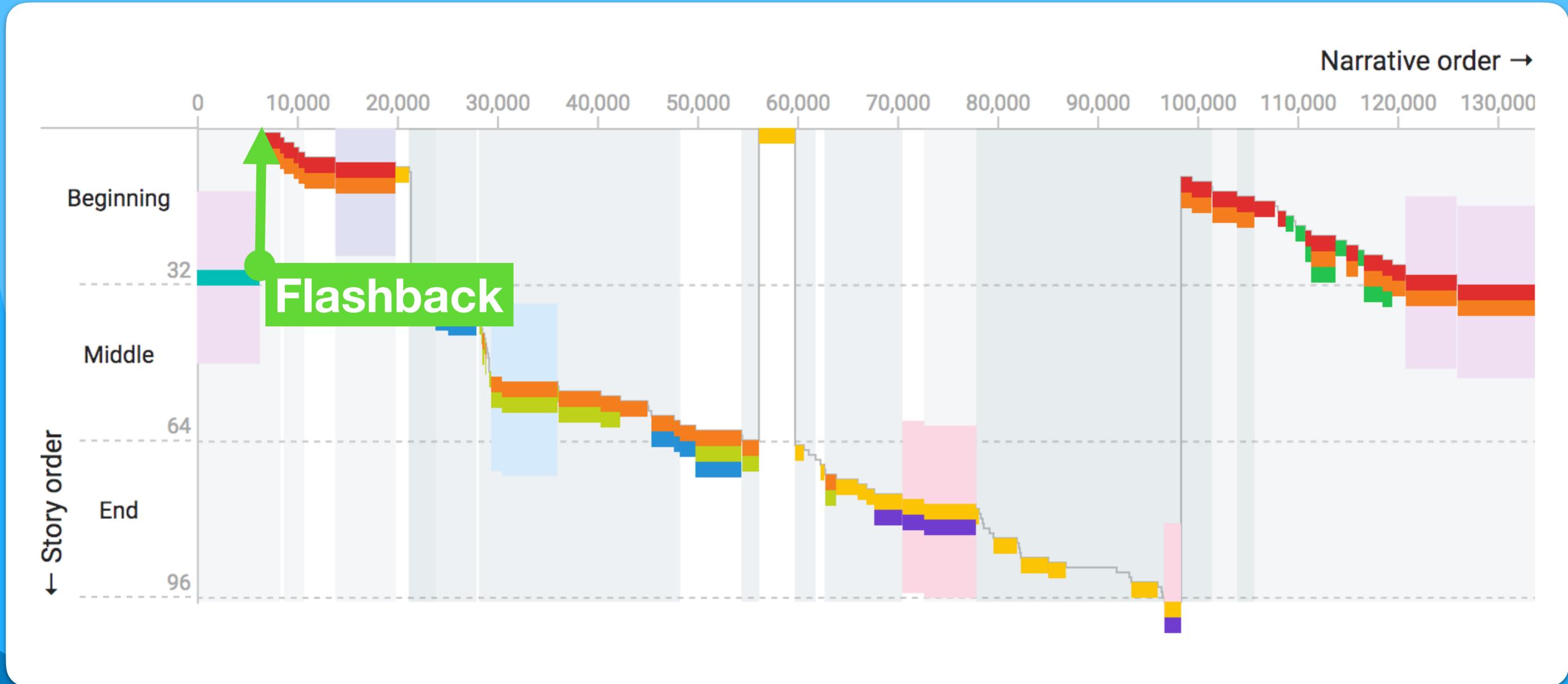
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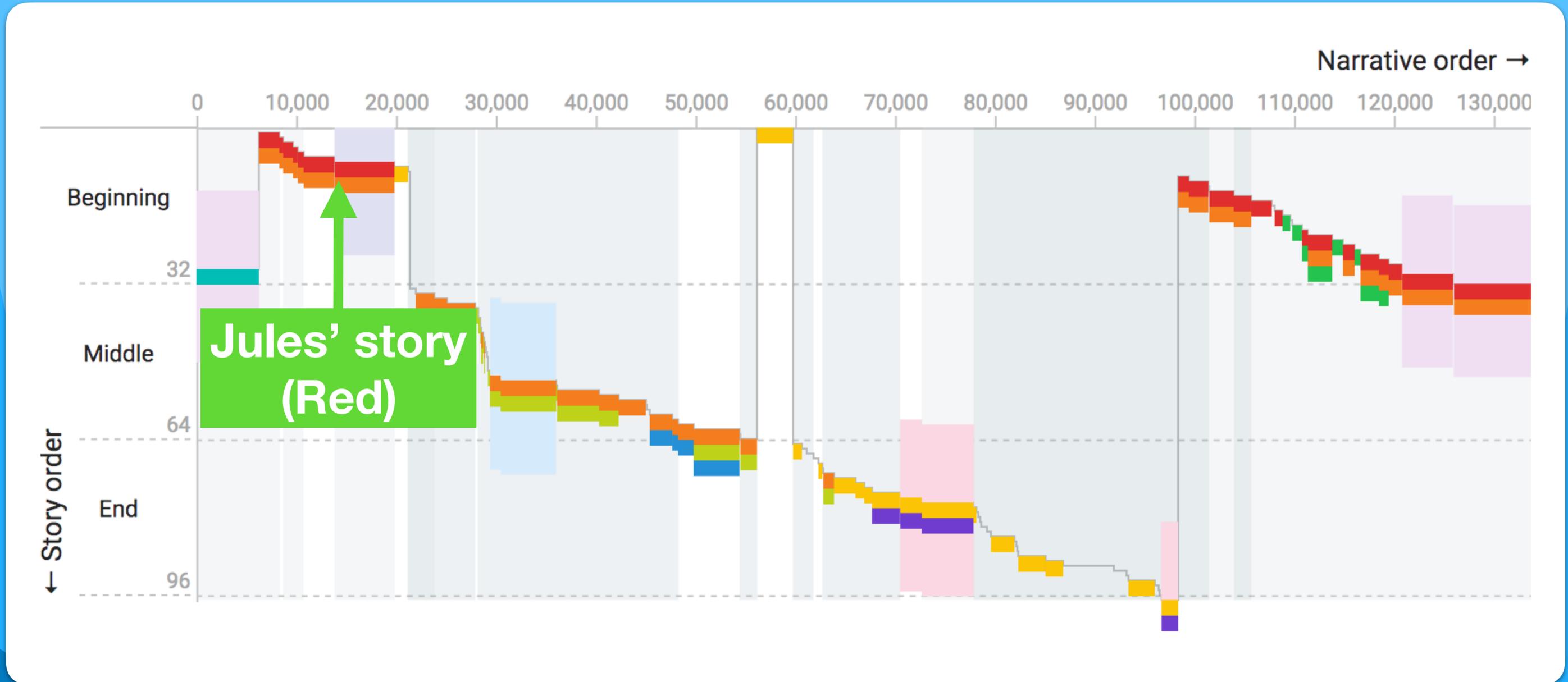
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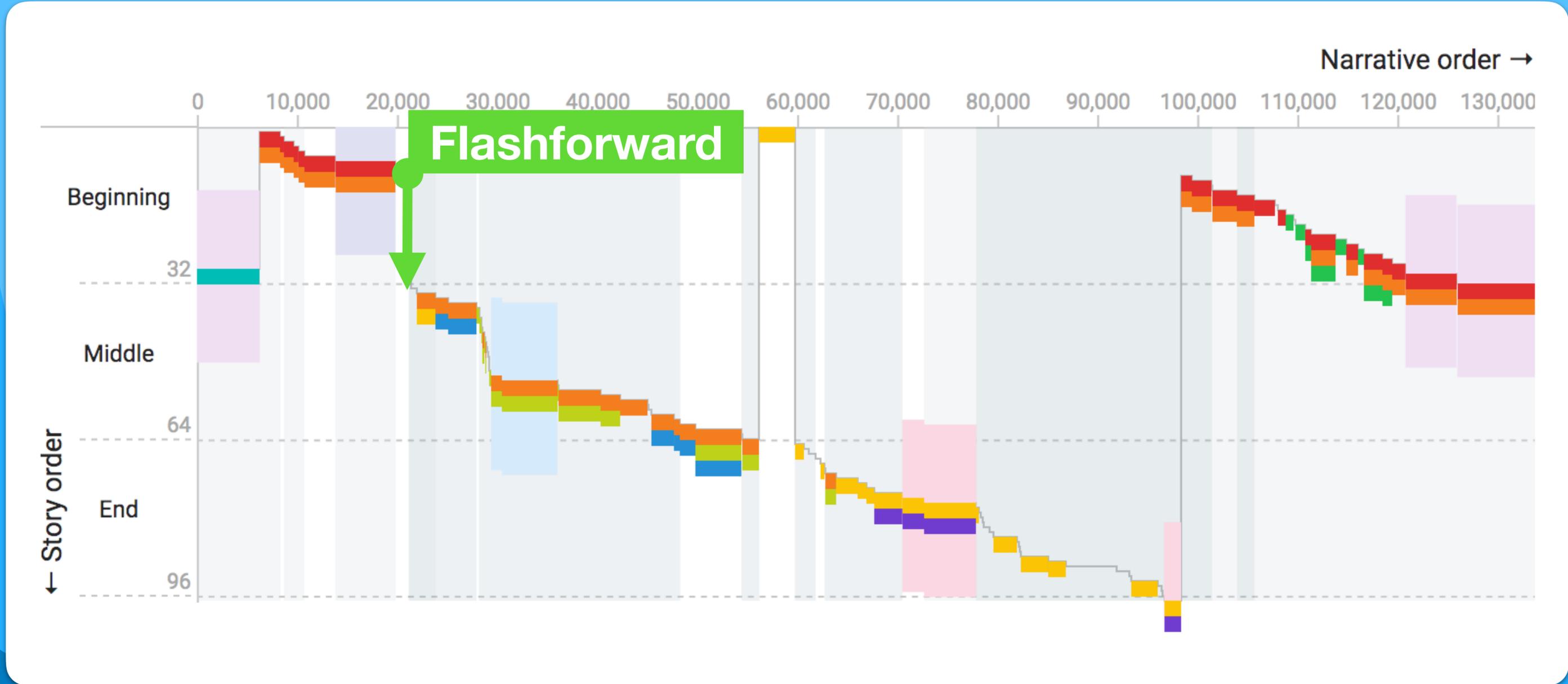
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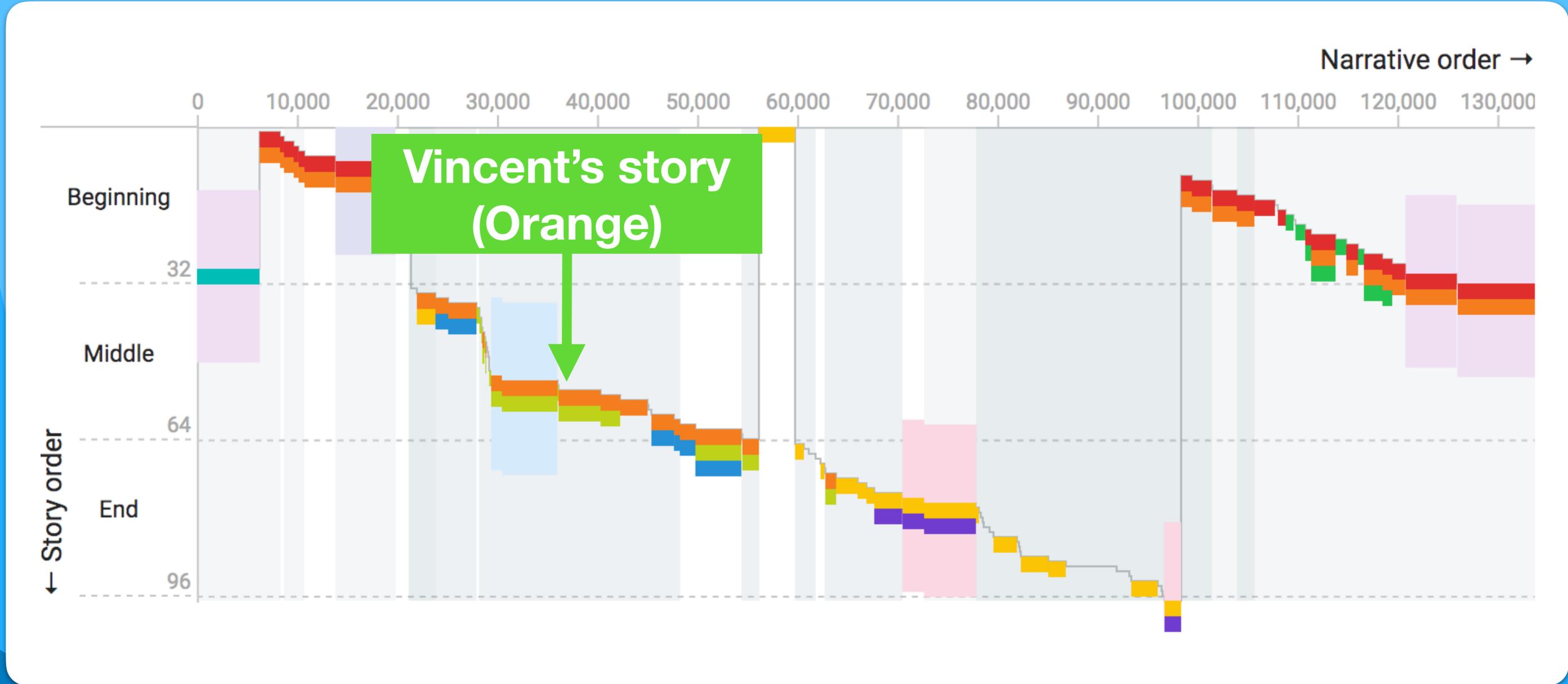
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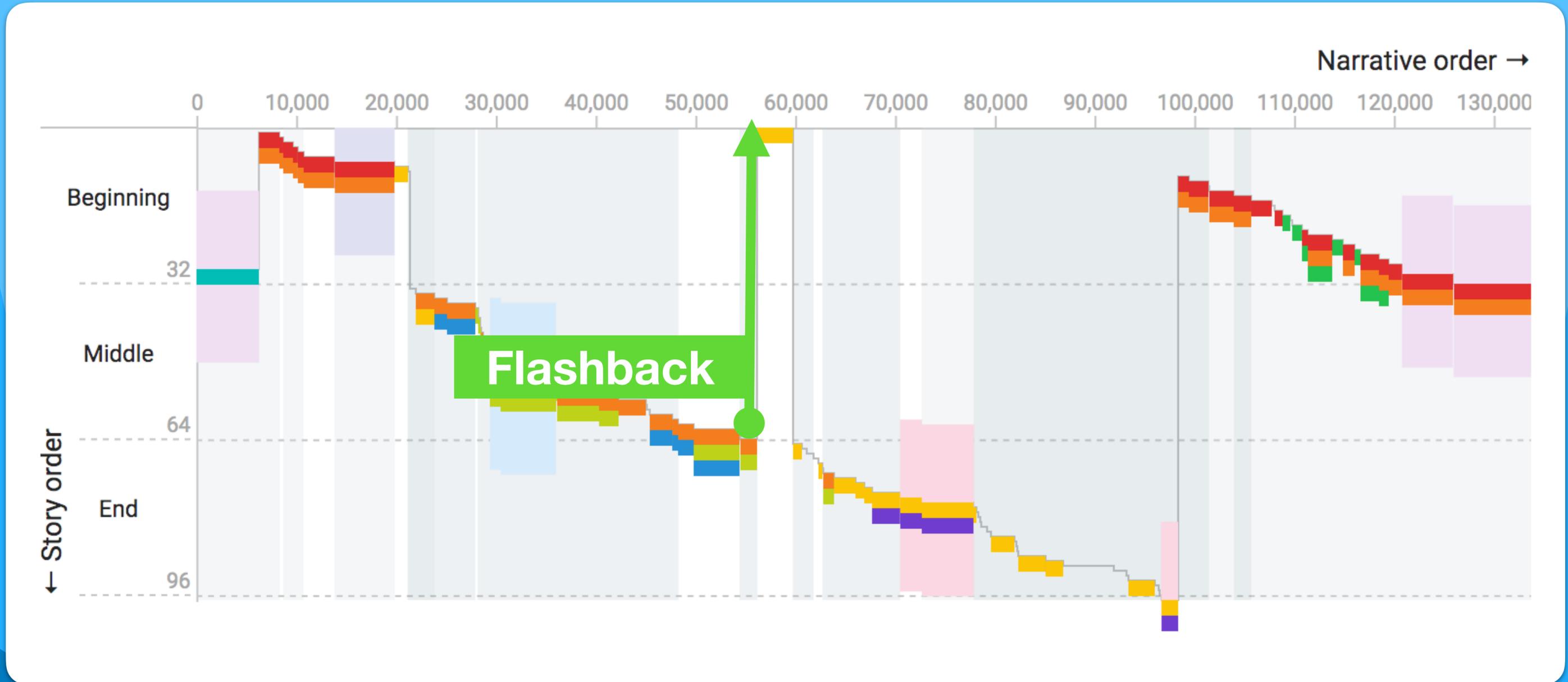
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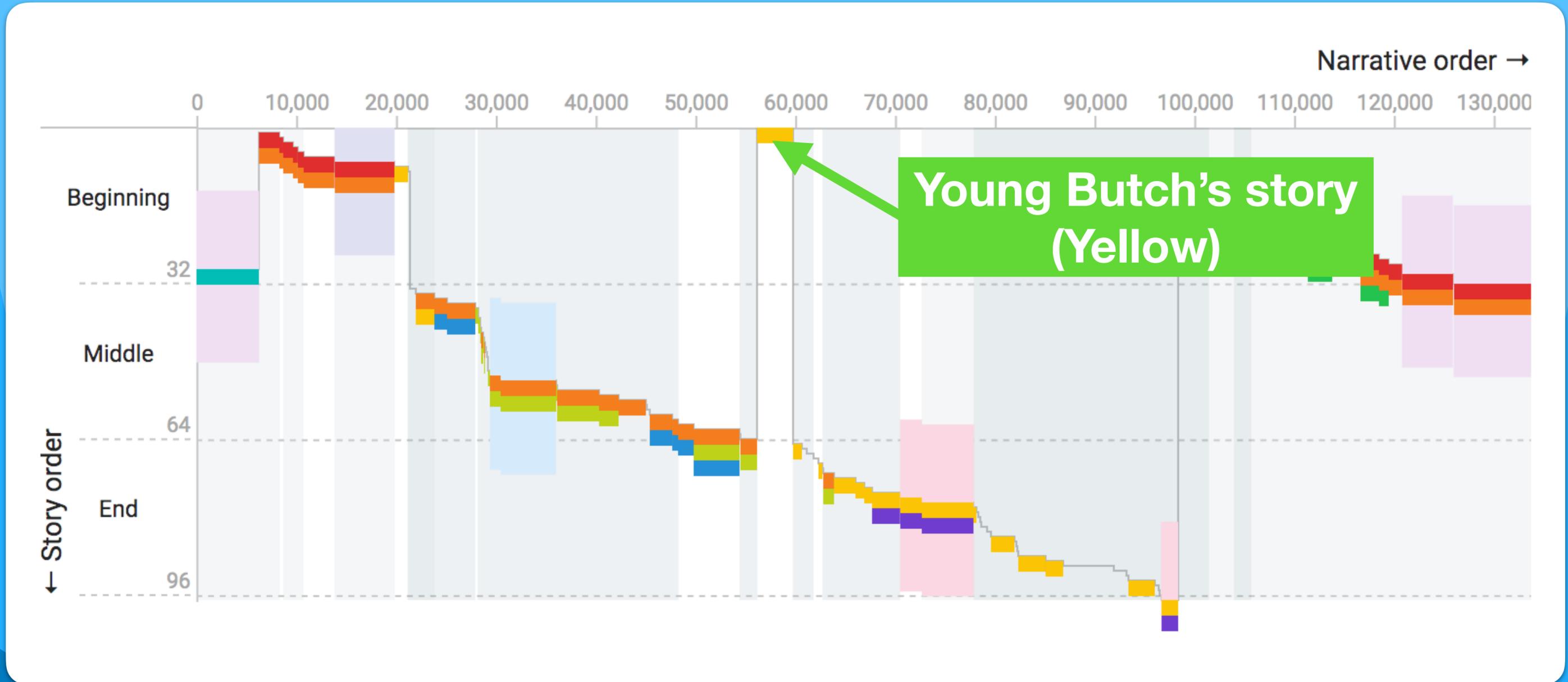
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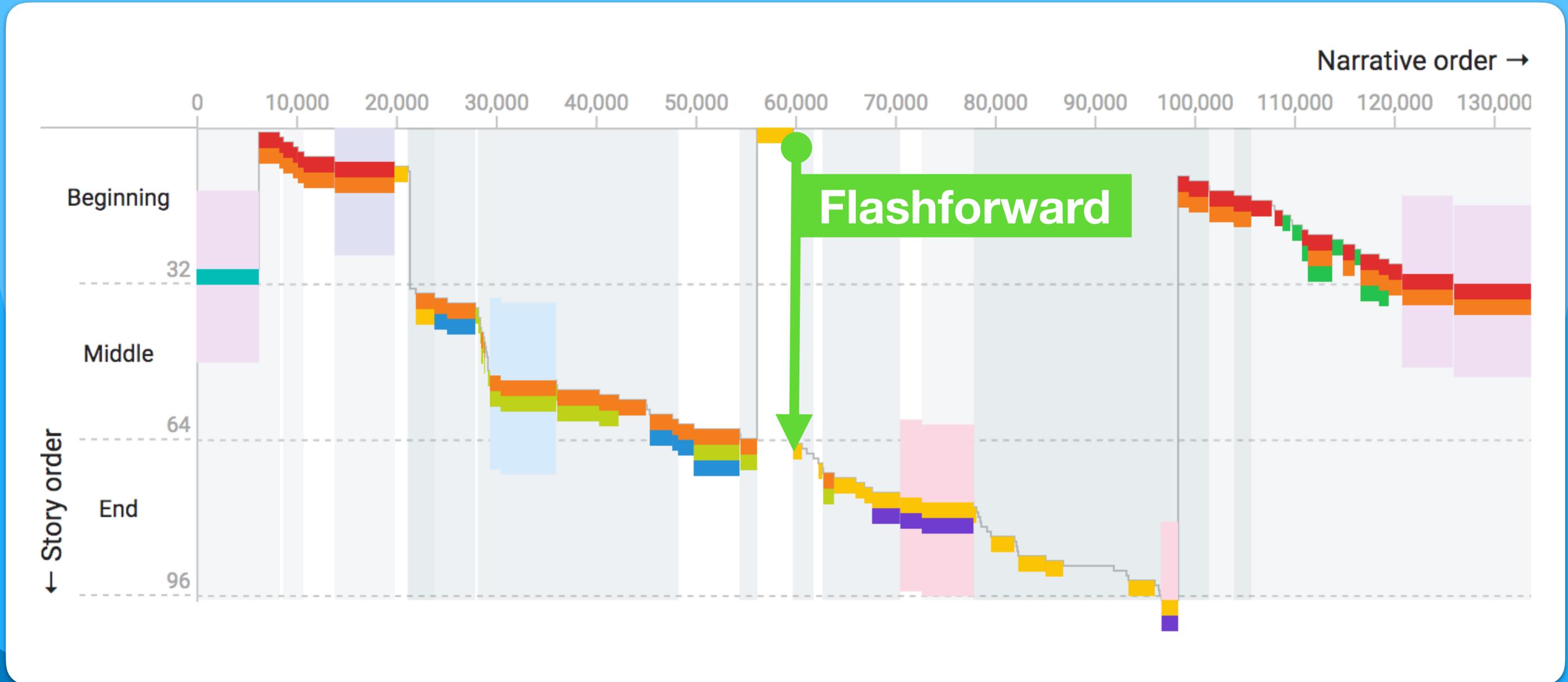
