Exploring Test-taking Processes in a While-listening Performance Test with Previewed Questions

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TESTING ENTERPRISES
Paragon

While-listening Performance Tests

- While-listening performance tests & Post-listening tests
    - While-listening: CAEL CE, IELTS
    - Post-listening: TOEFL, CELPIP

While-listening performance tests → Question previewing

Question Previewing in Listening Tests

- Format of previewing
  - Question+Option vs. Question-only vs. Option-only (Koyama, Sun, & Ockey, 2016; Yanagawa & Green, 2008)

- The need for question preview in listening tests
  - \+ Provide a purpose for listening (Buck, 1995; Sherman, 1997)
  - \- May change the way test-takers process input (Hughes, 2003)

- Effects of question preview
  - \+ Benefited low-proficiency test-takers (Sherman, 1997)
  - \+ Benefited advanced learners only (Chang & Read, 2006; Wu, 1998)
  - \+ Benefited the test takers of both levels (Koyama et al., 2016)
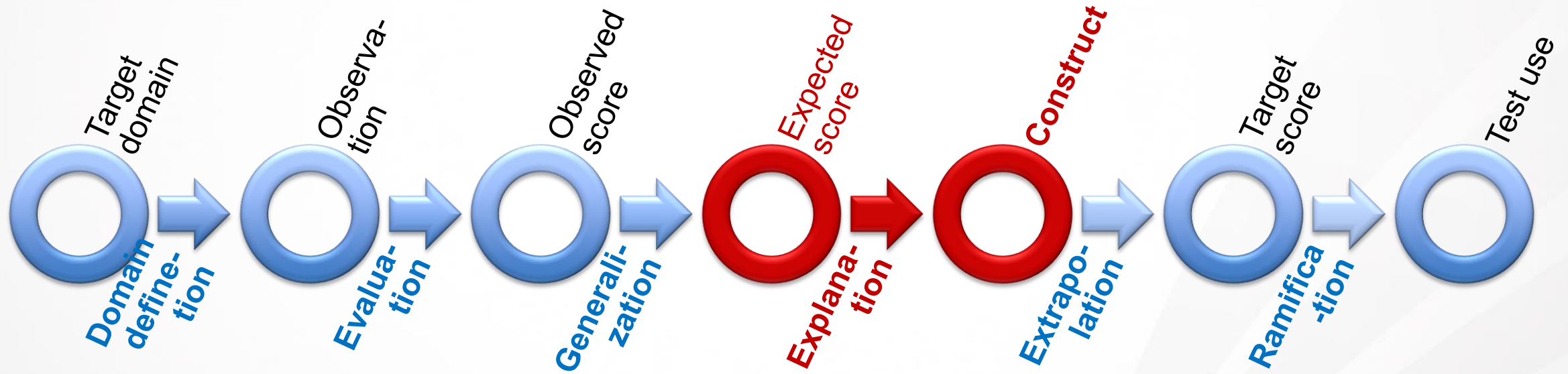
Listening Comprehension

