

Enhancing College Text Comprehension Through Brief Metalinguistic Training



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Background

Challenges in academic reading

- College students struggle with effective reading strategies despite the importance of academic reading proficiency. [1] [4]
- STEM texts present comprehension challenges due to content and distinct linguistic traits. [1] [4]
- Academic reading is important for success and a key pathway into disciplinary discourse. [1] [4]

Reading proficiency is crucial for academic success.

- However, Students received little formal instruction in academic reading and did not update their reading strategies to engage deeply with assigned texts during college. [2] [3]

Research Question

Does metalinguistic training improve reading comprehension of complex scientific texts?

Theoretical Framework: Systematic Functional Linguistics (SFL) [5] [6] [7]

- Language understood as a social semiotic system
- Enables us to construct and organize ideas, communicate experiences, and make sense of the world
- Focuses on language in social contexts and how grammar serves specific communicative purposes.

SFL and Reading Comprehension

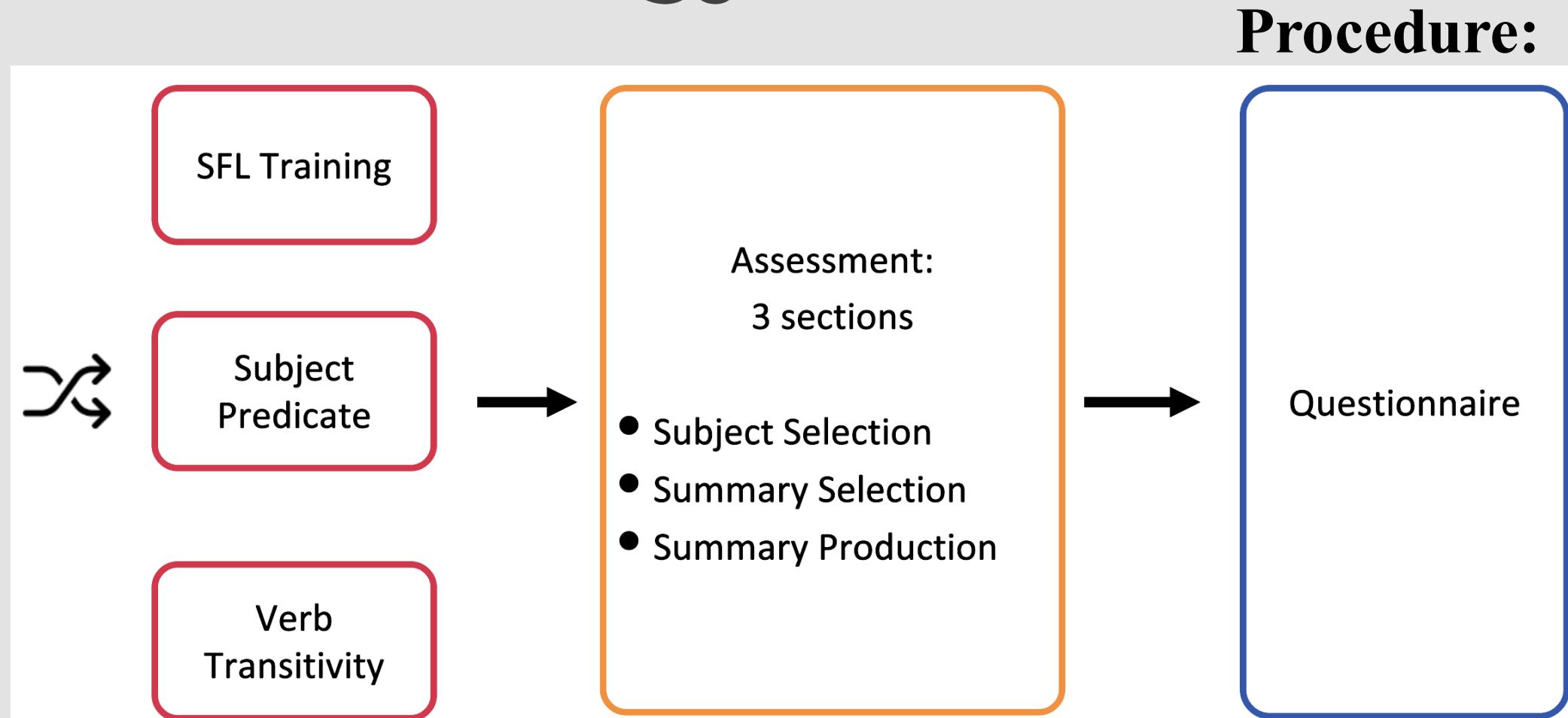
- Supports comprehension of difficult texts through meaning-based metalinguistic knowledge.
- The **textual metafunction** is most relevant for this study. It refers to the language's role in creating cohesive text.
- Analyzing the thematic progression (TP) in text enhances understanding of complex material .
- TP is the way information flows across independent clauses in text.
- Three types of TP: constant theme, zigzag patterning, and split rheme. This study utilized , zigzag patterning.