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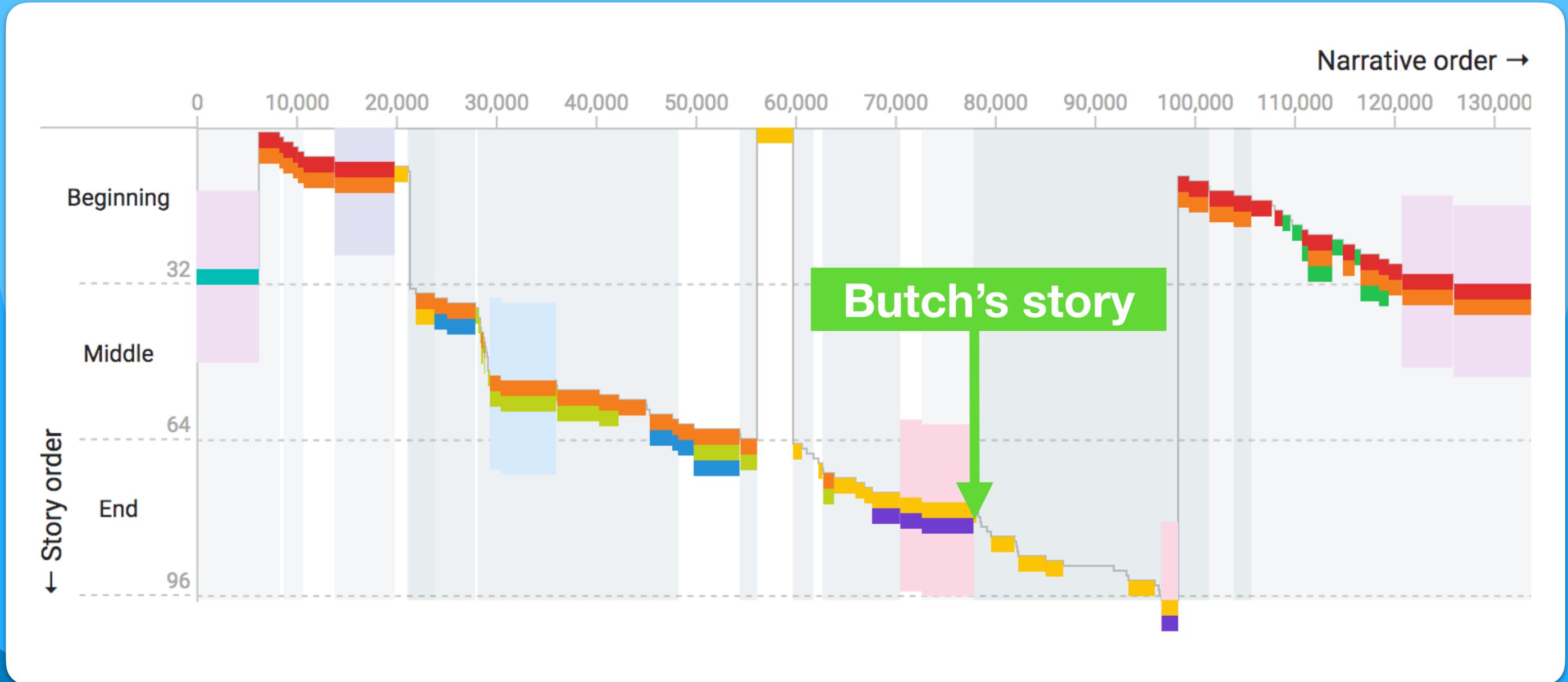
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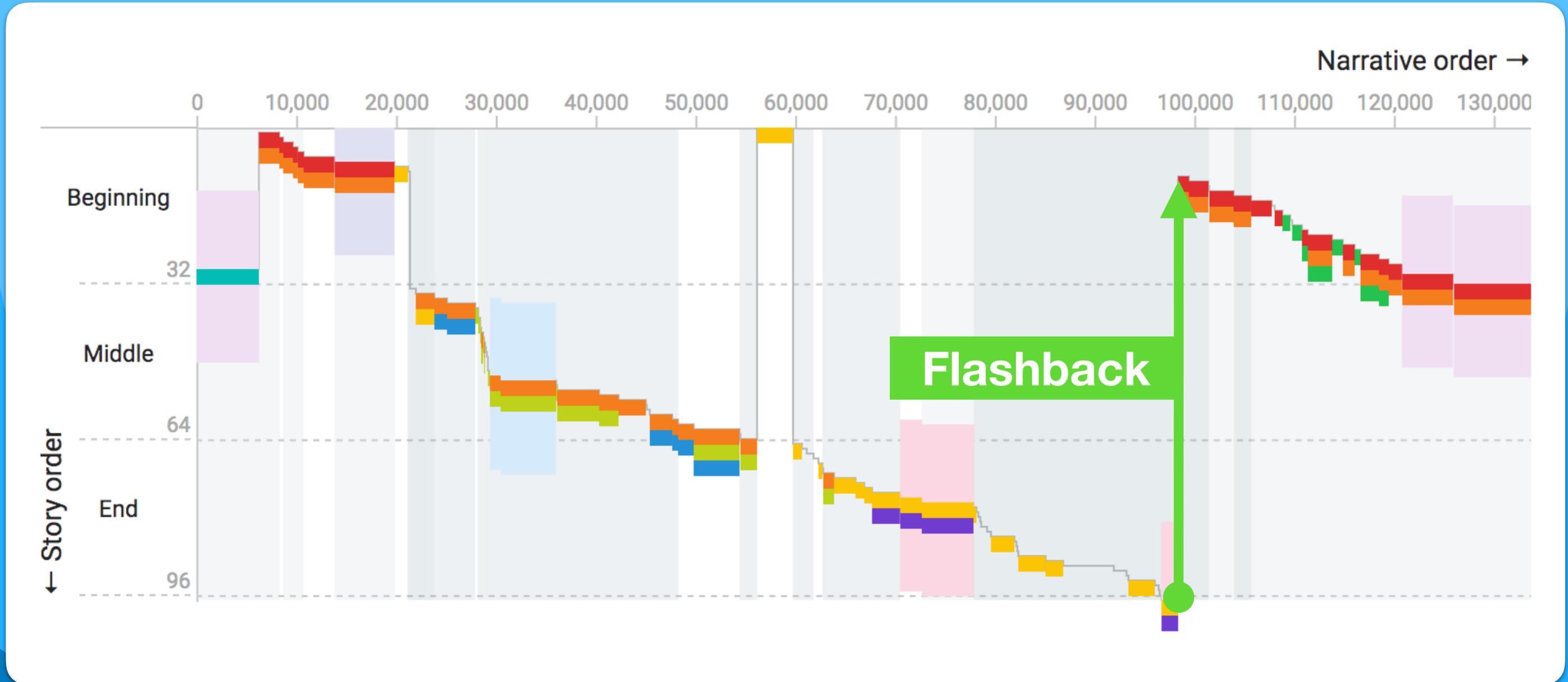
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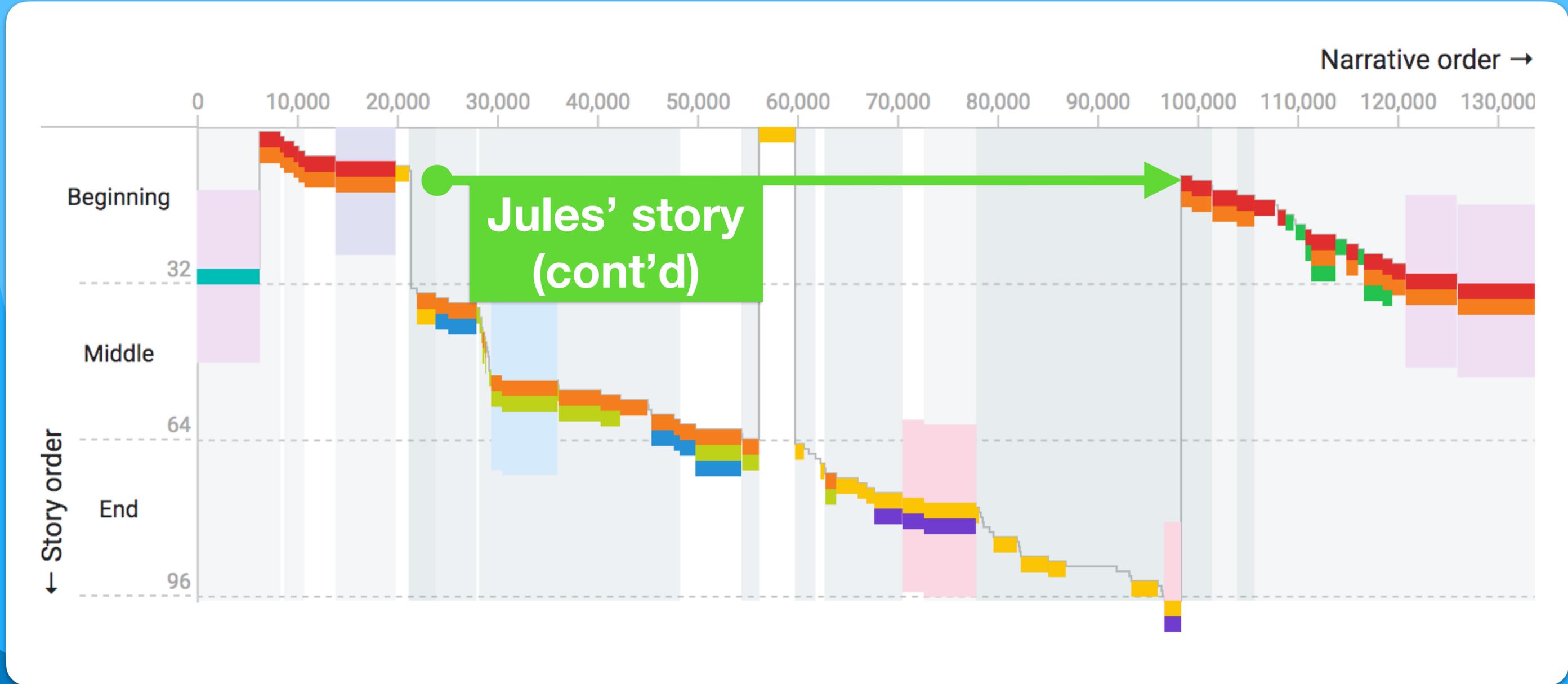
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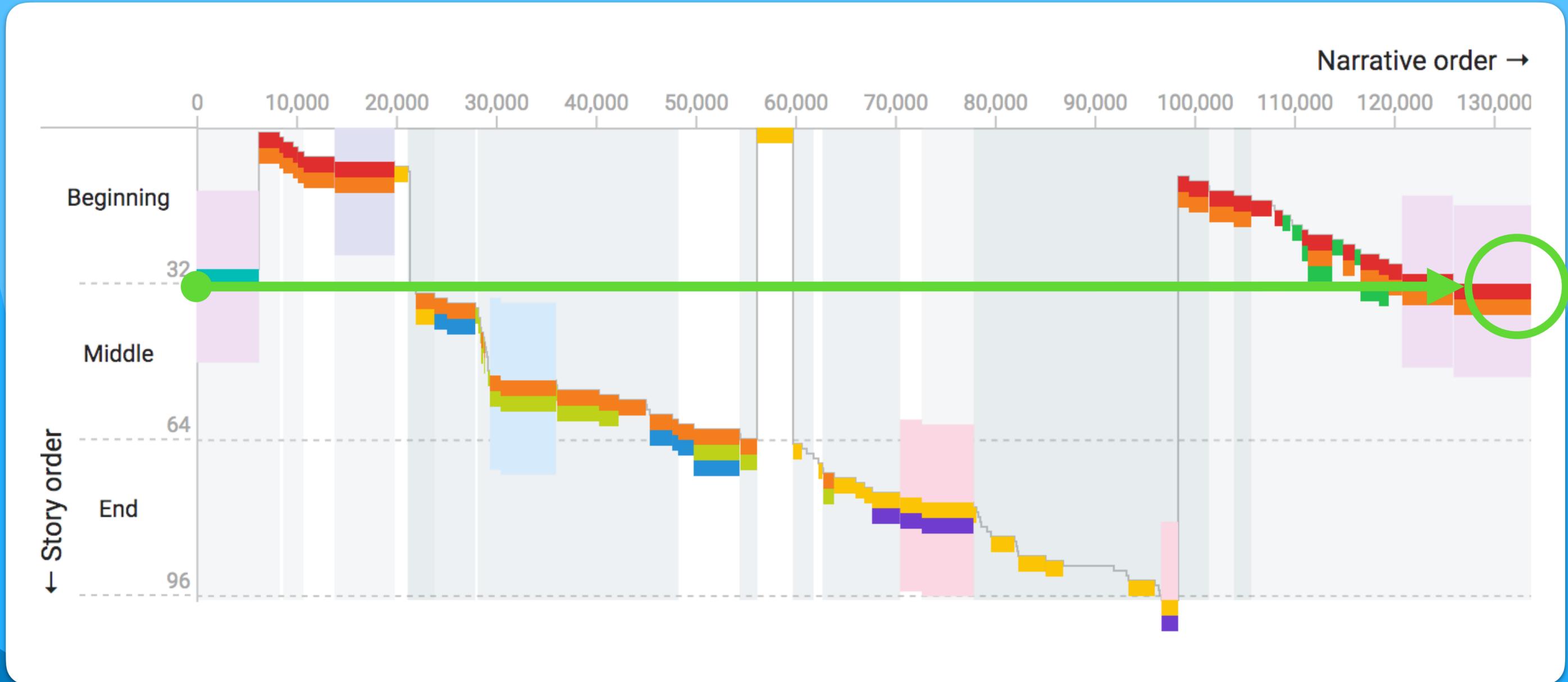
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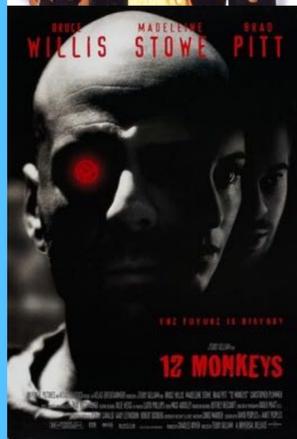
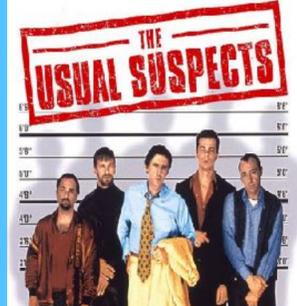
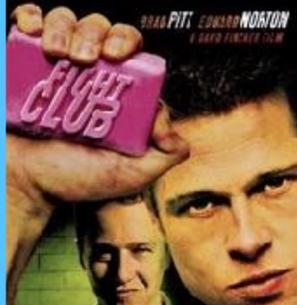
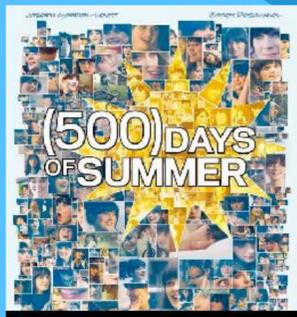
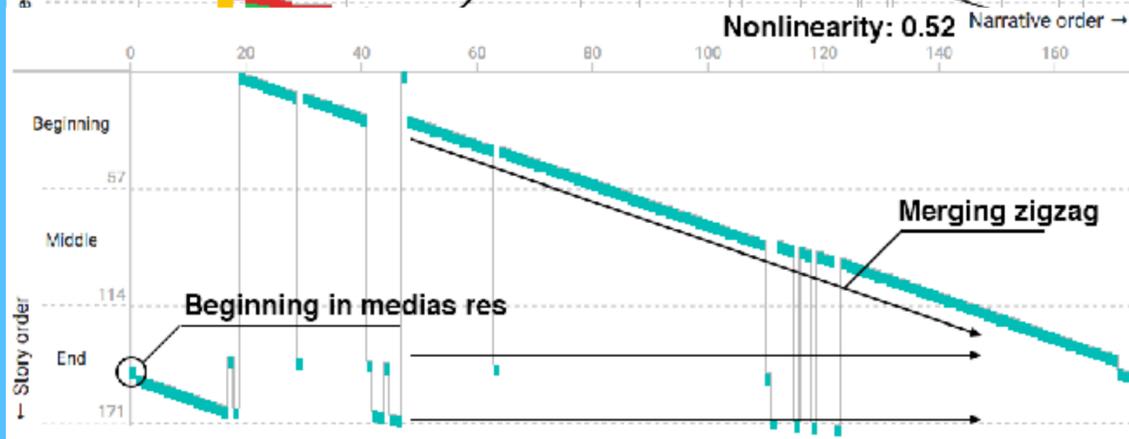
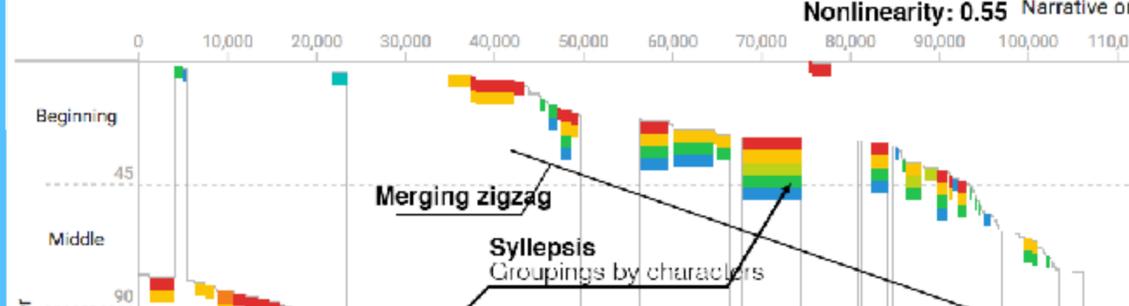