- Conceptualization of listening comprehension
  - Subskill-based
    - Listening for local information, comprehending global information, making inference
  - Strategy-based
    - Cognitive strategies & metacognitive strategies
  - Cognitive process-based
    - Bottom-up & top-down processing
    - Controlled processes & Automatic processes (Field, 2013; Green, 2017)
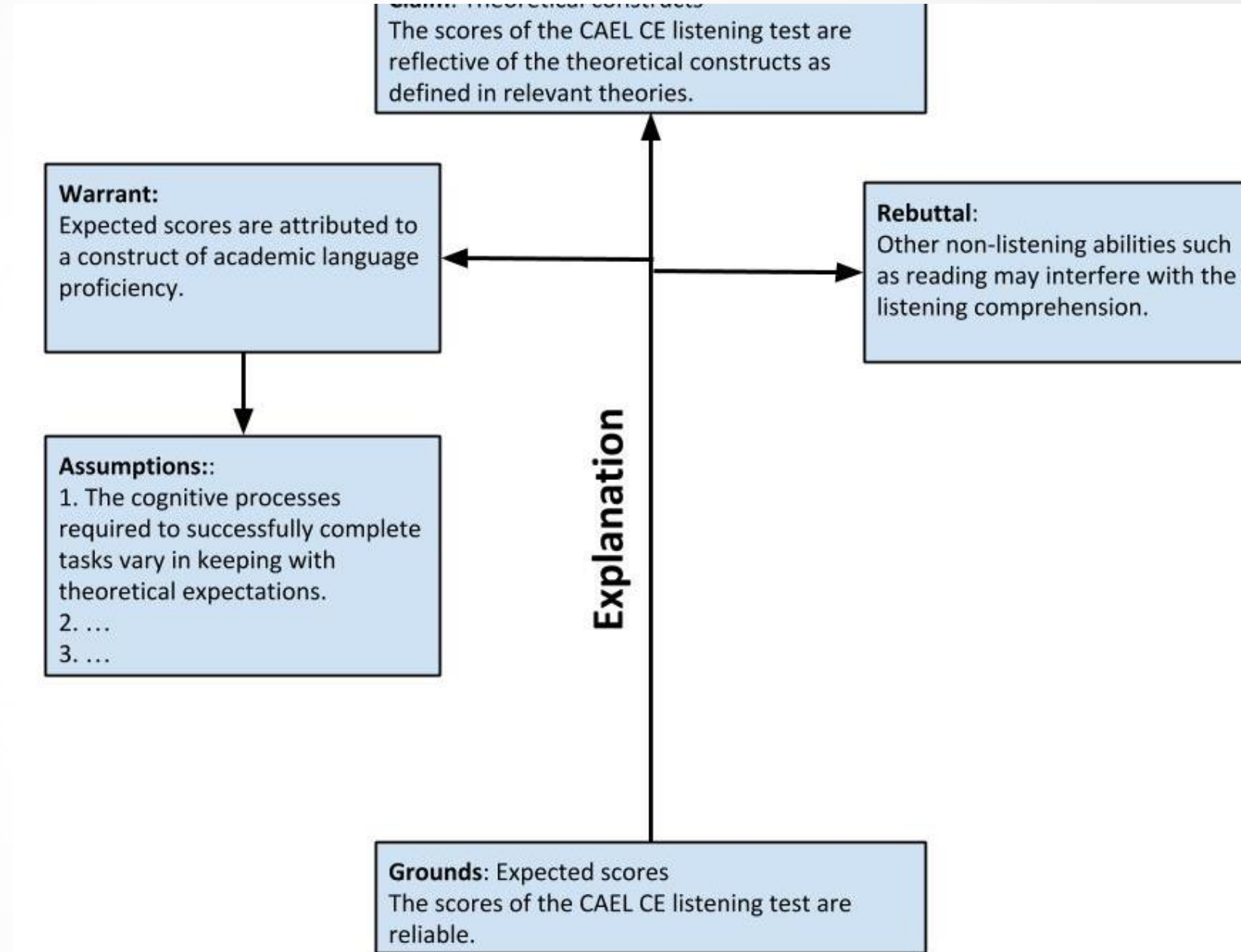   - Automaticity in second language processing (Segalowitz, 2008)

Responding Processes in While-listening Tests

- Field (2013, p. 106-107)
  - *The importance of automaticity in all these processes cannot be overstated. … If a basic operation like matching a set of speech sounds to a word requires an effort of attention, it imposes demands upon a listener's working memory that can preclude other operations. By contrast, when the mapping from word to word senses is highly automatic, working memory resources are freed for higher-level processes such as making inferences, interpreting the speaker's intentions, recognising a line of argument and so on.*

- Lots of studies on listening strategies, but few on responding processes

Argument-based Approach to Validation

Explanation Inference

Claim: Theoretical constructs
The scores of the CAEL CE listening test are reflective of the theoretical constructs as defined in relevant theories.

Warrant:
Expected scores are attributed to a construct of academic language proficiency.

Rebuttal:
Other non-listening abilities such as reading may interfere with the listening comprehension.

Assumptions::
1. The cognitive processes required to successfully complete tasks vary in keeping with theoretical expectations.
2. …
3. …

Explanation

Grounds: Expected scores
The scores of the CAEL CE listening test are reliable.

Research Questions

- 1). To what extent do test takers of different listening proficiency levels differ in their question previewing behaviors?
- 2). To what extent do test takers of different listening proficiency levels differ in their responding processes?

The CAEL CE Listening Test

- The Canadian Academic English Language (CAEL) Test, Computer Edition (CE)
  - An integrated and topic-based test of English for academic purposes (https://www.cael.ca/)
  - Five Parts delivered on computers:
    - Speaking, Integrated Reading, Integrated Listening, Academic Unit A, and Academic Unit B
  - One of the three long listening testlets used in this study
    - While-listening performance test
    - Mini-lecture on an academic topic

The CAEL CE Listening Test – Sample Interface

An audio clip will play automatically after the preparation time.