[5] [6] [7] [8]



Lab website:
<https://www.languagelearningandteachinglab.org/>

Methodology



SFL Training:

- Strategies for analyzing elaborations of subject-predicate patterns across independent clauses
- Thematic Progression Analysis: Identify Zig-zag patterns, where the rheme of one clause becomes the theme of the next, creating a logical chain.

Subject Predicate:

- Understanding different types of subjects and predicates
- Identifying the subject and predicate within a sentence to comprehend its structure

Verb Transitivity

- How sentences can be separated into chunks
- Three types of Verb Transitivity: Transitive verbs, Ditransitive verbs, Intransitive verbs

Measures: Subject selection, Summary Selection &Summary Production

A set of items comprised of 3-4 sentence-long passages from a college-level evolutionary biology textbook with zig zag patterns

Thematic Progression: Zigzag Pattern

Unit	Theme Complete Subject	Rheme Complete Predicate
1	The most common type of clay	is earthware.
2	Earthware clay	needs firing to temperatures of between 1000-1800 C
3	These high temperatures	result in a smooth, hard surface
4	The surface	is perfect for painted designs or mosaic finishes.

Participants: 133 participants (after screening)
44 (SFL), 35 (Subject-Predicate), 54 (Verb Transitivity)

Software: R stats package was used for all models

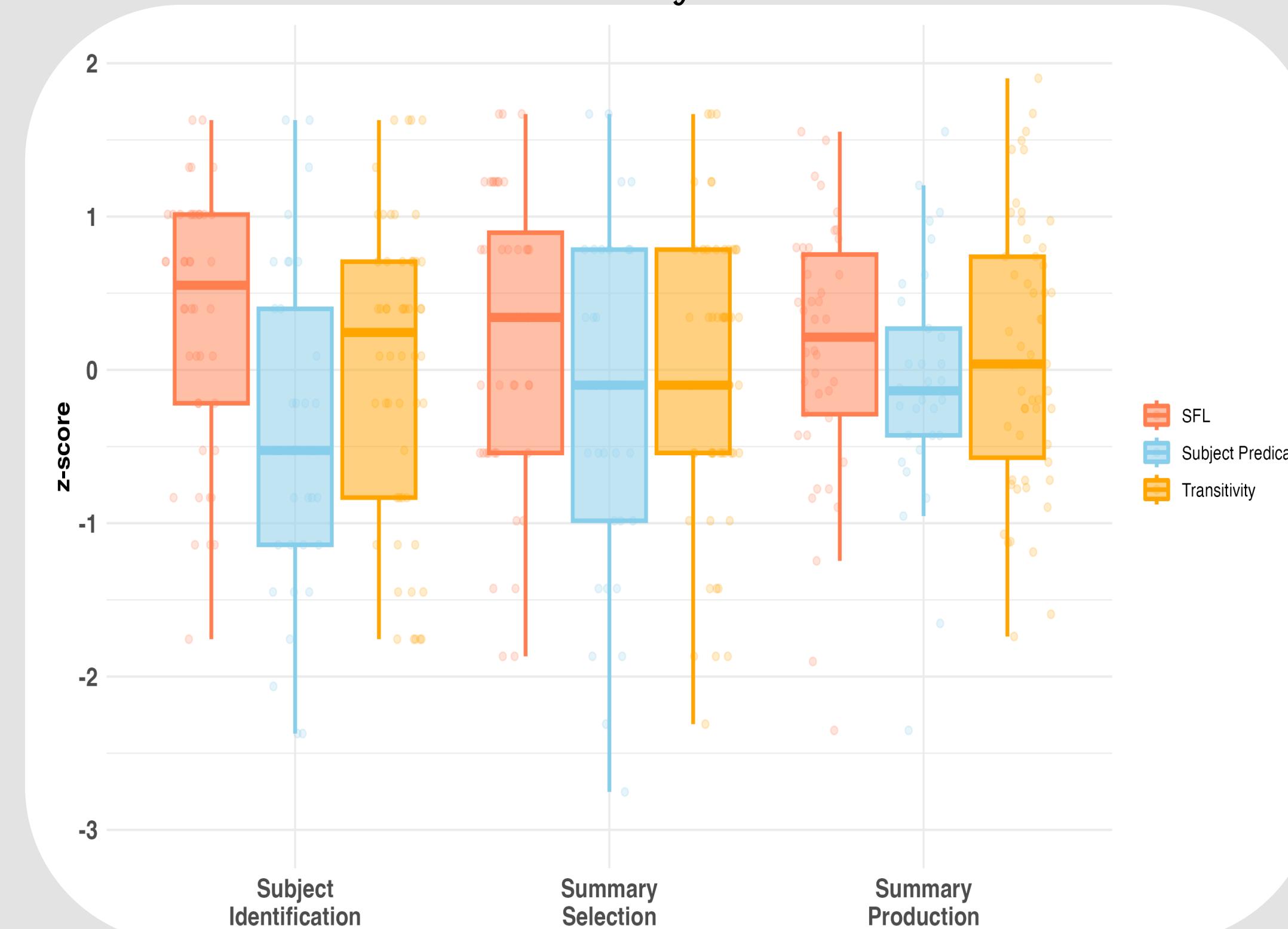
- Generalized linear model (GLM) for Subject Identification & Summary Selection.
- Linear mixed effect model (LM) for Summary Production.

Results

Model Results for Three Assessments

	Estimate	Std. Error	z-value	Pr (> z)
<i>Subject Identification</i>				
Subject-Predicate	-0.702	0.124	-5.645	<0.001
Verb Transitivity	-0.327	0.116	-2.815	0.004
<i>Paragraph Summary Selection</i>				
Subject-Predicate	-0.515	0.154	-3.332	<0.001
Verb Transitivity	-0.167	0.141	-1.183	0.236
<i>Paragraph Summary Production</i>				
Subject-Predicate	-0.454	0.107	-4.208	<0.001
Verb Transitivity	-0.075	0.096	-0.778	0.436