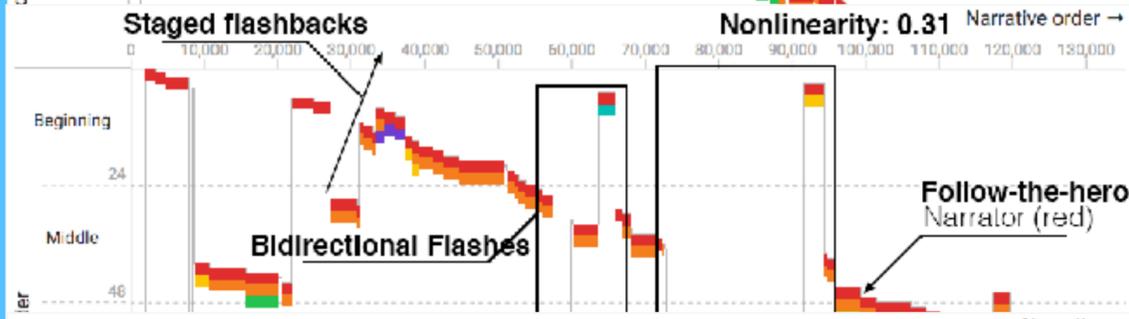
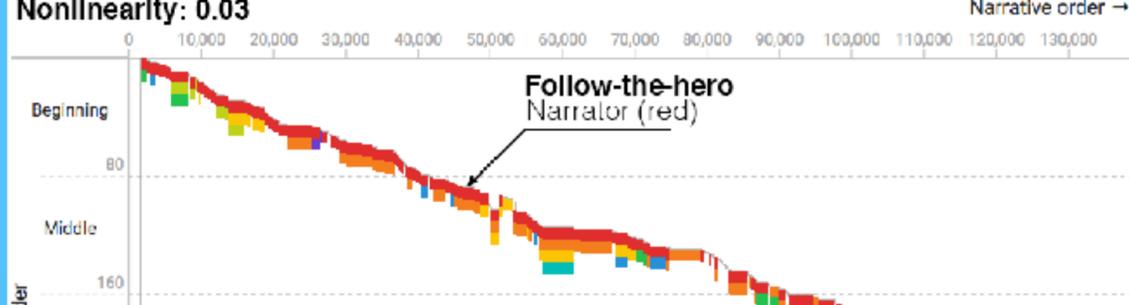
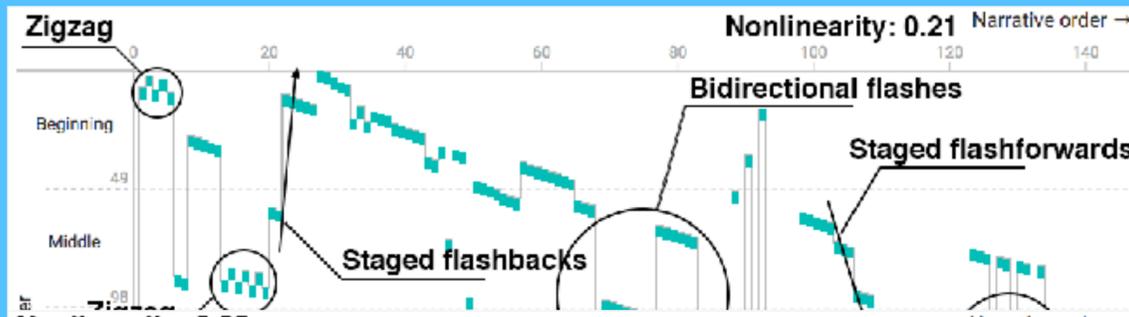
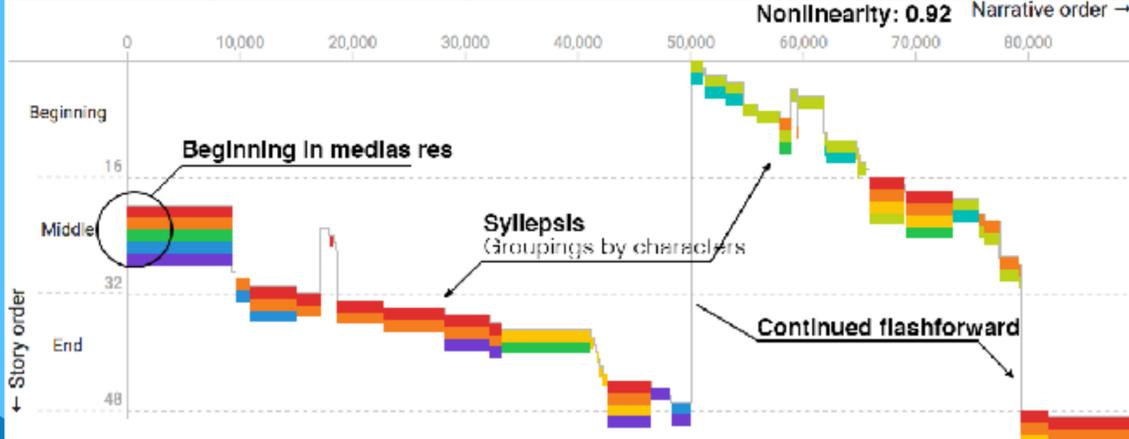
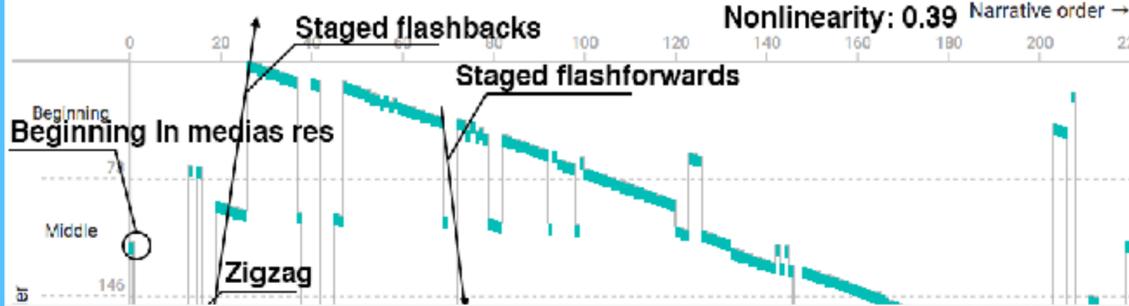
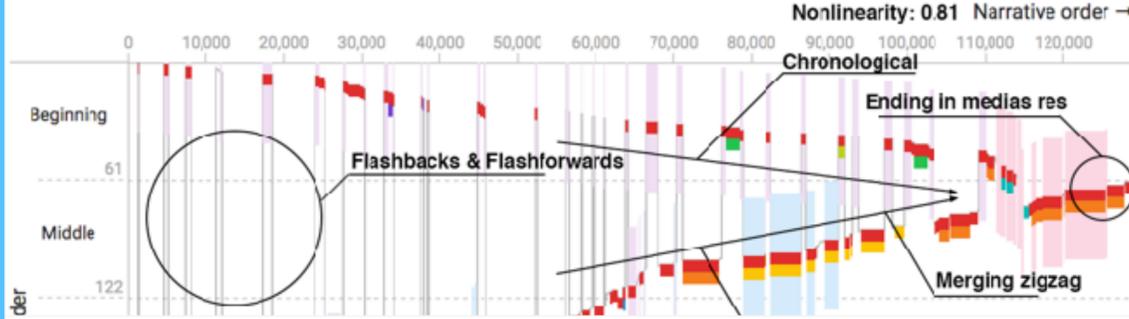
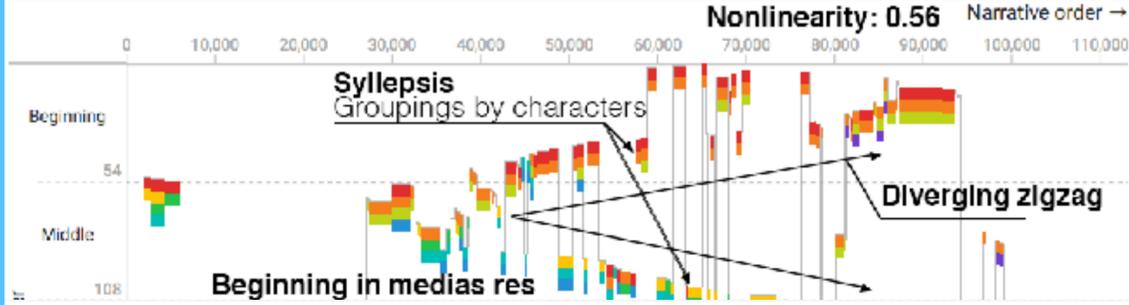
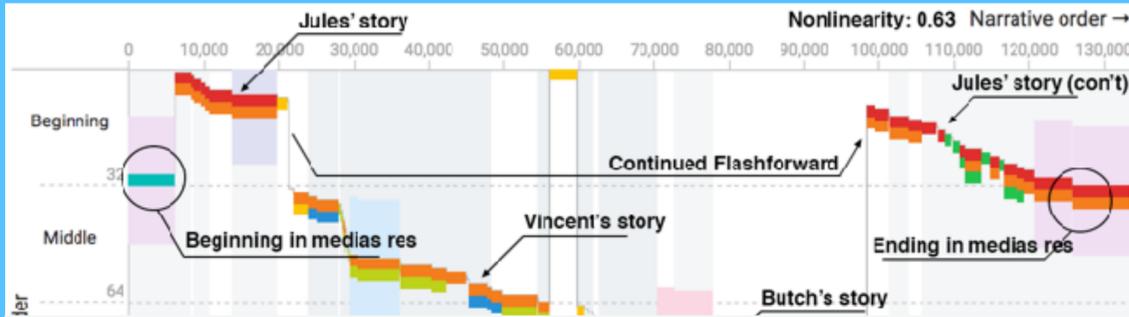
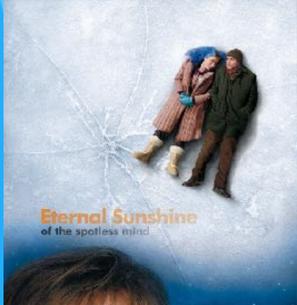
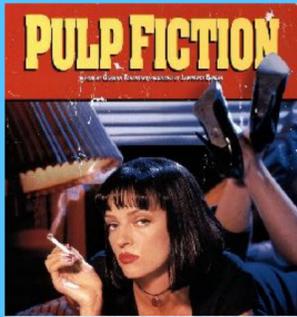
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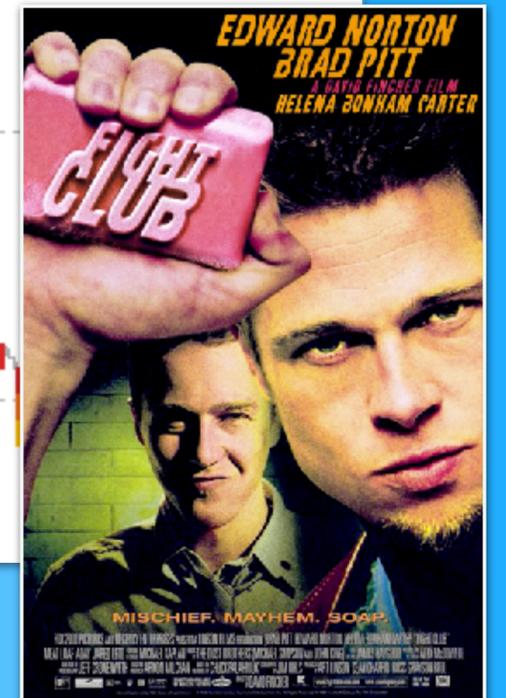
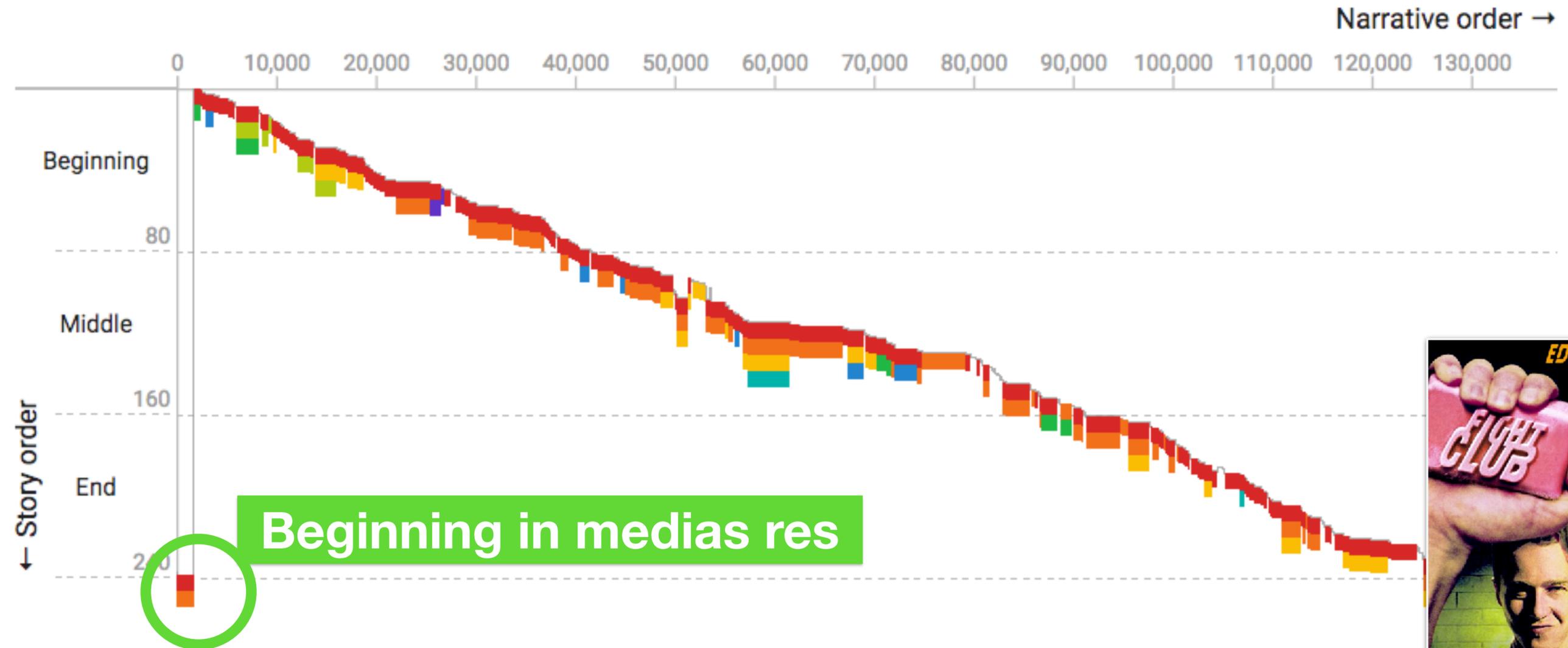
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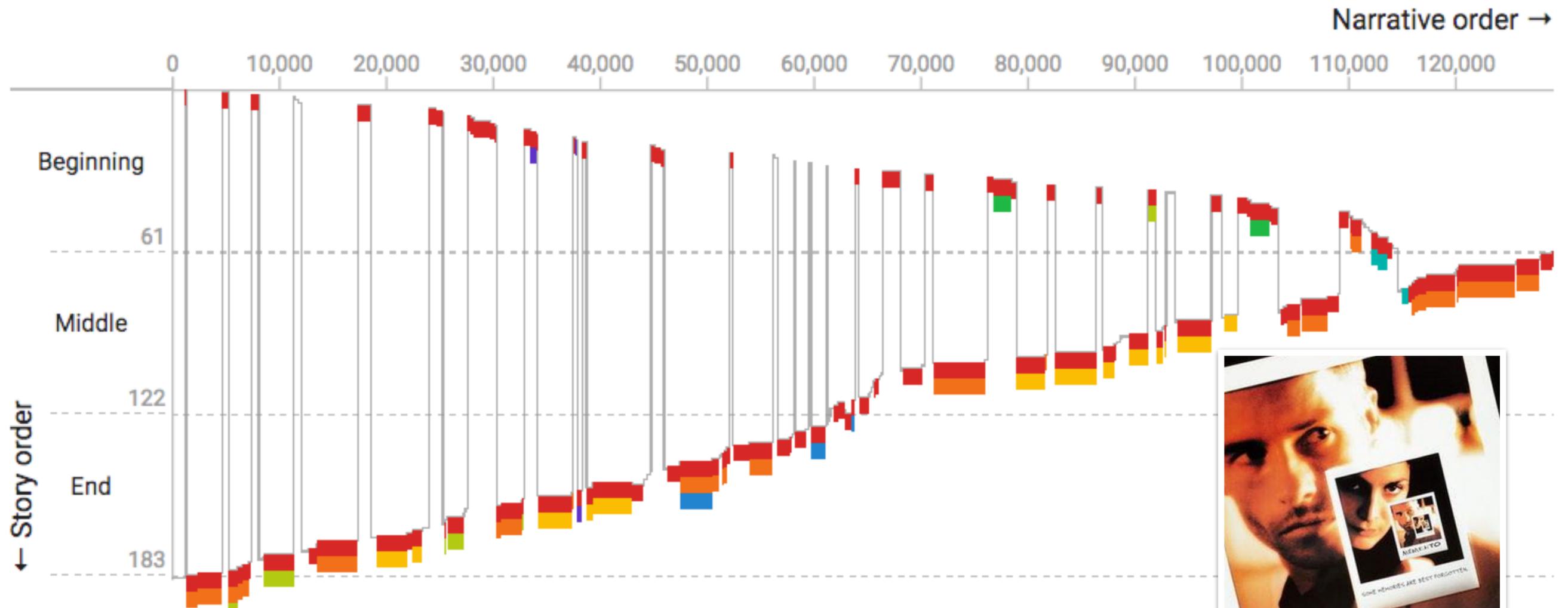