Preparation Time

🕐 **134**

second(s)

← 1 2 [3] 4 →

5. Fill in the blank with one word from the lecture.
A diagram is a type of [▼] model.

6. The instructor mentions "cultural impact on consumers' behaviour" as what kind of factor in modeling economic activities?

○ a common factor

○ a neglected factor

○ a decisive factor

○ an outcome factor

7. What is the "one-size-fits-all" issue in economic modeling concerned with?

○ the experience of economists

○ the types of models

○ the history of economics

○ the application of models

Note: This is a screenshot of an example listening test.

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The CAEL CE Listening Test – An Example Testlet

- Subskills
  - Comprehending local information (6 Items)
  - Comprehending global information (3 Items)
  - Making inferences (2 Items)
- Item formats
  - MCQ with 4 options (drop-down menu & regular layout)
  - Other formats (not in this testlet): Matching, Fill-in-the-blank

Topic	Duration of Question Preview	Duration of Lecture	Duration of Post-lecture Time	Item Configuration
Psychology	2 min. 30 sec.	5 min. 48 sec.	2 min.	P1: 1, 2, 3; P2: 4, 5; P3: 6, 7, 8; P4: 9, 10, 11

The CAEL CE Listening Test – An Example Testlet

104 Participants (after excluding 10 outliers) recruited for a pilot test

– Low (n=35): Average 27.8 (out of 100), SD 7.5

– Mid (n=34): Average 50.3 (out of 100), SD 7.5

– High (n=35): Average 81.2 (out of 100), SD 10.0

Data Collection and Analysis

- Data
  - Test score data
 - Timestamped behavior log data

- Analysis
  - State Sequence Analysis using R Package *TraMineR* (Gabadinho et al., 2011)
  - Visual examination of question-previewing behaviors and responding processes
  - Non-parametric tests for the comparison of time allotments in the question-previewing stage
  - Non-parametric tests for the comparison of time allotments in the lecture stage
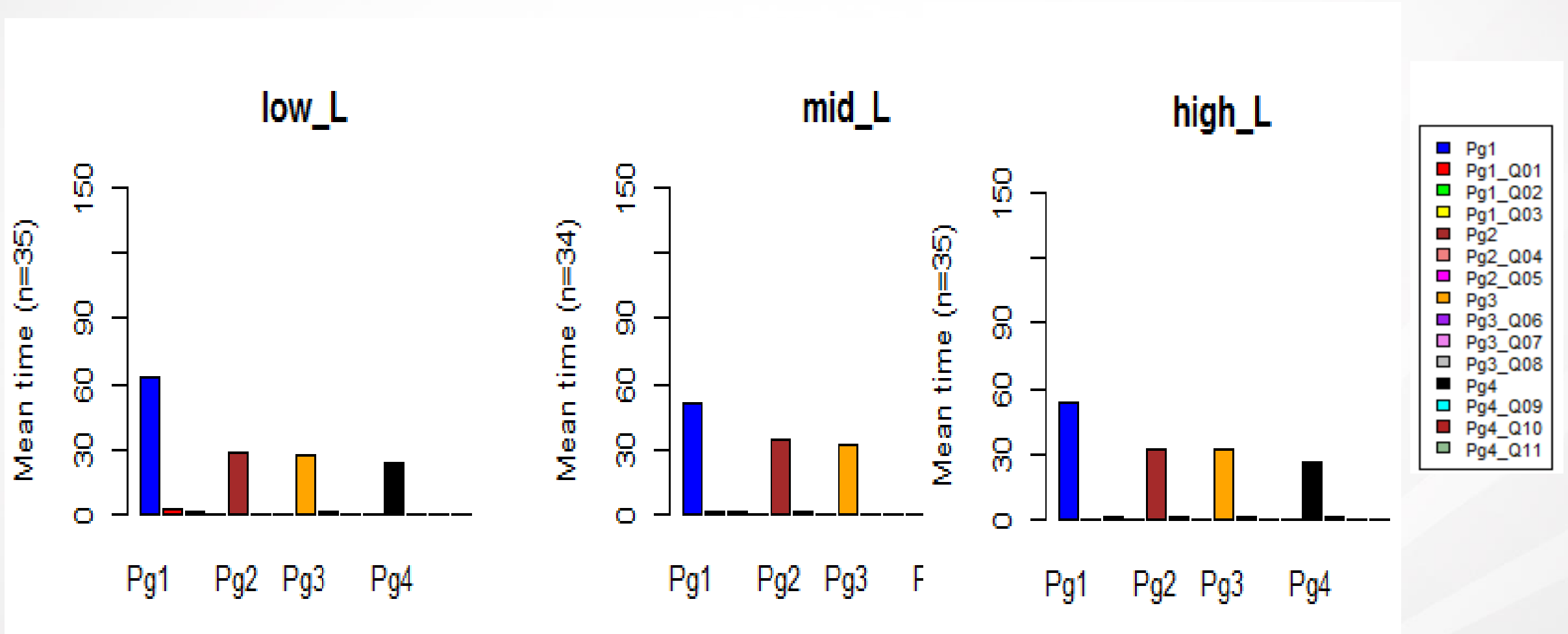
Question-previewing Behaviors
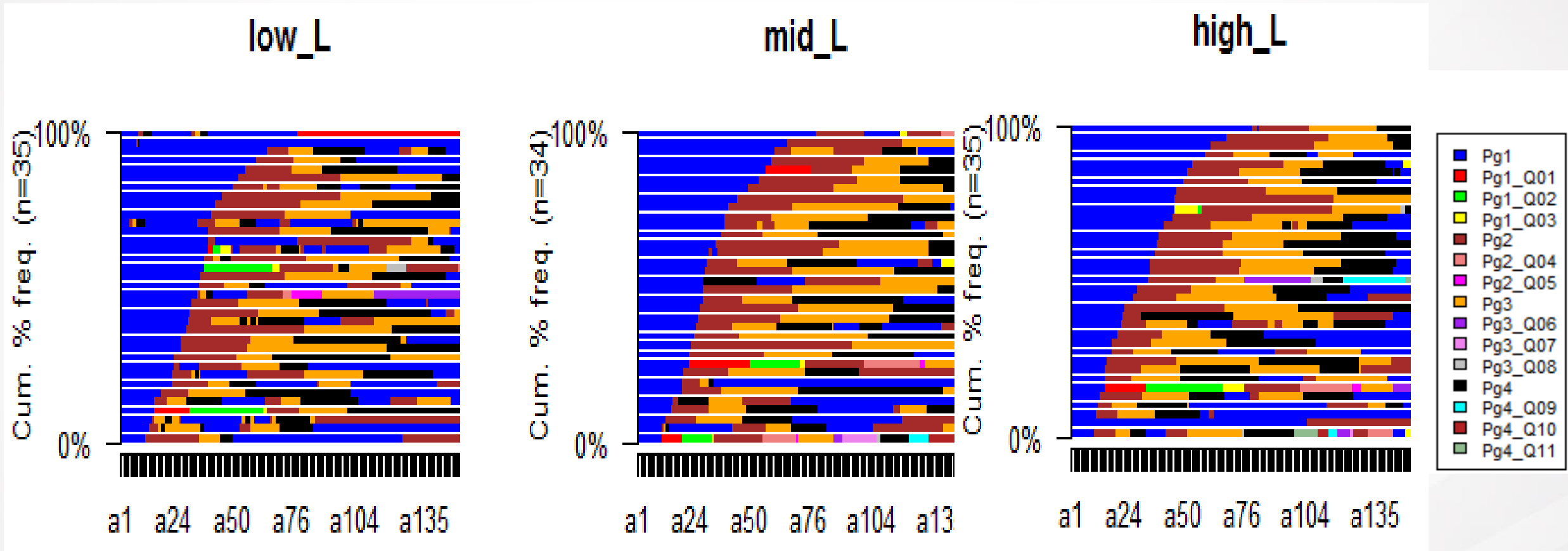
Sequence frequency plot for each group in the question-preview stage