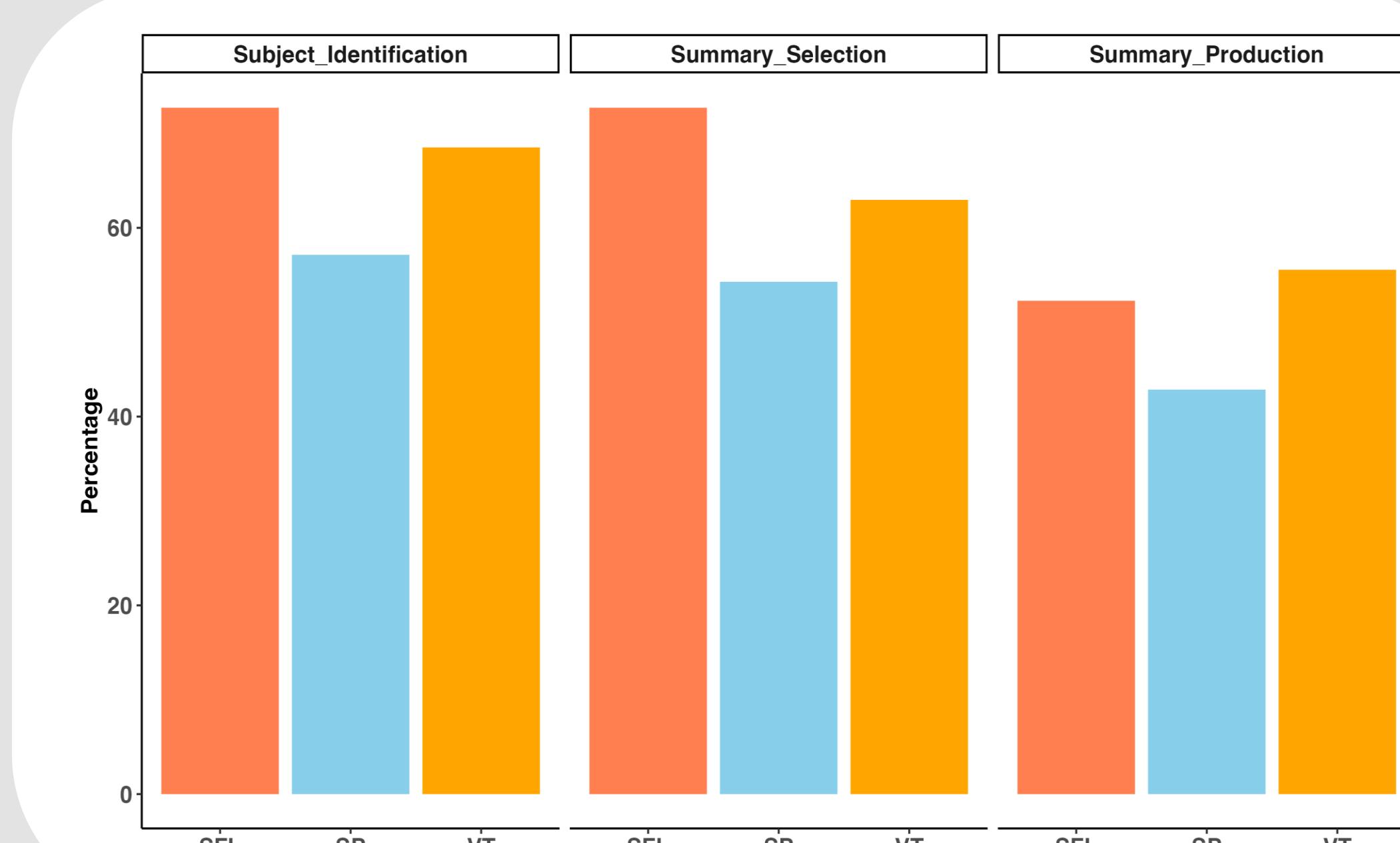
Z-Score Distributions by Treatment & Section



Key Finding:

- SFL group had higher mean scores across all three measures
- Significant difference between SFL and SP conditions.
- VT group showed better performance than SP in the Subject identification and summary production section

Helpfulness of Training Across Three Tasks by Treatment



Key Finding:

- Participants reported SFL training as more helpful
- SP condition was reported as least favorable.

Conclusion

- Metalinguistic content improved reading comprehension.
- Both SFL and Verb Transitivity positively impacted comprehension perhaps due to their higher emphasis on meaning than Subject-predicate training.
- Limited differences between SFL and Verb Transitivity conditions may be due to both foregrounding meaning. For shorter paragraphs, less emphasis on meaning is necessary.
- Non-significant difference could also be due to reliance on multiple cues (syntax, semantics, lexical frequency, predictability) without reaching the context level.

Limitations

- Short passages (3-4 sentences)
- Brief training sessions (only 12-14 minutes)
- Missing no-training condition
- Training only focused on exclusively on the zig-zag pattern of thematic progression, more may be needed.
- Fatigue towards the end of the study

Implications

- Integrate approaches like SFL to provide a holistic framework for understanding language as a resource for meaning-making
- Emphasize the role of metalinguistic awareness in effective reading practices
- Tailor instructional strategies to reflect the multifaceted nature of academic reading

References

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