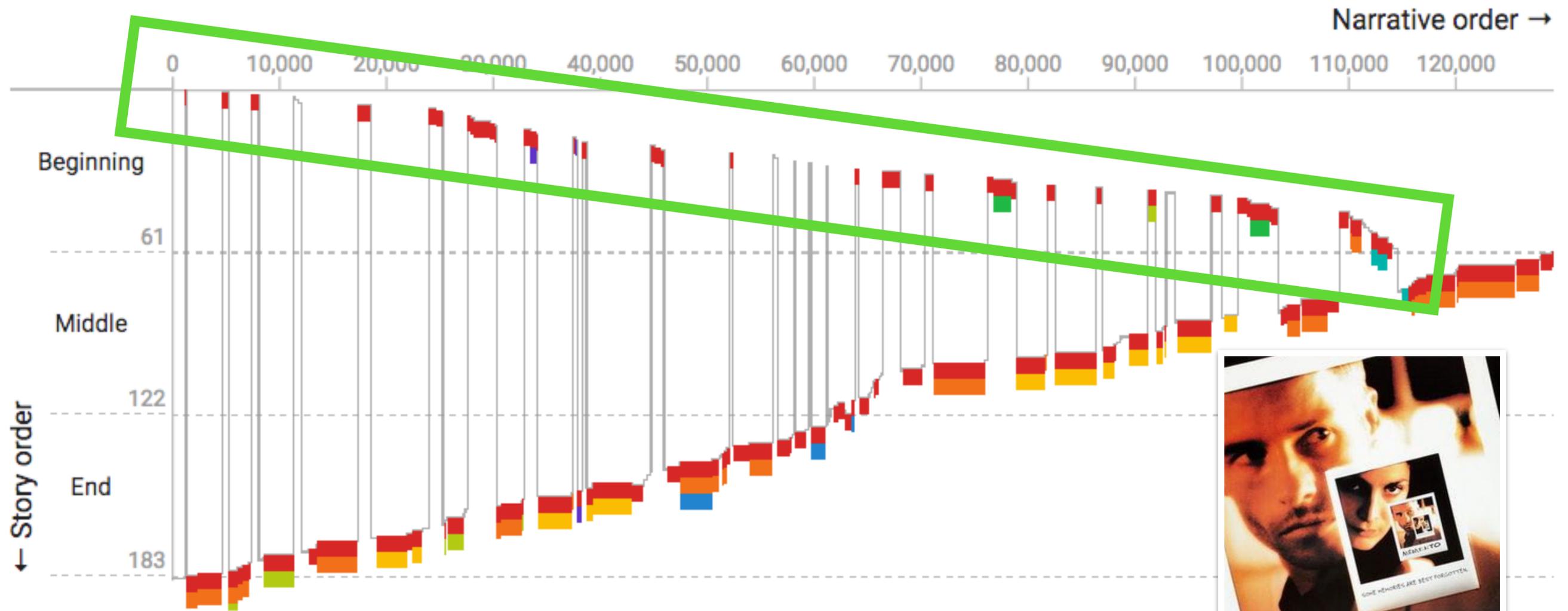
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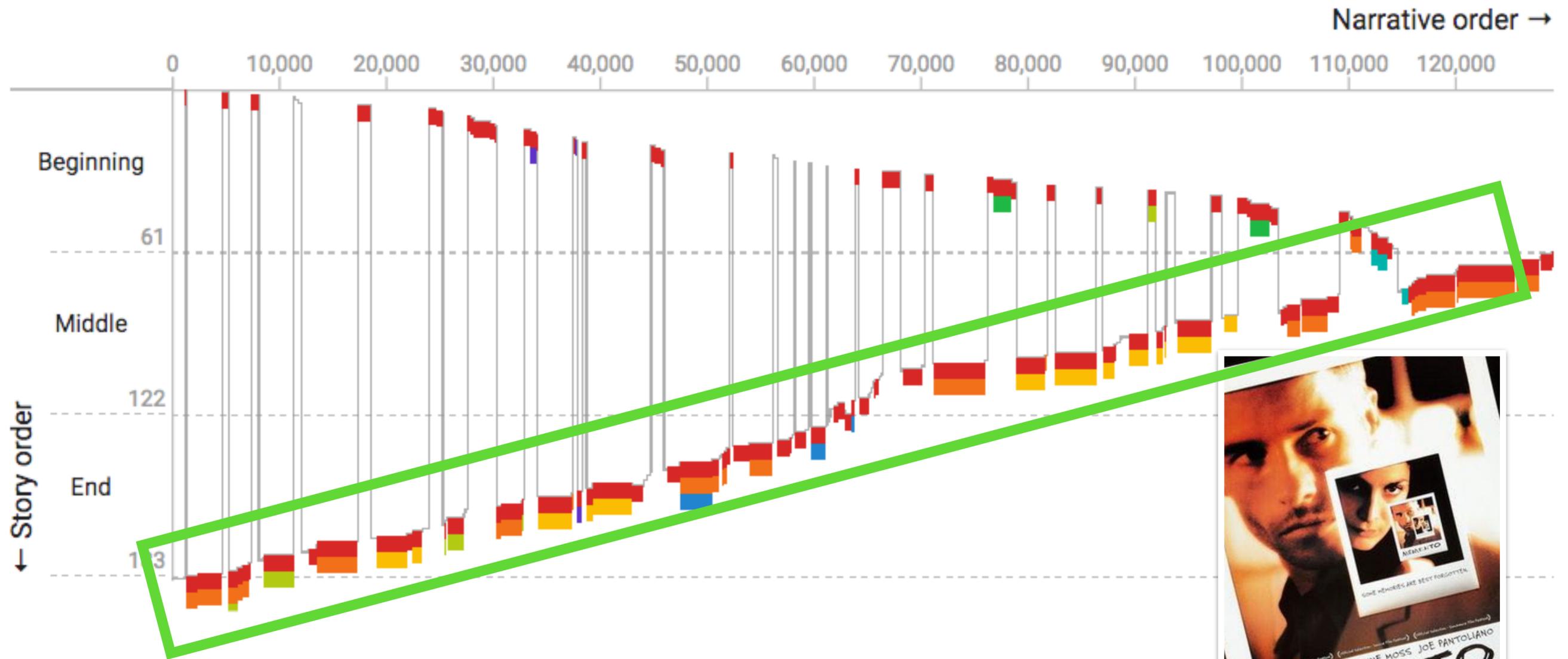
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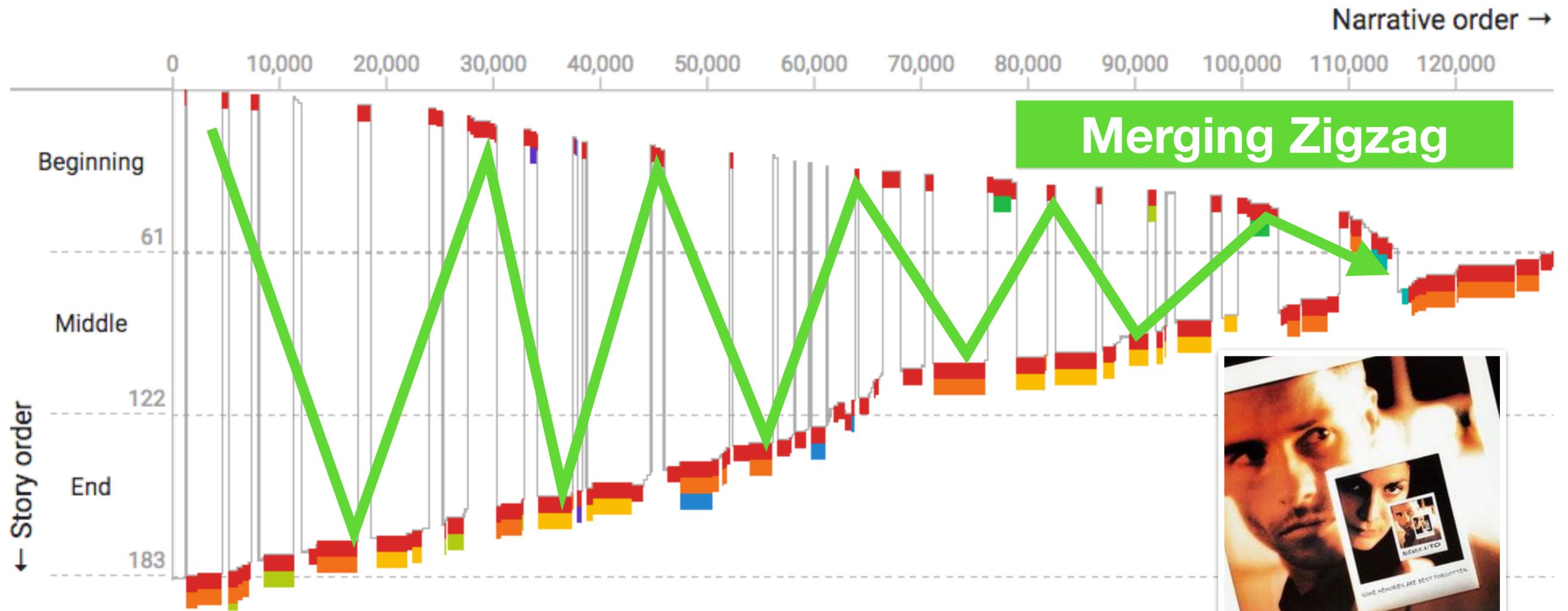
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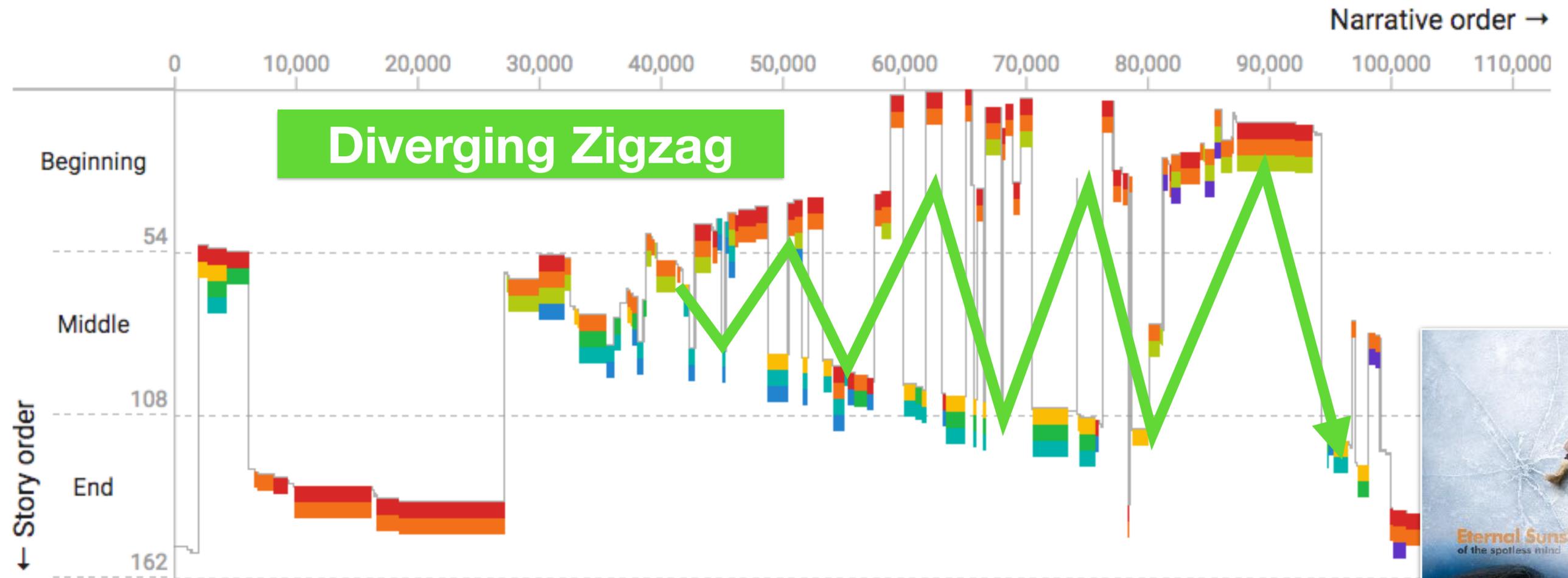
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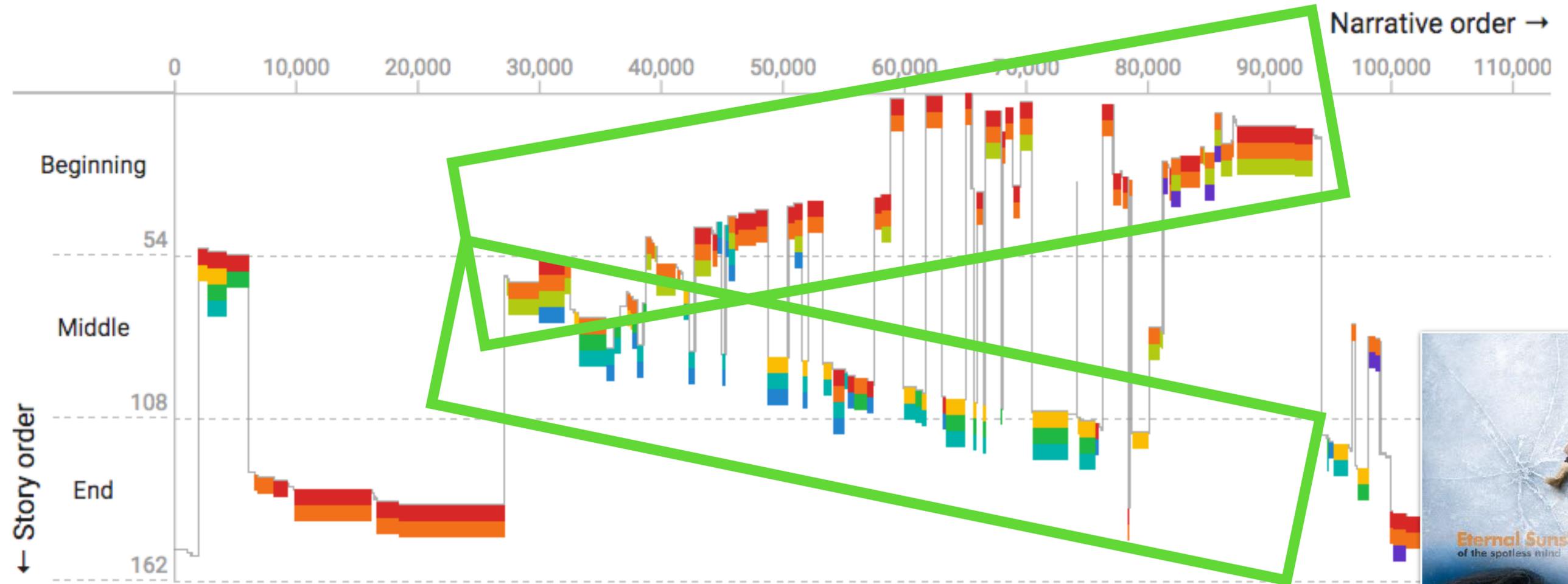
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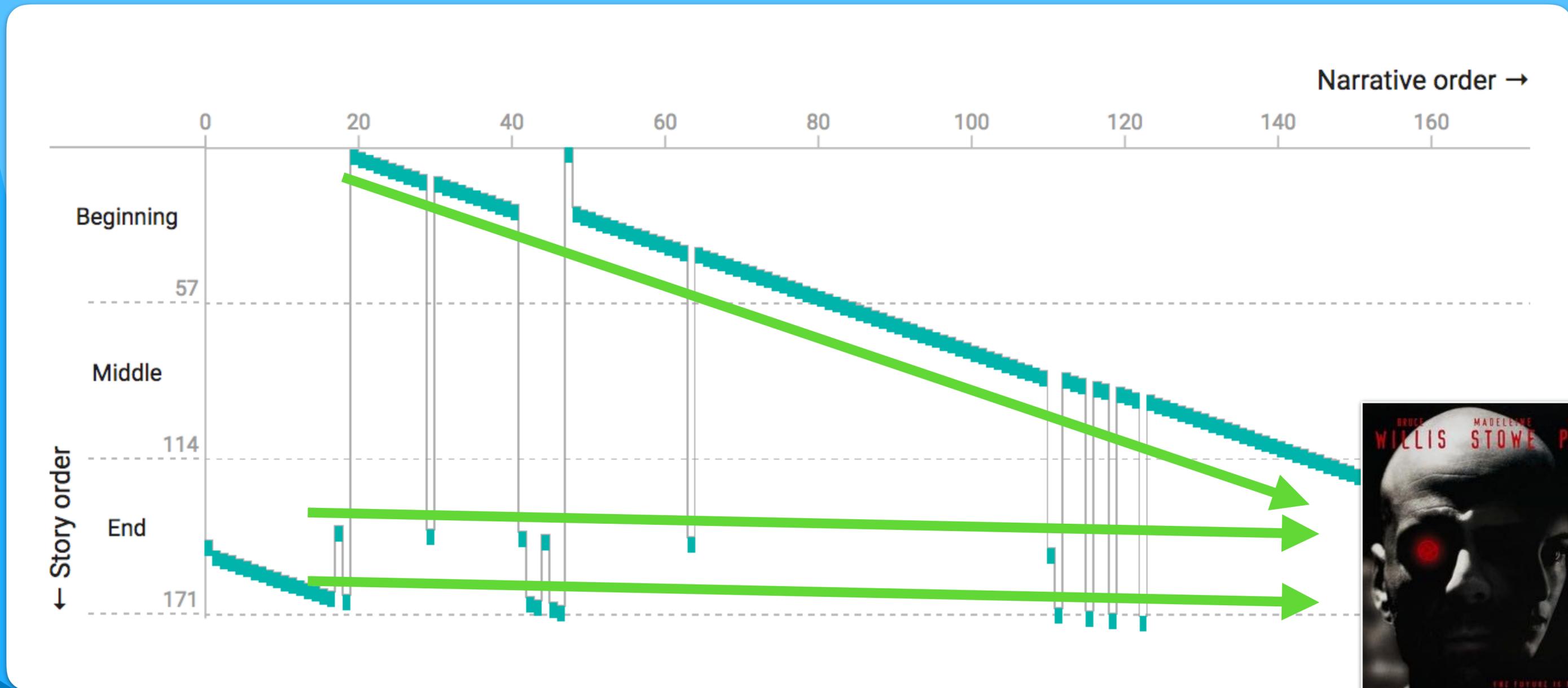
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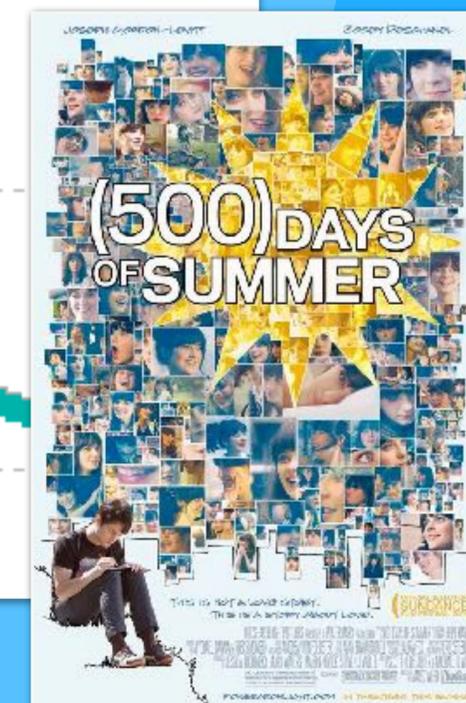
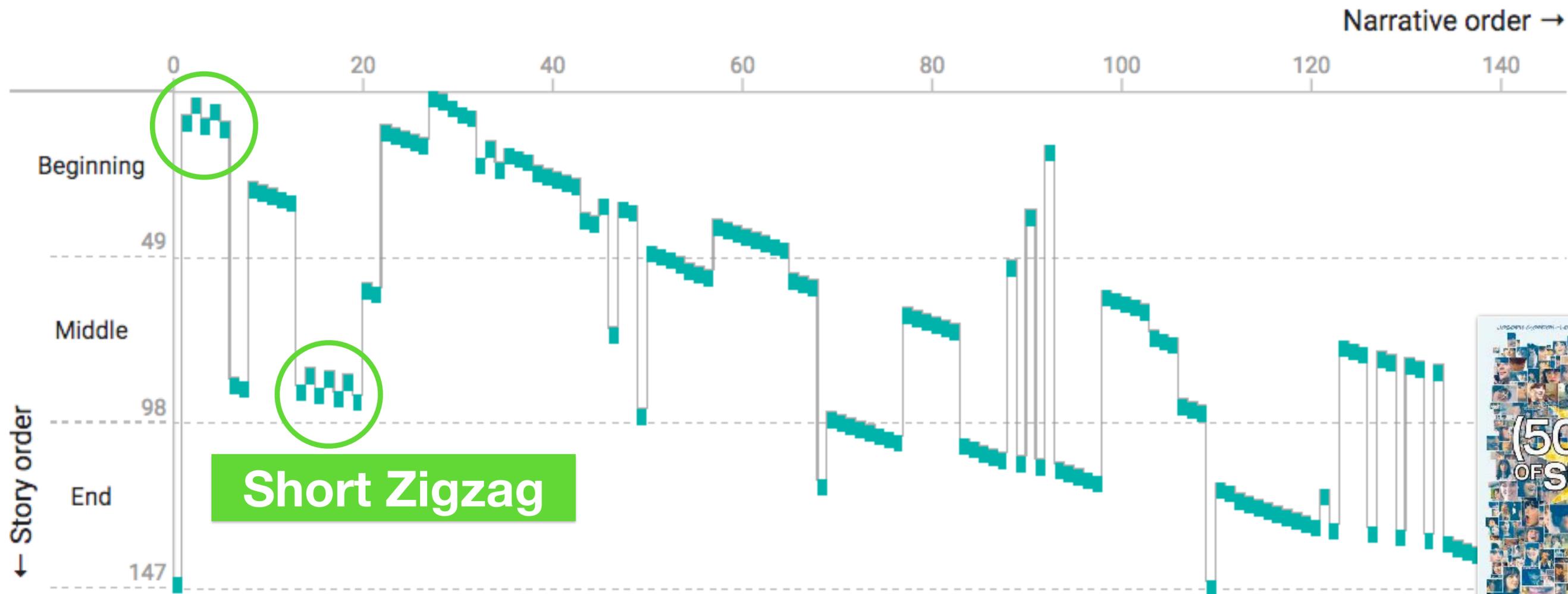
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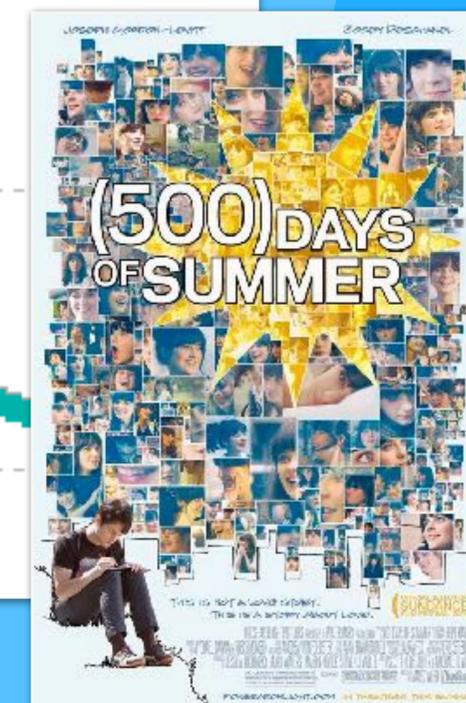
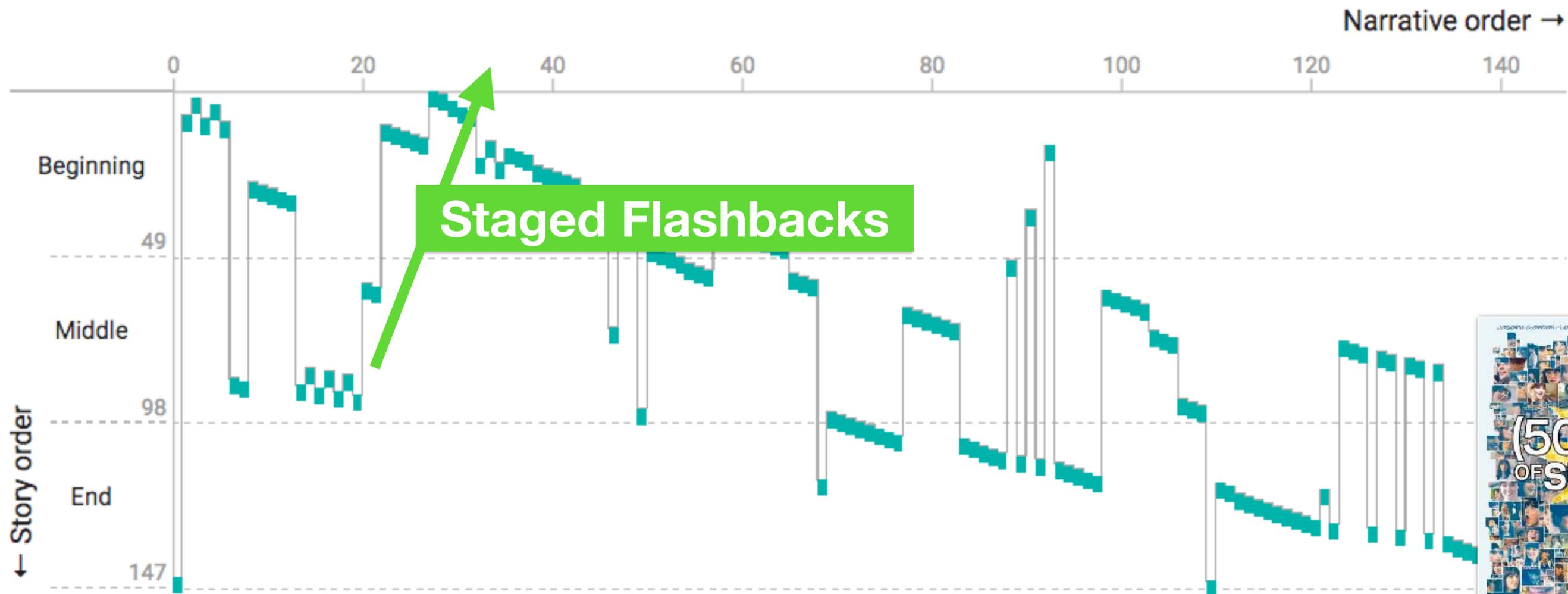
# 12 MONKEYS