Question-previewing Behaviors
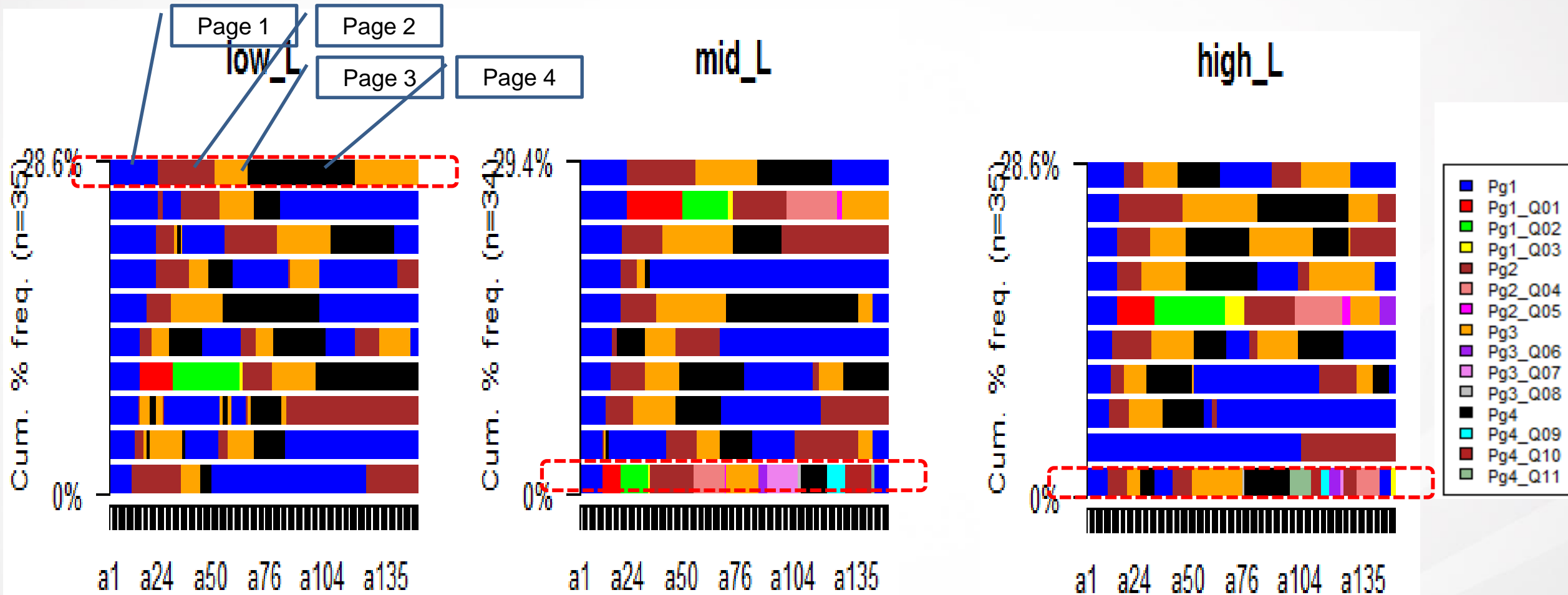
Sequence frequency plot for the first 10 cases in each group in the question-preview stage

# Question-previewing Behaviors – Time Allotment

Average time allotment during the question-preview stage

Summary: Question-previewing Behaviors

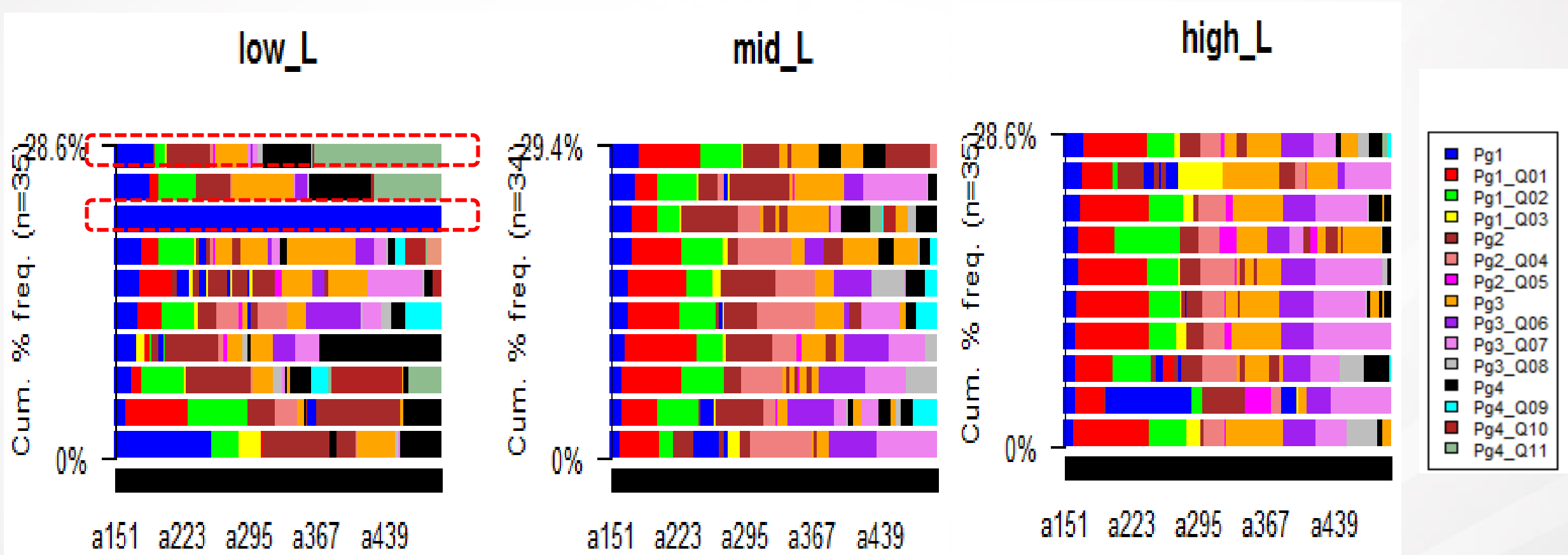- All the test takers could complete previewing the questions