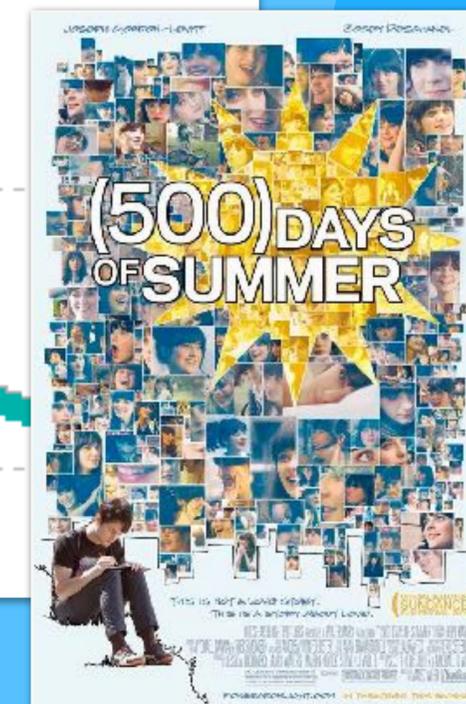
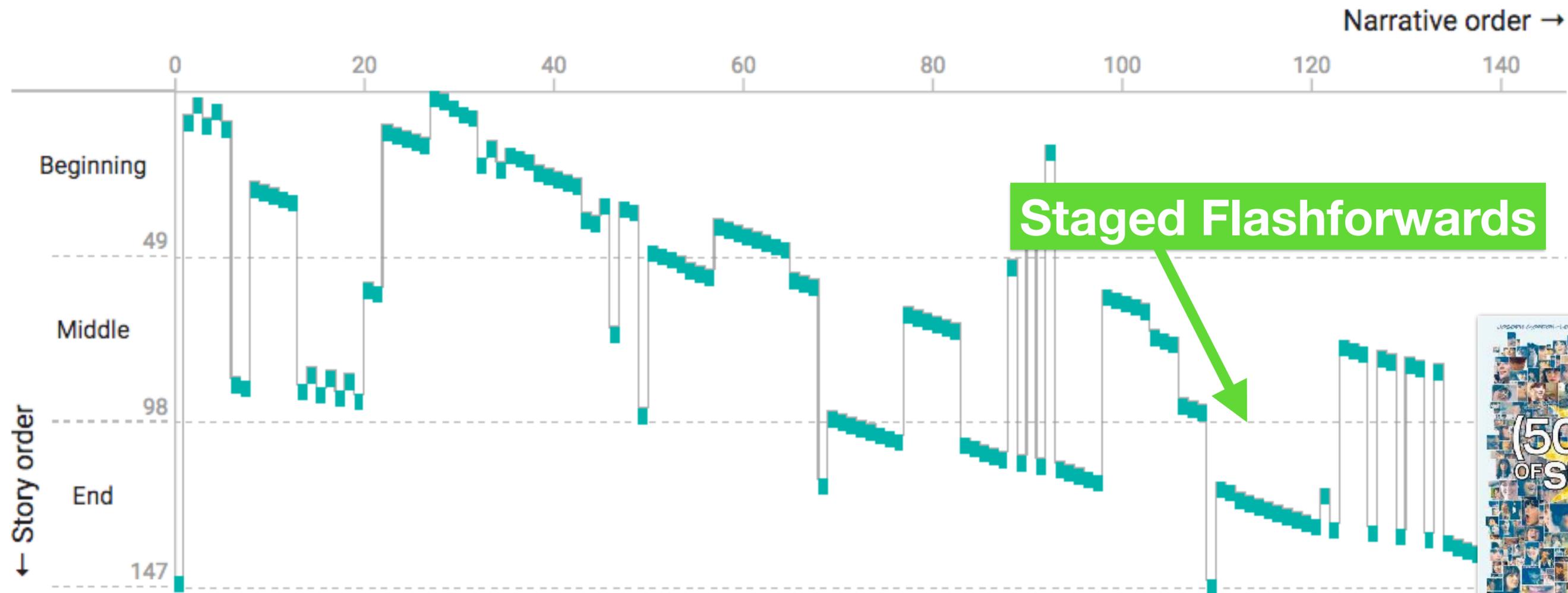
# 500 DAYS OF SUMMER



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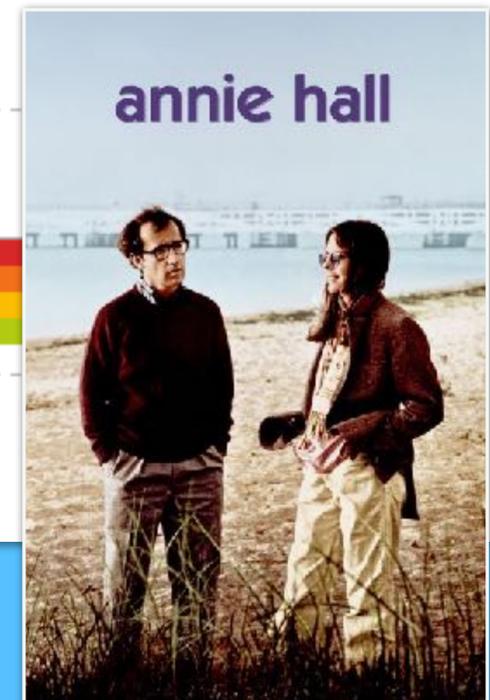


# 500 DAYS OF SUMMER

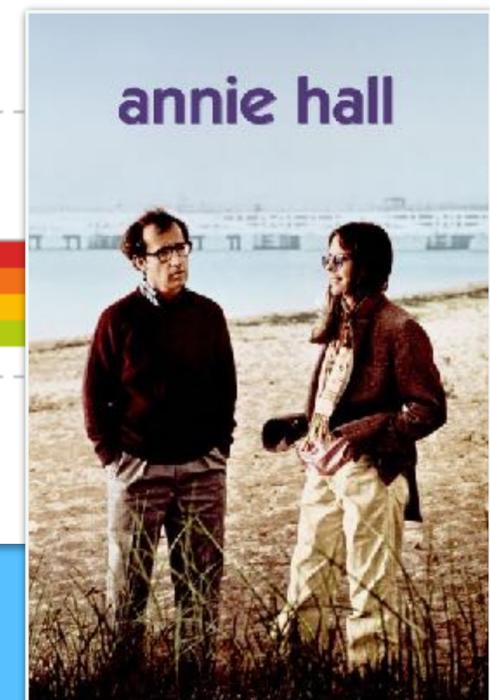




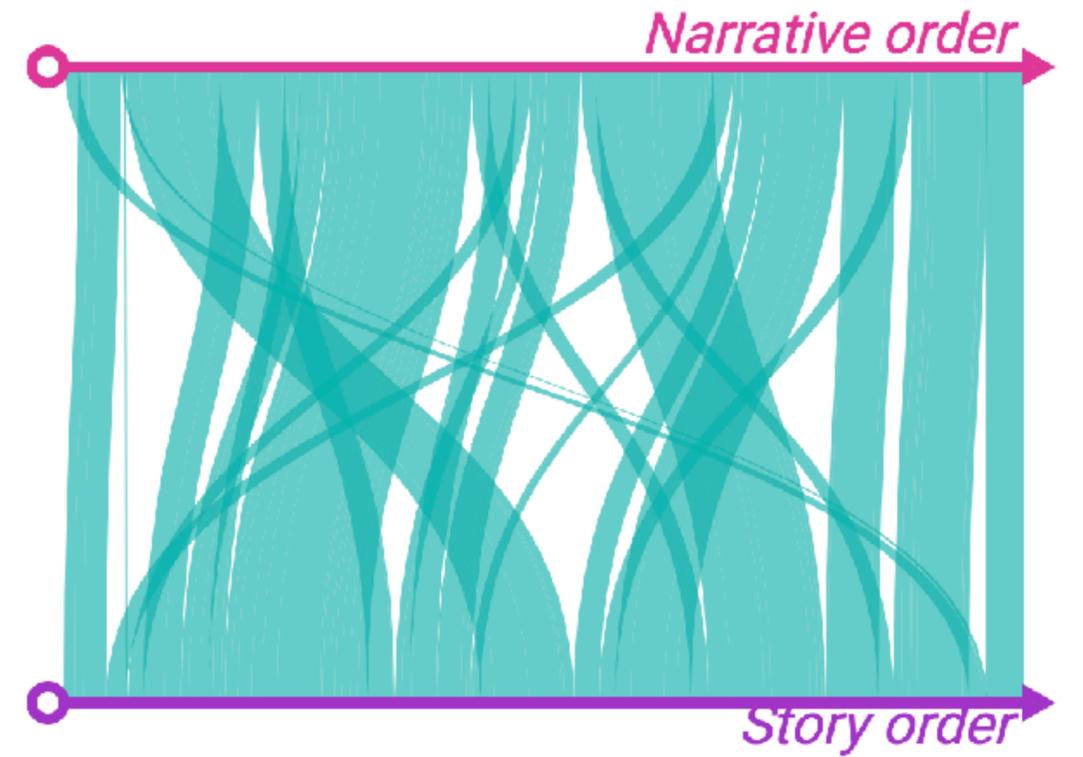
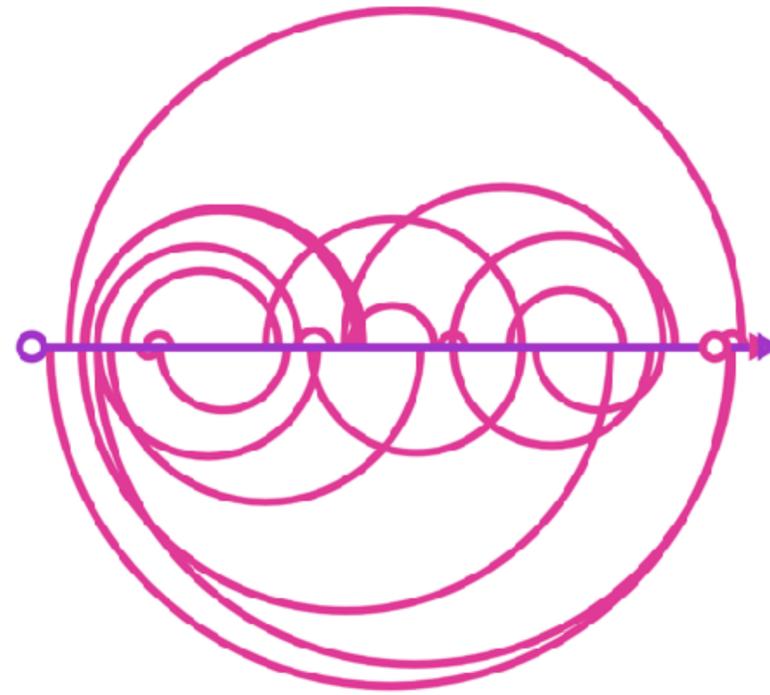
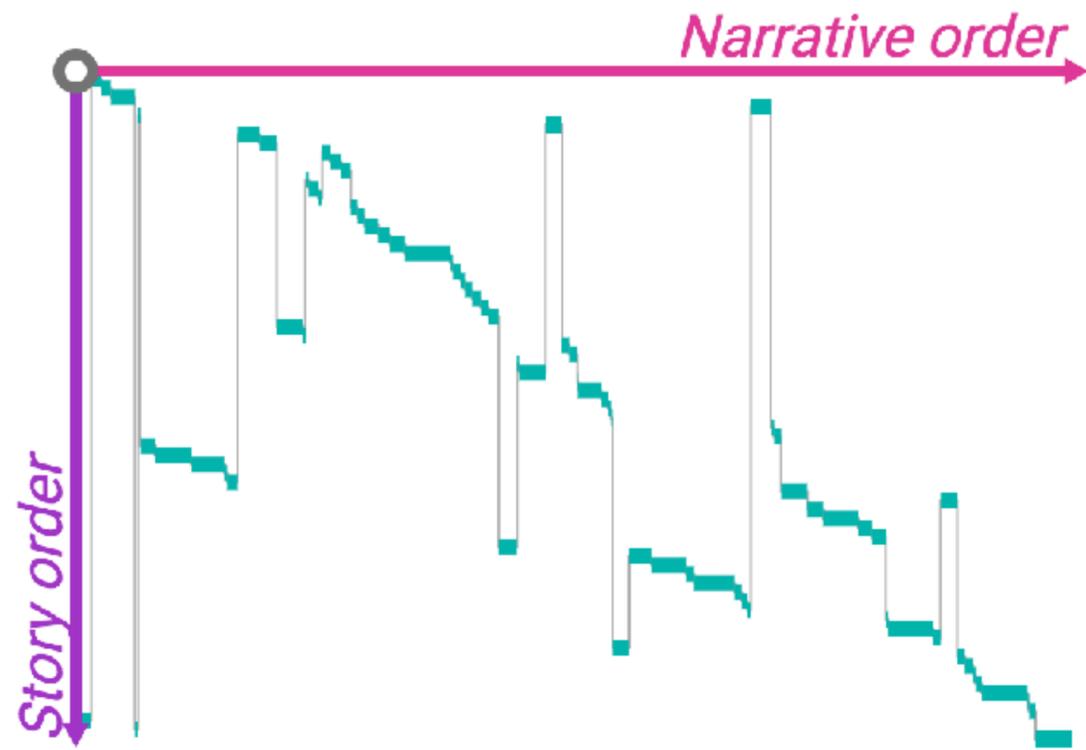
# ANNIE HALL



# ANNIE HALL



# ANNIE HALL



# READABILITY STUDY

Can people read narrative patterns from story curves?

# READABILITY STUDY

## 13 Participants

- 8 female, 12 graduates
- no expertise in visualization or narrative theory

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## Procedure

- Introduced to basic nonlinear narrative patterns
- shown how they are represented in story curves

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## Procedure

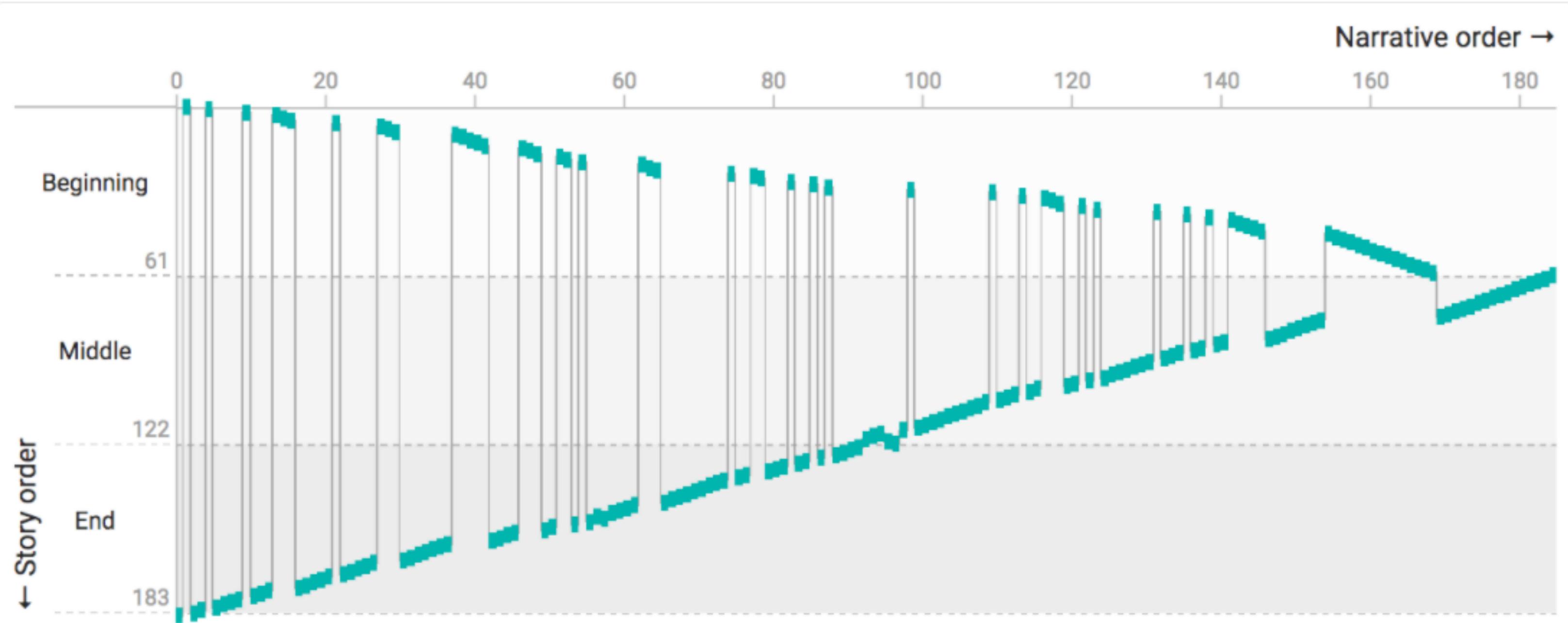
- Introduced to basic nonlinear narrative patterns
- shown how they are represented in story curves

**20 multiple-choice pattern reading questions**

**Q5. Among five basic patterns (Chronological, Retrograde, Flashback, Flashforward, Zigzag), how many of them do you see in this story curve?**

Hint: Be careful and look at both overall patterns as well as sub-group patterns.

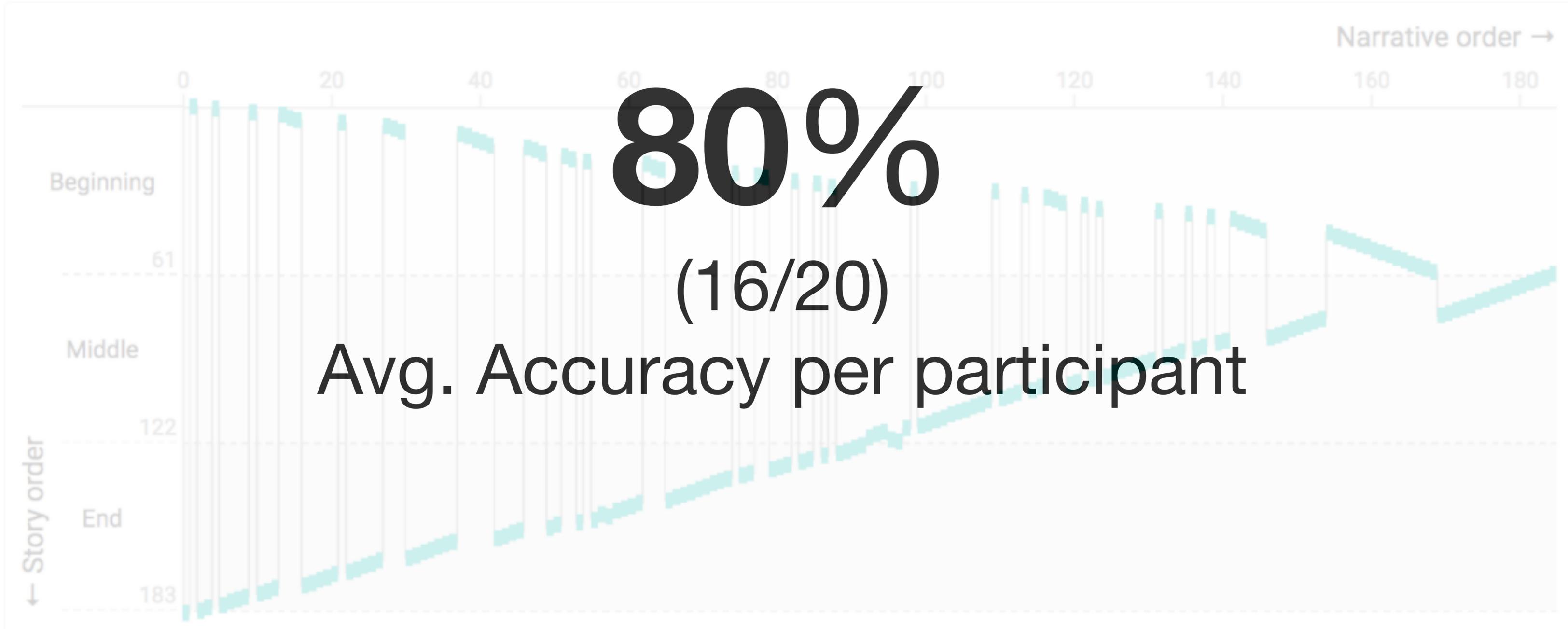
- One
- Two
- Three
- Four
- All Five



Q5. Among five basic patterns (Chronological, Retrograde, Flashback, Flashforward, Zigzag), how many of them do you seen in this story curve?

Hint: Be careful and look at both overall patterns as well as sub-group patterns.

- One
- Two
- Three
- Four
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80%

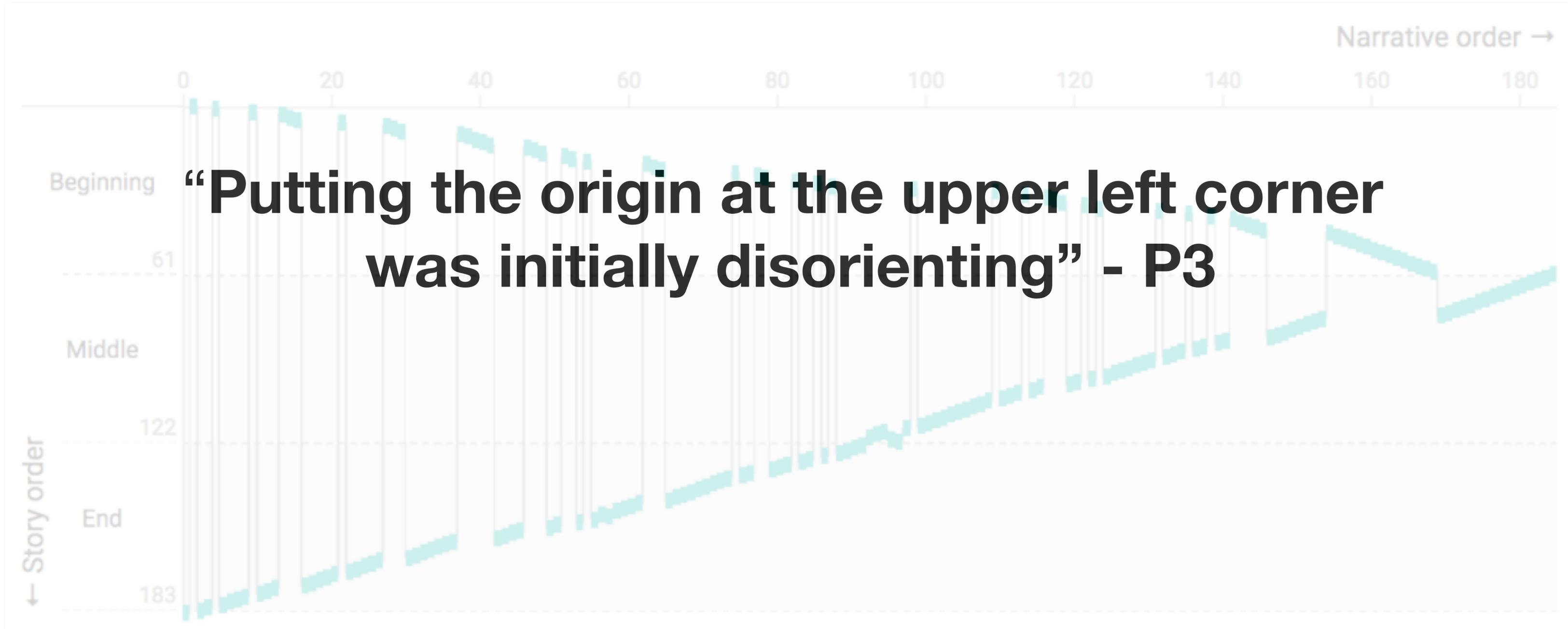
(16/20)

Avg. Accuracy per participant

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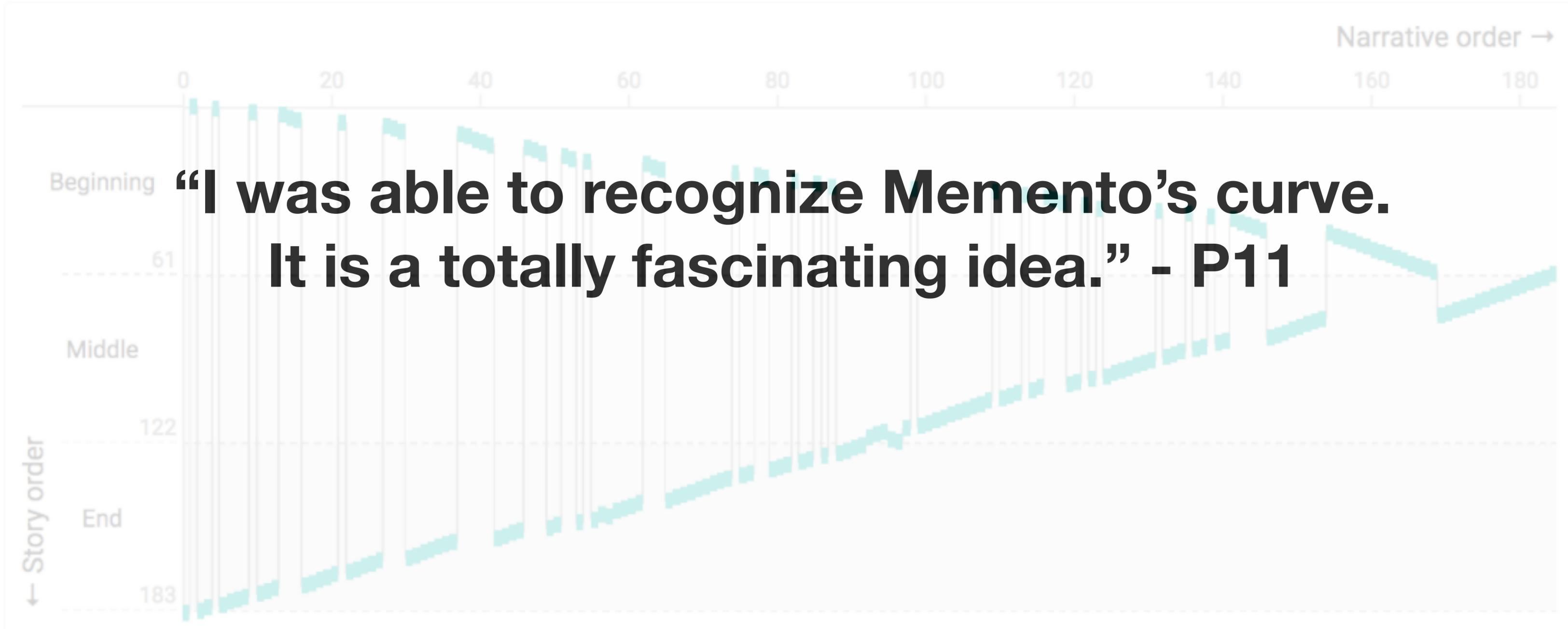


**“I needed to remind myself that one thing is narrative and the other is chronological.” - P9**

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How did we build story curves?