- Different preview approaches are observed.

- There were no significant differences in terms of time allotment among the three proficiency groups

Responding Processes
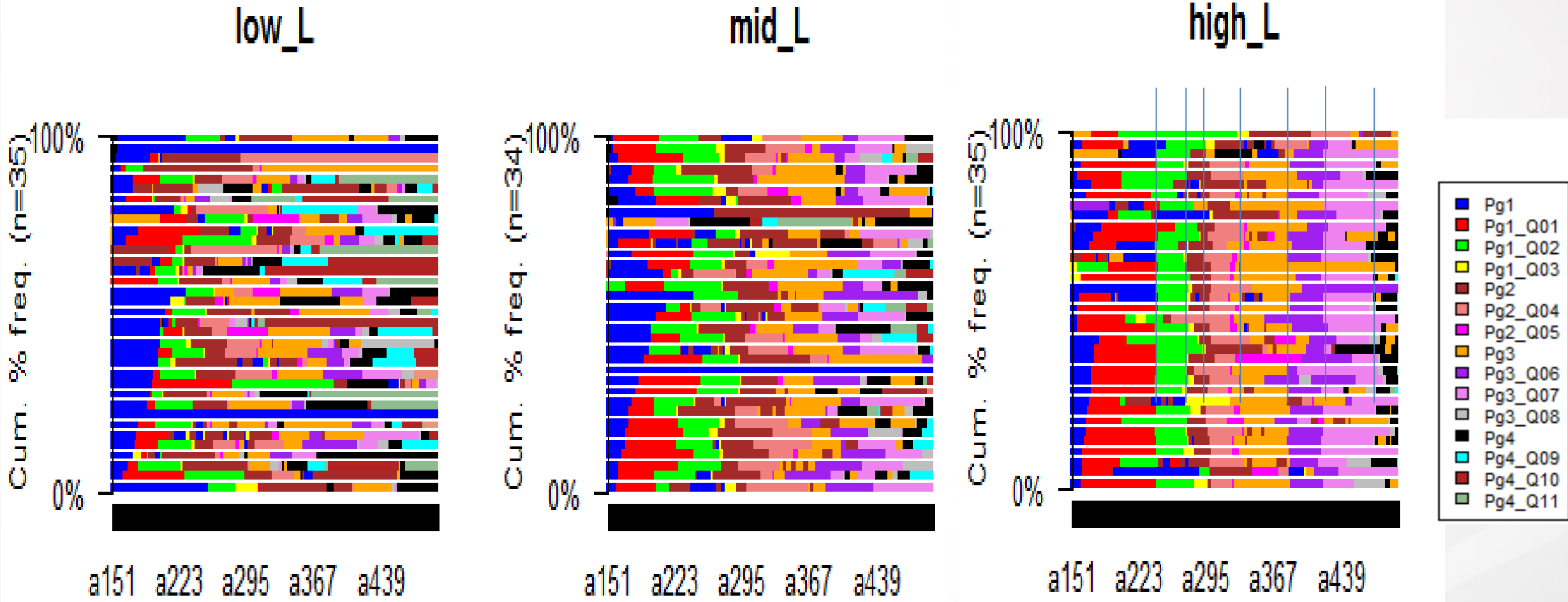
Sequence frequency plot for the ALL cases in each group in the lecture stage