## **Eternal Sunshine of the Spotless Mind (2003) by Charlie Kaufman.**

**INT. PUBLISHING HOUSE RECEPTION AREA - DAY**

It's grand and modern. Random House-Knopf-Taschen is etched on the wall in large gold letters. An old woman enters carrying a tattered manuscript, maybe a thousand pages. She seems haunted, hollow-eyed, sickly. The young receptionist, dressed in a shiny, stretchy one-piece pantsuit, looks up.

**RECEPTIONIST**

Oh, hi.

**OLD WOMAN**

(apologetically)

Hi, I was in the neighborhood and thought I'd see --

**RECEPTIONIST**

I think he's in a conference.  
Unfortunately. I'm really sorry.

**OLD WOMAN**

Would you just try him? You never know.  
As long as I'm here. You never know.

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## Features

- Left Margin
- Boldness
- Letter Case
- Parenthesis
- etc

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**Group1: Bold**

**Group2: Regular**

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## Group1: Bold

- Scene Heading
- Character Name

## Group2: Regular

- Action
- Dialogue
- Parenthetical

# Eternal Sunshine of the Spotless Mind ▾

Tagging

Metadata

0.	<b>INT. PUBLISHING HOUSE RECEPTION AREA - DAY</b>	Scene Heading ▾
1.	It's grand and modern. Random House-Knopf-Taschen is etched	Action ▾
2.	on the wall in large gold letters. An old woman enters	Action ▾
3.	carrying a tattered manuscript, maybe a thousand pages. She	Action ▾
4.	seems haunted, hollow-eyed, sickly. The young receptionist,	Action ▾
5.	dressed in a shiny, stretchy one-piece pantsuit, looks up.	Action ▾
6.	<b>RECEPTIONIST</b> ⓘ	Character Name ▾
7.	Oh, hi.	Dialogue ▾
8.	<b>OLD WOMAN</b>	Character Name ▾
9.	(apologetically)	Parenthetical ▾
10.	Hi, I was in the neighborhood and thought	Dialogue ▾
11.	I'd see --	Dialogue ▾
12.	<b>RECEPTIONIST</b>	Character Name ▾
13.	I think he's in a conference.	Dialogue ▾
14.	Unfortunately. I'm really sorry.	Dialogue ▾
15.	<b>OLD WOMAN</b>	Character Name ▾
16.	Would you just try him? You never know.	Dialogue ▾
17.	As long as I'm here. You never know.	Dialogue ▾

# Eternal Sunshine of the Spotless Mind ▾

Tagging

Metadata

## Scene

- Length
- Time of Day
- Location
- Interior/Exterior

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Scene Heading ▾

Action ▾

Action ▾

Action ▾

Action ▾

Action ▾

Character Name ▾

Dialogue ▾

Character Name ▾

Parenthetical ▾

Dialogue ▾

Dialogue ▾

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Scene Heading ▾

Action ▾

Action ▾

Action ▾

Action ▾

Action ▾

Character Name ▾

Dialogue ▾

Character Name ▾

Parenthetical ▾

Dialogue ▾

Dialogue ▾

Character Name ▾

Dialogue ▾

Dialogue ▾

Character Name ▾

Dialogue ▾

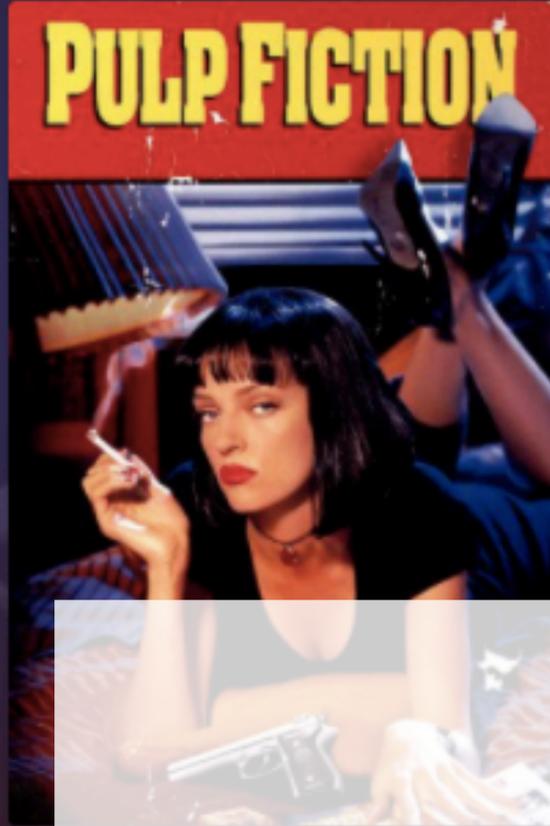
Dialogue ▾

## Scene

- Length
- Time of Day
- Location
- Interior/Exterior

## Character

- Verbosity
- Sentiment



# Pulp Fiction (1994)

83<sup>MC</sup>

User Score



▶ Play Trailer

## Overview

A burger-loving hit man, his philosophical partner, a drug-addled gangster's moll and a washed-up boxer converge in this sprawling, comedic crime caper. Their adventures unfurl in three stories that ingeniously trip back and forth in time.

## Featured Crew

# MovieDB

([www.themoviedb.org](http://www.themoviedb.org))

Discussion

Share

## Top Billed Cast



**John Travolta**  
Vincent Vega



**Samuel L. Jackson**  
Jules Winfield



**Uma Thurman**  
Mia Wallace



**Bruce Willis**  
Butch Coolidge



**Ving Rhames**  
Marsellus Wallace

Find out where to watch this on:



## Facts

Status

Released

## Release Information

September 23, 1994  
Premiere

October 14, 1994

Theatrical

## Scene

- Length
- Time of Day
- Location
- Interior/Exterior

## Character

- Verbosity
- Sentiment
- Gender

# Movie Script

# Movie Info

## Eternal Sunshine of the Spotless Mind (2003) by Charlie Kaufman.

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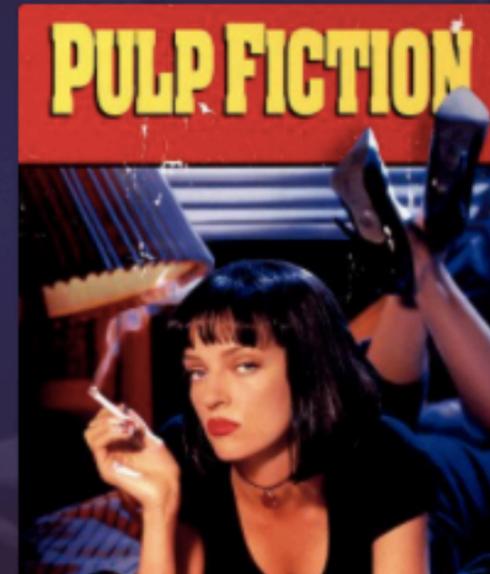
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Quentin Tarantino  
Director, Screenplay

Roger Avary  
Screenplay

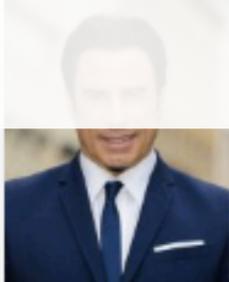
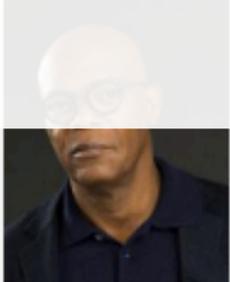
Still no information about the chronological order of scenes

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Find out where to watch this on:  
fanTV

Facts  
Status  
Released

**Release Information**  
🇺🇸 September 23, 1994  
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R Theatrical

 <b>John Travolta</b> Vincent Vega	 <b>Samuel L. Jackson</b> Jules Winfield	 <b>Uma Thurman</b> Mia Wallace	 <b>Bruce Willis</b> Butch Coolidge	 <b>Ving Rhames</b> Marsellus Wallace
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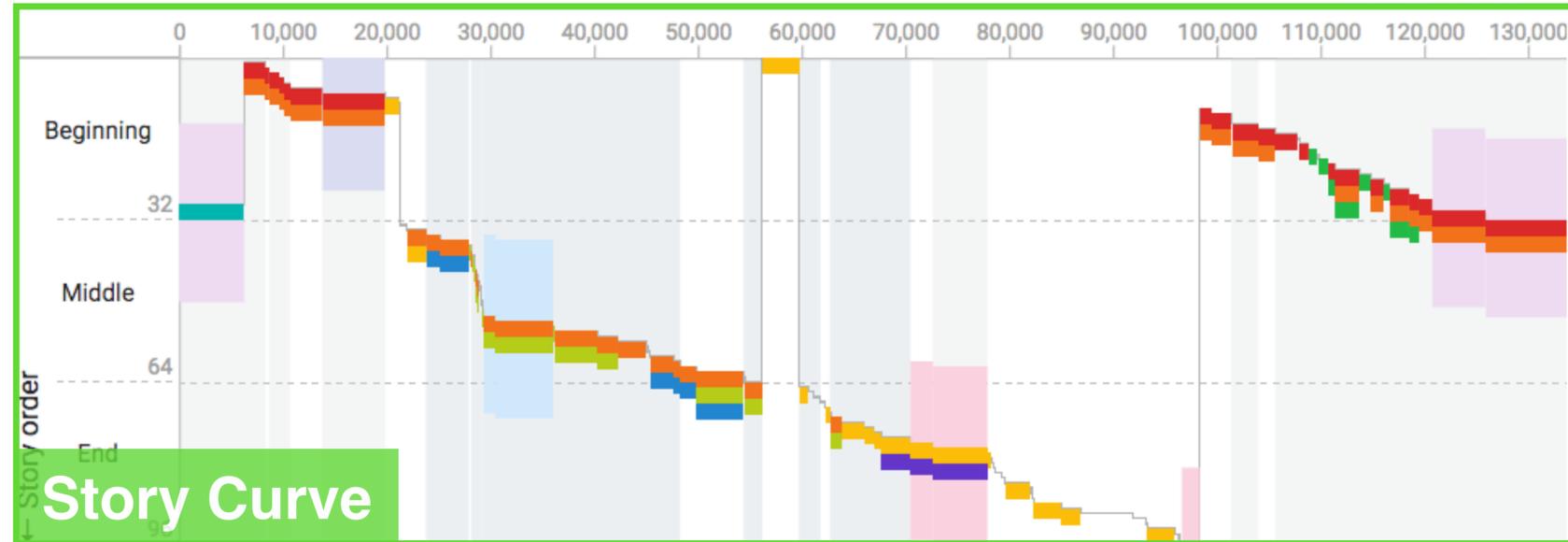
# STORY EXPLORER

# Pulp Fiction

Thriller, Crime | October 1994 | Directed by Quentin Tarantino | Nonlinearity 0.63 | [IMDB](#)

Navigation icons: Refresh, Previous, Next, Zoom In, Zoom Out, Full Screen, Scene Length, RichView, Characters

Narrative order →



Story Curve



Story Metadata



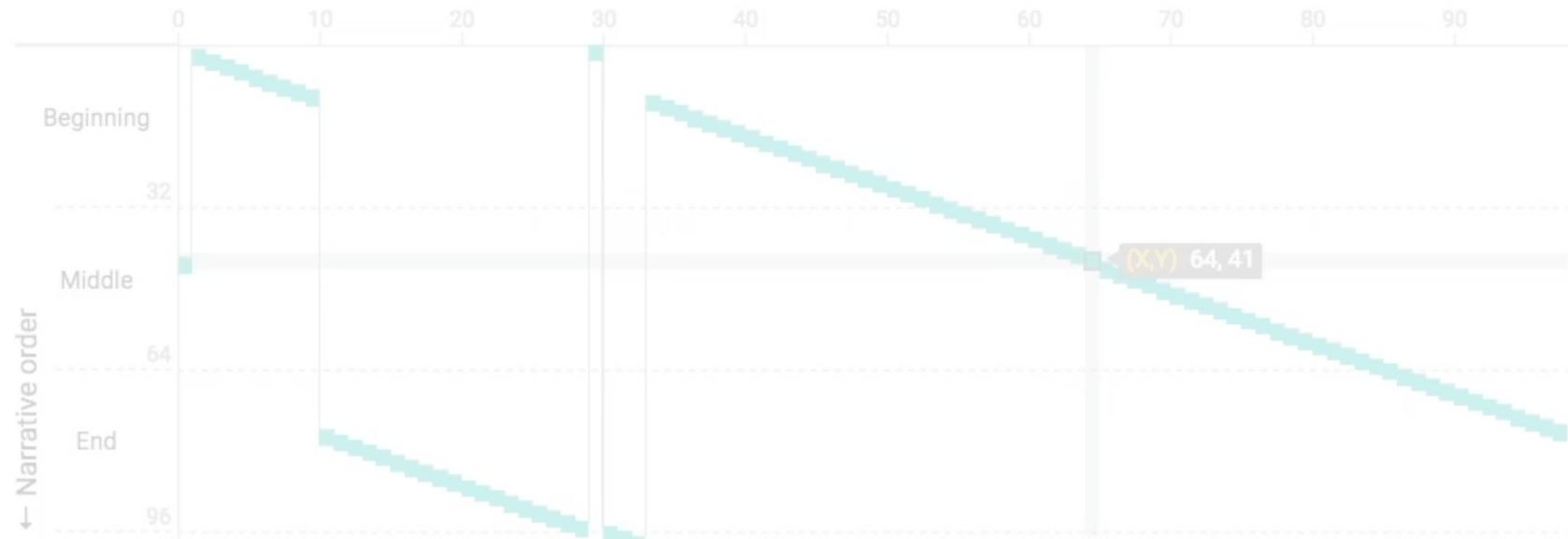
INT. COFFEE SHOP - MORNING
INT. '74 CHEVY (MOVING) - MORNING
INT. CHEVY (TRUNK) MORNING
EXT. APARTMENT BUILDING COURTYARD - MORNING
INT. RECEPTION AREA (APARTMENT BUILDING) - MORNING
INT. ELEVATOR - MORNING
INT. APARTMENT BUILDING HALLWAY MORNING
INT. APARTMENT (ROOM 49) - MORNING
MEDIUM SHOT BUTCH COOLIDGE
INT. CAR (MOVING) - DAY
EXT. SALLY LEROY'S - DAY
INT. SALLY LEROY'S - DAY
INT. LANCE'S HOUSE (KITCHEN) - NIGHT
INT. LANCE'S BEDROOM - NIGHT
EXT. MARSELLUS WALLACE'S HOUSE NIGHT
INT. MARCELLUS' HOUSE / LIVING ROOM - NIGHT
INT. MARCELLUS' HOUSE / DRESSING ROOM - NIGHT
INT. MARCELLUS' HOUSE / LIVING ROOM- NIGHT

Movie Script

# Pulp Fiction

Thriller, Crime | October 1994 | Directed by Quentin Tarantino | Nonlinearity 0.63 | [IMDB](#)

Scene Length RichView Characters

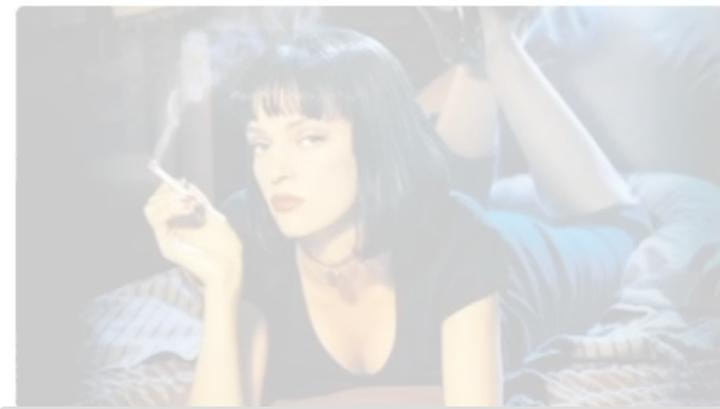


Characters

- Jules
- Vincent
- Butch
- Mia
- The Wolf
- Young Man
- Lance
- Fabienne

Location

- Coffee Shop
- Motel Room
- Jackrabbit Sli...
- Apartment Roo
- Time of Day
- Morning
- Night

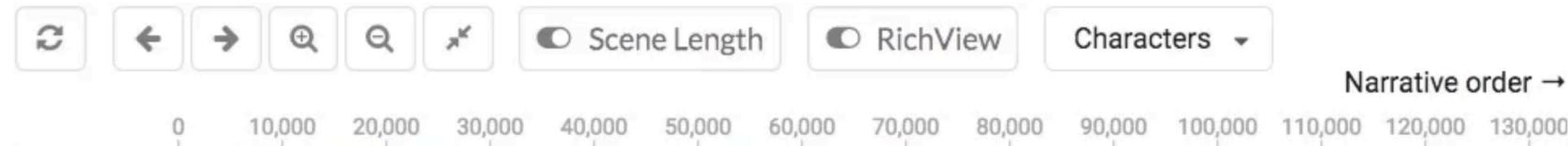


INT. SPARE ROOM
INT. VINCENT'S MALIBU (MOVING) - NIGHT
EXT. FRONT OF MARSELLUS WALLACE'S HOUSE - NIGHT
INT. LOCKER ROOM - NIGHT
EXT. ALLEY (RAINING) - NIGHT
INT. TAXI (PARKED/RAINING) - NIGHT
EXT. BOXING AUDITORIUM (RAINING) NIGHT
INT. TAXI (PARKED / RAINING) NIGHT
EXT. BOXING AUDITORIUM (RAINING) - NIGHT
INT. WILLIS LOCKER ROOM (AUDITORIUM) - NIGHT
INT. CAB (MOVING / RAINING) - NIGHT
EXT. PHONE BOOTH (RAINING) - NIGHT
EXT. MOTEL (STOPPED / RAINING) - NIGHT
INT. MOTEL (ROOM SIX) - NIGHT
INT. MOTEL ROOM
INT. MOTEL ROOM - MORNING
INT. HONDA (MOVING) - DAY
EXT. CITY STREET - DAY
EXT. RESIDENTIAL STREET CORNER - DAY

## Reconstruct the Chronological Order of Scenes

# Pulp Fiction

Thriller, Crime | October 1994 | Directed by Quentin Tarantino | Nonlinearity 0.63 | [IMDB](#)



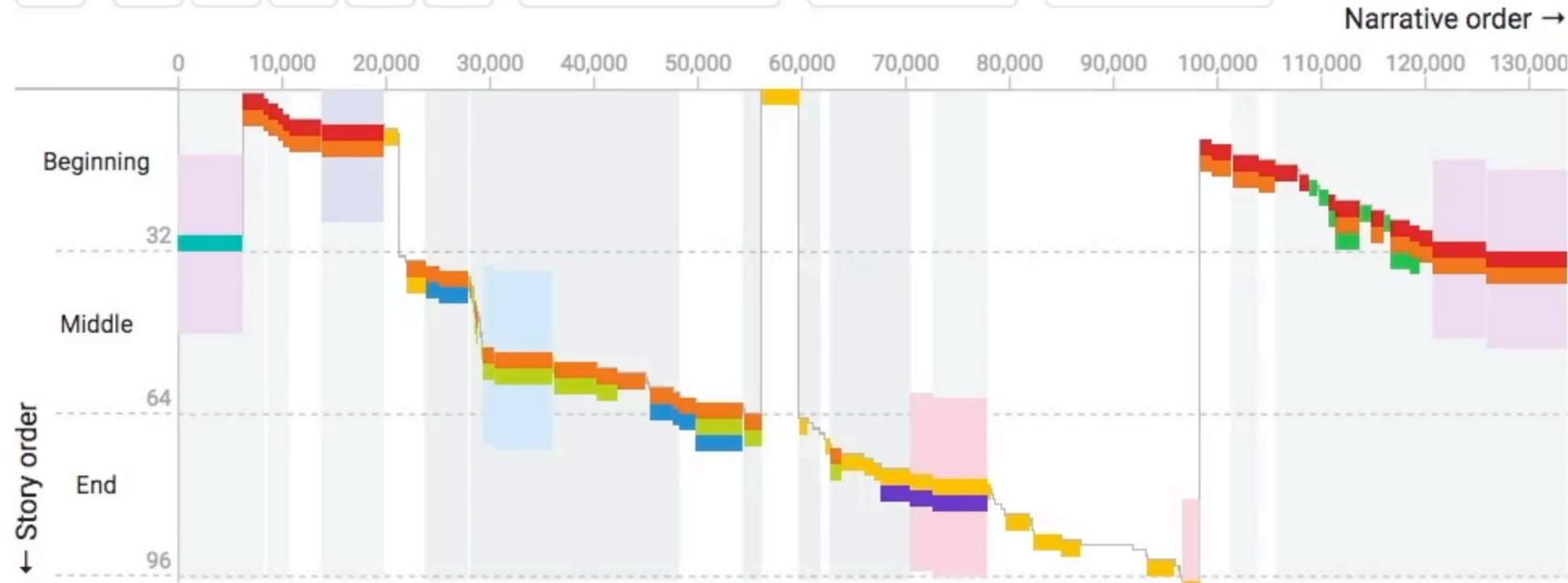
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Support Visual Exploration of Movie Scripts

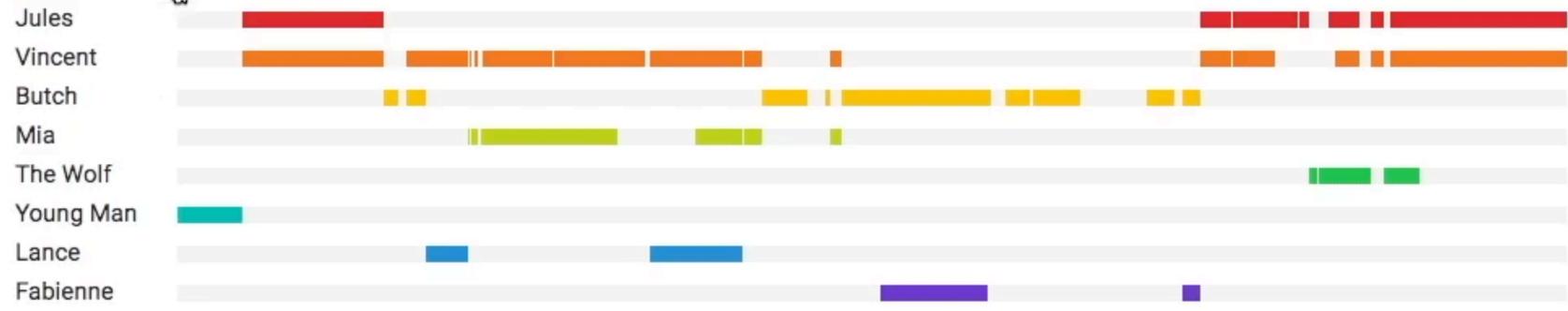
# Pulp Fiction

Thriller, Crime | October 1994 | Directed by Quentin Tarantino | Nonlinearity 0.63 | [IMDB](#)

Scene Length  RichView



## Characters



## Location



## Time of Day



EXT. FRONT OF MARSELLUS WALLACE'S HOUSE - NIGHT

**Vincent**

*Well I'm of the opinion that Marsellus can live his whole life and never hear of this incident.*

The Malibu pulls up to the front. Mia gets out without saying a word (still in a daze) and begins walking down the walkway toward her front door.

**Mia**

*Don't worry about it. If Marsellus ever heard of this, I'd be in as much trouble as you.*

Mia smiles. She turns around. Vincent's out of the car, standing on the walkway, a big distance between the two.

**Mia**

*What's yours?*

**Vincent**

*What are your thoughts on how to handle this?*

**Vincent**

*Mia!*

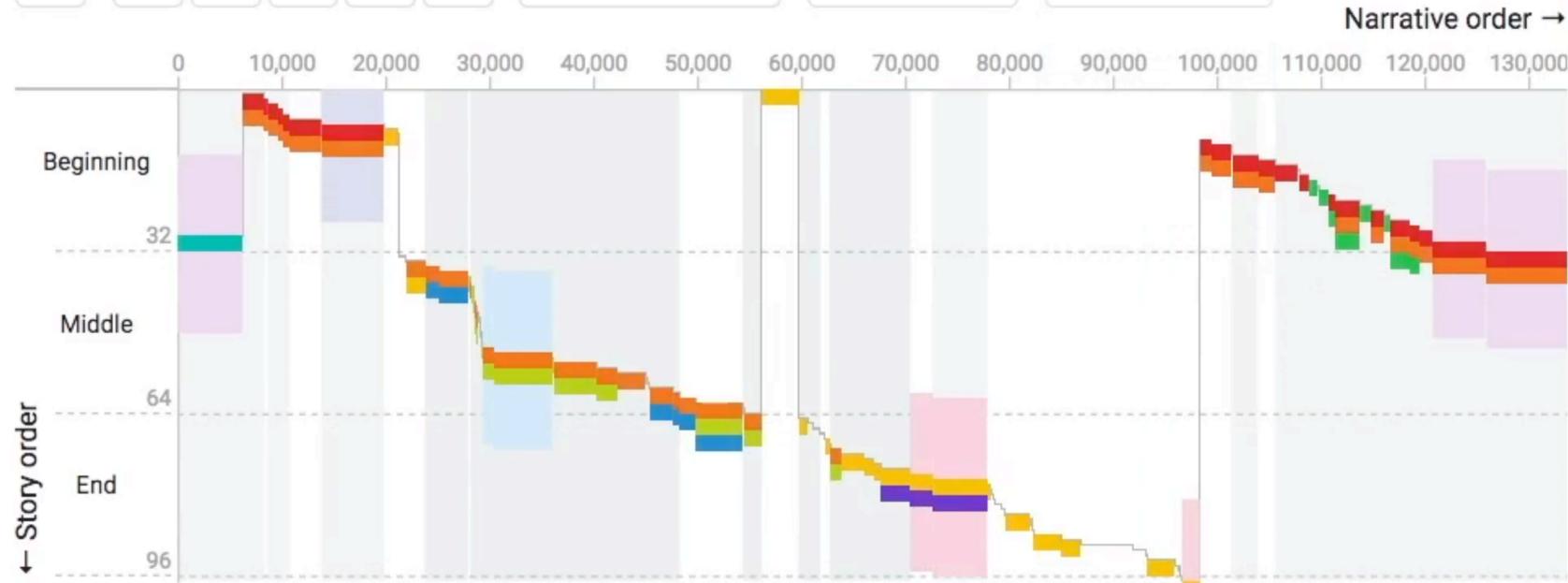
**Vincent**

*Let's shake on it*

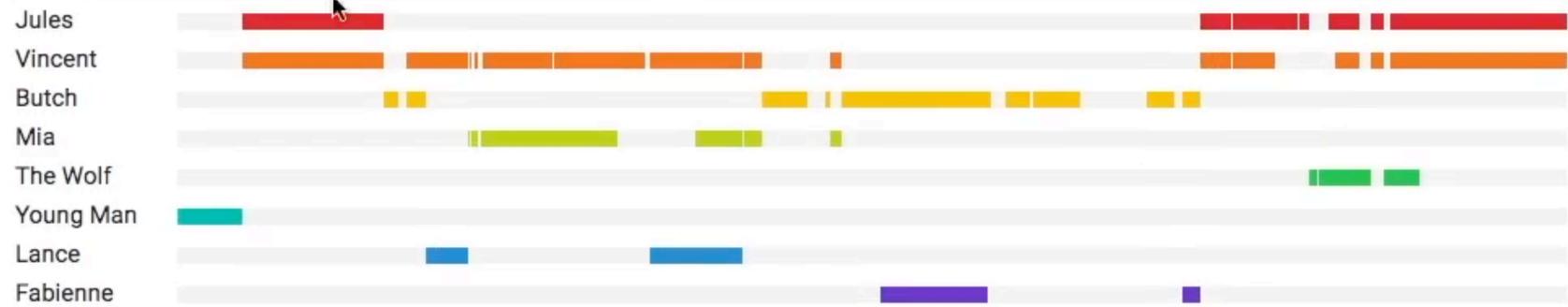
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Scene Length  RichView  Characters



## Characters



## Location



## Time of Day



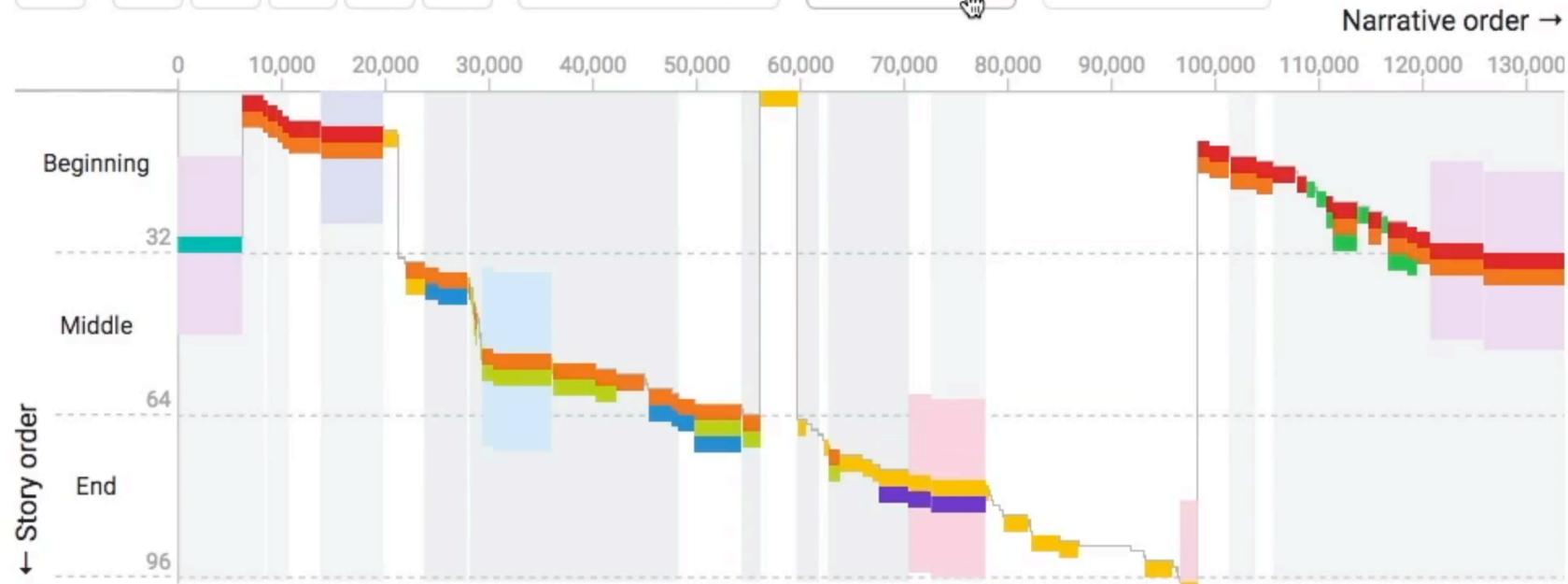
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# Pulp Fiction

Thriller, Crime | October 1994 | Directed by Quentin Tarantino

Show all metadata on the story curve

Navigation icons: Refresh, Previous, Next, Zoom In, Zoom Out, Full Screen, Scene Length, RichView, Characters



## Characters



## Location



## Time of Day



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# EXPERT EVALUATION

What are potential use cases of Story Explorer?

## Participants

- 3 Professional writers (W)
- 1 Literary scholar (L)

## Participants

- 3 Professional writers (W)
- 1 Literary scholar (L)

## Procedure

- Introduced Story Explorer
- Presented narrative patterns discovered
- Discussed potential use cases

Writer#1

*“The visuals look like **musical notes**. A literary work has also **rhythm**. It is fantastic to see the narrative structure in this way.”*

Writer#1

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Writer#1

*“Students often have a hard time writing **a good narrative** even if they have **a good story**. They especially **don't know how to use time well and often overuse flashbacks**. This tool can visually teach how time is manipulated in a narrative”*

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*“Students often have a hard time writing a **good narrative** even if they have a **good story**. They especially **don’t know how to use time well and often overuse flashbacks**. This tool can visually teach how time is manipulated in a narrative”*

Literary Scholar#1

*“In a TV series, people could use it to help **visualize the amount and type of nonlinearity** that is typical in early episodes. Similarly, it could help someone who rearrange the rendered scenes and **compare different arrangements of events**”*

# FUTURE WORK

## *Extensions to Different Aspects of Nonlinear Temporality*

- **Frequency**: repetitive descriptions of a single story event
- **Duration**: time taken to narrate a story event
- **Temporal paradoxes**: time loops & parallel timelines

# FUTURE WORK

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- *Frequency: repetitive descriptions of a single story event*
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- *Temporal paradoxes: time loops & parallel timelines*

## *Generalizations to Other Domains*

- *Other genres: theater plays, novels, video games, etc*

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## *Generalizations to Other Domains*

- *Other genres: theater plays, novels, video games, etc*

- ***Other data domains:***

***comparison of two orderings for the same set of elements***

- 1. Rankings in sports analytics*
- 2. Chromosome rearrangements in biology*

# storycurve.namwkim.org

Story Curves 첫 번째 사용자

storycurve.namwkim.org

Go to Story Explorer

Best viewed on Desktop

## Pulp Fiction

Thriller, Crime | October 1994 | Directed by Quentin Tarantino | Nonlinearity 0.63 | [IMDB](#)

Scene Length RichView Gender

Narrative order →

Beginning  
32  
Middle  
64  
End  
96

Story order ↓

### Characters

Jules	0 - 20,000	100,000 - 130,000	
Vincent	0 - 130,000	Vincent Male	
Butch	20,000 - 25,000	60,000 - 70,000	
Mia	30,000 - 40,000	60,000 - 70,000	Mia Female
The Wolf	100,000 - 110,000		
Young Man	0 - 10,000		

- EXT. VINCENT'S HOT ROD (MOVING) - NIGHT
- INT. VINCENT'S HOT ROD (MOVING) - NIGHT
- INT. LANCE'S HOUSE - NIGHT
- EXT. LANCE'S HOUSE - NIGHT
- INT. LANCE'S HOUSE NIGHT
- INT. SPARE ROOM
- INT. VINCENT'S MALIBU (MOVING) - NIGHT
- EXT. FRONT OF MARSELLUS WALLACE'S HOUSE - NIGHT

**Vincent**

*Well I'm of the opinion that Marsellus can live his whole life and never hear of this incident.*

The Malibu pulls up to the front. Mia gets out without