Responding Processes

Sequence frequency plot for the first 10 cases in each group in the lecture stage

Responding Processes – Time Allotments

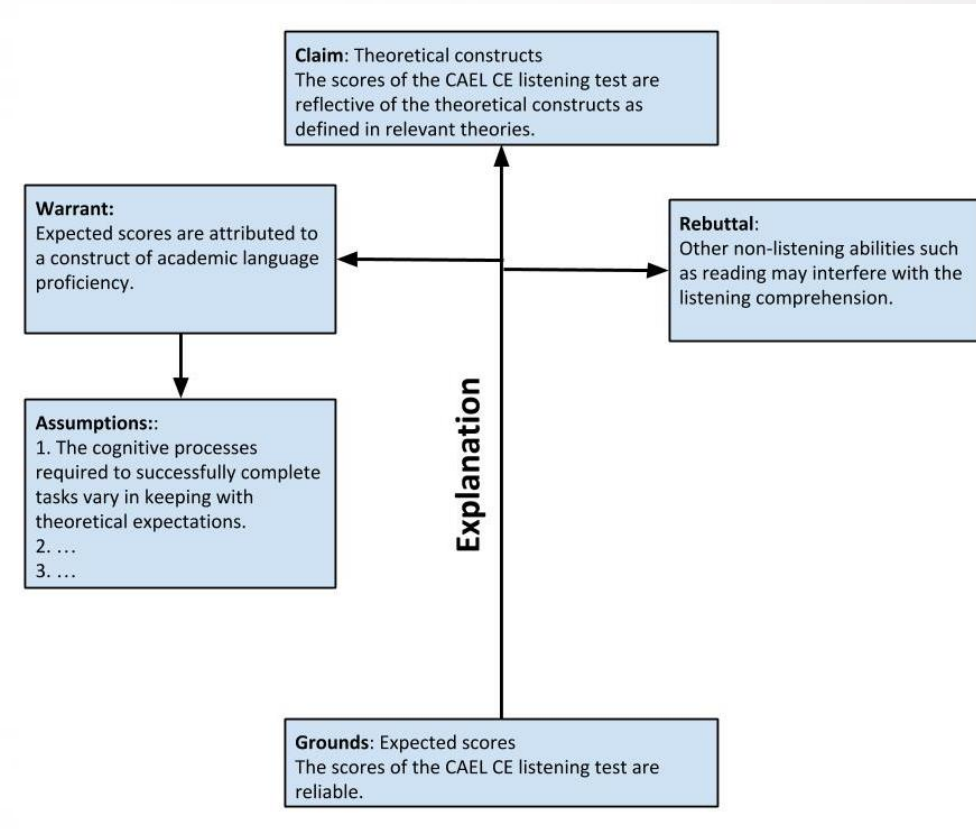| Item	Subskill	Item Format	Difficulty	Discrimi-nation	Difference in Time Allotments
2	Global	In-line Choice	0.43	0.54	H > M&L
3	Local	In-line Choice	0.51	0.27	H > M&L
5	Global	MCQ	0.30	0.47	H < M&L
7	Local	MCQ	0.63	0.37	H > M&L
8	Local	In-line Choice	0.26	0.33	H > M&L

Note: H: High proficiency group; M = Medium proficiency group; L = Low proficiency group

Summary: Responding Processes

- Noticeable responding patterns or progression patterns were observed among the three proficiency groups

- High-performing group seemed to be able to follow closely with the lecture and respond to items in a more timely manner.

- There were some differences in the time allotment on individual items in the test. More investigations are needed to find out what caused these differences.

Explanation Inference

- The results in this study lend support or backing to the assumption (RQ2), while providing evidence to partially refute the rebuttal (RQ1).

- Implications

- More studies are needed to study other relevant assumptions for this inference.

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Limitations & Future Studies

- The participants
  - Limited demographic information
  - Possible variations in the motivation levels in this pilot test

- The testlet
  - Single test -> limited generalizability
  - The need to study the relationship between item quality and responding processes

Thank you!
Questions & Comments?

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